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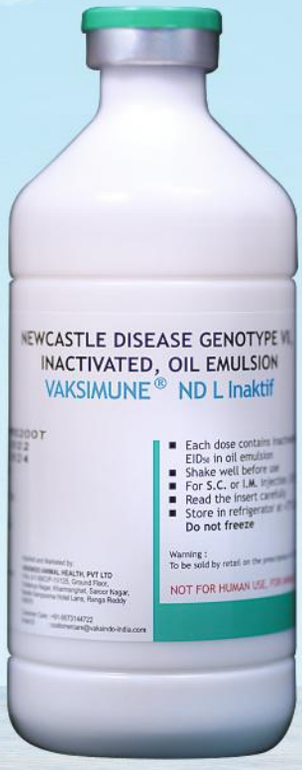

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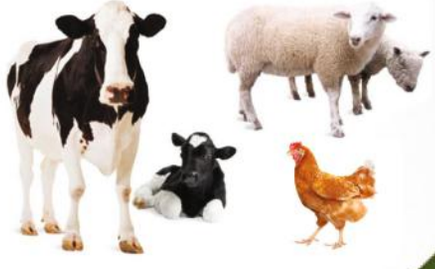

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Treating Life Naturally

From the Editor's Desk

Fake-Istan

The unexpected failure of PSLV – EOS – 09 is indeed heart breaking. There was no predictable reason for this mission failure. The latest suspect is the involvement and possible sabotage by our enemy countries. Of course, the matter is under investigation and soon the truth will be out.

India is a country that will not accept defeat and gets stronger with every challenge. That comes its way as it has already proven itself now.

It was very clear that to fight a war, India can never depend on real-time support from foreign weapon suppliers, as was proven in history. This prepared India to be self-dependent and also produce its own high technology weapons and make in India even to Schuring, the global standards. The victory over Pakistan recently is an excellent demonstration of India's local manufacturing capability.

With the active social media, for the first time, the aware Indian is now knowledgeable about how the international media manipulates information to malign and control India. While India beat Pakistan Hollow in less than four days to make it a historic case globally, it was projected as a Pakistani victory, which is ridiculous. Shocking, how can the whole world be blind to the facts? Are there no truthful global media in existence anymore? Is the deep state so deeply seated that it manipulates the global truth? All these points for the Indian intelligentsia to ponder.

The so-called International Monetary Fund dares to release a terrorist state like Pakistan, fuelling. Further terrorism – the whole world is a silent witness to such a crime, exposing the double standards that they practice in this dirty politics, which is clearly against humanity. India exposed by destroying the terror camps before the bailout, but the IMF chose not to acknowledge this barbaric terrorism and simply called it an attack, just to prevent any obstacle to the release of the IMF fund. The USA chose to happily recommend the bailout to Pakistan, clearly exposing double standards on the one hand, claiming to fight terror, and on the other, funding this terror.

Pakistan was born with no clear identity and is managing to fly in the sky rudderless. It has dreams to represent and lead the Islamic countries with its nuclear arsenal, but has miserably failed to garner any kind of support from the Islamic countries due to fake narratives, corruption, and lack of direction for the nation as a whole. The world is shocked in realising that there can also exist a country devoid of reality and living in a fake existence. Completely manoeuvred by their rulers.

The education system based on Madrasas has kept the young population with lower intelligence guided by religious control to meet the army's intentions. The militant C has become an integral part of the army to manage and control the nation, meeting the selfish greed and power of the rulers. Pakistan has become a laughing stock in the world as the whole nation lives in an imaginary world, far away from reality and controlled by the army and its conniving puppet rulers.

India today is a very bold, strong, and confident nation to defend itself against enemies of all kinds. The world has now come to recognise this. It is no more stopping India's rise as a military power as well. The high level of technology used in this war has earned a very great position among successful and powerful global military forces. There is a surge in the demand for weaponry loaded with technology in the global market.

The recent Poultry events are being very grandly organised with a lot of sponsorship to support them. The only matter of concern is that it is prohibitively expensive, discouraging the actual audience and participants from attending such programmes freely. The organisers must realise that all the grandeur will not yield the desired results in the absence of quality, audience, and participants.

The seasonal heat wave continues to take its to on the Poultry farmers. With advanced fast fast-growing feed and high-quality feed, the stress levels also get elevated, calling for a multilevel approach to fight the stress, not only the mechanical action of cooling fans. Fockers sprinklers to reduce the environmental temperature, but also the use of anti-stress feed additives, such as vitamin C and polyphenols, will play a good role in combating heat stress. Please rely on your related veterinarian or consultants to achieve the desired results.

The current challenge is not about tackling the external enemies, but rather the ones within the country in the form of betrayal for greed and power. It is disheartening to see some of the opposition in the country are no less than the external enemies in their actions and attitude.

Editor

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12.	Mercury	mg/kg	BLQ (LOG-0.1)	Max 1.0	FRAC/SOP/INST/066
26.	Aerobic plate count	cfu/g	<10	Not Specified	IS 5402 : 2012
27.	Enterobacteriaceae	cfu/g	<10	Not Specified	IS 17112 : Part-2 : 2019
28.	Salmonella	/25g	Absent	Not Specified	IS 5887 (Part-3) : 1999
29.	Listeria monocytogenes	/25g	Absent	Not Specified	IS 14986 : Part-1: 2020

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S.No.	Parameters	Unit	Results	Specification	Test Method
7.	Lead	mg/kg	BLQ (LOQ-0.1)	Max 2.5	FRAC/SOP/INST/066

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हर पोल्ट्री फार्म को हमने चूहा या चुहिया (RAT & MICE) का ब्रीडिंग फार्म बना रखा है। क्या यहाँ भी जेहाद करना होगा ?

हर पोल्ट्री फार्म को हमने चूहा या चुहिया (RAT & MICE) का ब्रीडिंग फार्म बना रखा है। क्या यहाँ भी जेहाद करना होगा ?

अजीब विडम्बना है भारत के सभी पोल्ट्री फार्म, ब्रायलर, लेयर एवं पेरेंट ब्रीडिंग फार्म के साथ–साथ चूहों का ब्रीडिंग फार्म भी बना रखा है। एक जमाना था कि सदियों तक हम गॉव शहर छोड़ कर भाग जाते थे, जब वह 'प्लेग' नामी बिमारी फैलाता थी। यह बीमारी फैलाने वाला या कारण चूहा था। आज इस दुश्मन को हमने रहने और खाने–पीने की सुविधा के साथ बढ़िया आश्रय दे रखा है, जहां बढ़िया संतुलित आहार हर समय बहुत आसानी से उपलब्ध है।

मुझे याद है सन् 1966 में जब मैं रानी शेवर पोल्ट्री ब्रीडिंग फार्म पर नया–नया आया था तो स्वर्गीय जनरल नेहरा सप्ताह में एक या दो बार पूरे फार्म का राउंड लेते थे। हैचरी से शुरू कर फीड मिल होते हुए एग रूम, ब्रूडिंग, ग्रोइंग और अंत में लेइंग यूनिट का राउंड लेते थे। उनके साथ हर यूनिट में जाना पड़ता था। फीड मिल के इंचार्ज एक सूबेदार मेजर थे। वह अटेंशन खड़े हो जाते। जनरल साहब पहले वहां की सफाई देख कर, उनकी तारीफ करते, फिर तुरंत चूहे पर आ जाते – "कितने हैं?" जवाब होता "सर एक है"। "ओ ब्लूडीफूल हर बार तुम एक बताते हो– ट्रैप क्यों नहीं लगाते?"

हर शेड में यह सवाल जरूर होता। जनरल साहब कोई पोल्ट्री एक्सपर्ट नहीं थे परन्तु आर्मी की ट्रेनिंग ने उन्हें कॉमन सेंस या जनरल सेंस बहुत दे रखा था। उनसे बहुत कुछ सीखने को मिला, विशेष रूप से फार्म एडमिनिस्ट्रेशन के क्षेत्र। आज जब यह लेख लिख रहा हूँ तो उनकी याद आ रही है। उन्होंने चूहों के खिलाफ 'जेहाद' छेड़ रखा था, आज से लगभग 60 साल पहले आज हम यह जेहाद चूहों के खिलाफ क्यों नहीं छेड़ते? इस जेहाद की क्यों बहुत जरूरत है ? आगे आपको पता चल जायेगा।

क्या आप जानते हैं कि हमारे यहाँ मुख्य रूप से चूहों की दो प्रकार की नस्लें हैं? आम भाषा में बात करें तो चूहा एक बड़ी नस्ल है जिसे हम रैट (RAT) कहते हैं और दूसरी चुहिया जिसे हम (MICE) कहते हैं। यह काफी छोटी होती है, बड़े चूहे की लगभग एक चौथाई।

क्या आप जानते हैं कि यदि आपके फार्म पर एक चूहे के जोड़े ने आशियाना बना लिया तो बहुत जल्दी ही उसकी एक लम्बी–चौड़ी फौज खड़ी हो जाएगी? हाँ जी। यह एक जोड़ा साल में 6–7 बार बच्चों को जन्म देगी और हर बार 8–10 बच्चे होंगे।

क्या आप जानते हैं यह बच्चे 3–4 महीने में माँ–बाप बन जायेंगे? इसके बाद यह भी अपनी माँ– बाप की तरह बहुत तेजी से प्रजनन करेंगे। गुणा भाग करके देख लें इस एक जोड़े ने आपके फार्म पर एक साल में ही कितनी बड़ी फौज खड़ी कर दी। उसे हर साल दुगनी नहीं बल्कि तिगुनी–चौगुनी बढ़ोत्तरी होगी।

क्या आप जानते हैं इस फौज का सारा खर्च कौन उठा रहा है ? जी हाँ, आप उठा रहे हैं।

क्या आपको मालूम है कि एक चूहा (RAT) साल में कितना फीड खाता है, बर्बाद करता और चुराता है ? यह लगभग 18–20 किलोग्राम संतुलित आहार है। इसके मुकाबले चुहिया (MICE) लगभग 4 किलोग्राम पर ही निर्वाह कर लेती है। चोरी इसलिए करते है कि बुरे दिन के लिए, बरसात, बहुत ठण्ड के समय अपने बिल में ही उसे प्रयाप्त भोजन मिल जाए। इस 20 किलोग्राम फीड की कीमत जोड़ लें, आप हताश हो जायेंगे। यह सब काफी है चूहों की फौज के खिलाफ 'जेहाद' छेड़ने के लिए। यह आपको जनरल बातें बताई गयी हैं। अभी और भी कुछ बाकी है जिस पर गंभीरता से आपको विचार करना होगा।

चोरी–डाका जो कुछ करते हैं वह तो करते ही हैं परन्तु सबसे ज्यादा हानिकारक है कि बिमारियों को फैलाने का भी काम करते हैं। इसके अतिरिक्त यह स्वयं भी कैरियर हैं। पोल्ट्री में साल्मोनेला (SALMONELLA) फैला सकते हैं। मनुष्य में तो कई बीमारियां फैलाने की क्षमता रखते हैं। पोल्ट्री में फीड कंटेमिनेशन हर समय करते रहते हैं जिसमें इनका पेशाब और बीठ मुख्य है।

शेड को जगह जगह से क्रैक या बिल बनाना तो आम बात है। बिजली की तारों को जगह जगह से कुतर (काट) देना भी आम बात है। यहीं तक नहीं सिमित है। छोटे चिक्स के साथ खेलना और फिर उन्हें मार देना–उसका कुछ भाग खा लेने में दिलचस्पी रखते हैं। उन्हें उठा कर अपने बिल में ले जाना भी प्रोग्राम में शामिल है। मैं स्वयं इसका चश्मदीद गवाह हूँ। 90 फीसदी इन्हे रात के अँधेरे में कामयाबी मिलती है, यही समय है उनका हमला करने का।

आज से लगभग 25 साल पहले रात 8 बजे गुडगाँव की एक सड़क पर जा रहा था, बिलकुल अँधेरा था परन्तु कार की लाइटों में देखा कि पूरी सड़क चूहों से भरी है। सड़क के दोनों और खेत थे– जो खाली थे क्योंकि गेहूं एक महीने पहले कट चुका था। इस लगभग 1 मील लम्बी पट्टी पर चूहे ही चूहे थे जहाँ आपको पैर रखने की जगह तक नहीं मिल सकती। इस जगह से दिन में अक्सर गुजरना हुआ लेकिन कभी चूहों के दर्शन नहीं हुए। यह रात में "गोरिल्ला वार" करते हैं। यह सड़क ऐसी थी जहाँ से चारों तरफ के गॉव के लोग दिन में खुली ट्राली में अनाज लेकर मंडी जाते थे। उससे गिरे हुए अनाज को चुगने के लिए चूहे रात में निकलते थे। अजीब बात इसमें कुछ सफेद भी दिखे, कुछ काले भी परन्तु अधिकाँश हल्के चॉकलेटी थे।

इन सब जानकारी के बाद हमें जेहादी कदम उठाना ही पड़ेगा अन्यथा हमारा नुक्सान बढ़ता ही जायेगा क्योंकि इनकी जनसँख्या फार्म पर तेजी से बढ़ती ही जाएगी। दिन में यह कम दिखते हैं, परन्तु रात में एका–एक लाइट जलाएं तो आपको पता चलेगा किस तरह से चूहों की एक बड़ी फौज रेल–पेल के साथ भाग रही है।

गंगा फीड का एक ही लक्ष्य – समृद्ध व सम्पन्न हो फार्मर हमारा ।

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सन् 70 के दशक की बात है राजा साहब 'मल्हौजी' स्वर्गीय H.V. SINGH ने 'रैट प्रूफ' शेड बनाये थे। इसके पहले भी वह महल में ब्रायलर पालते थे। स्वयं के लिए एक शानदार कोठी कम्पाउंड में बना ली थी। पोल्ट्री से उन्हें काफी लगाव था। यह रैट प्रूफ शेड भारत का पहला पोल्ट्री शेड था। यह शेड इन आतंकियों को शेड के अंदर जाने से रोकता था, मारता नहीं था।

कुछ चीजें ऐसी हैं जो फीड स्टोर या पोल्ट्री शेड में इनके प्रवेश को रोक देती हैं इनके महक से दूर भागते हैं। इसमें सफेदे के तेल, पेपरमिंट आयल, सिरका, लहसुन, प्याज इत्यादि के तेल या रस का स्प्रे करने से चूहे दूर भागते हैं। यह सब प्राकृतिक रिपेलेंट्स हैं। यह सभी मात्र भगाने का ही काम करते हैं। हमें कुछ ऐसी खोज करनी होगी जिसे मिलाकर मुर्गी दाना बनाया जाए जो मुर्गियों को तो फायदा पहुंचाए परन्तु उसकी महक से चूहे दाना में मुँह ना लगाए।

हमें ऐसा लीथल औजार चाहिए जो सीधे इनकी जान ले–ले। चूहों के खिलाफ जेहाद कामयाब करना है तो यह लीथल औजार चूहों को मारने वाली दवा (RODENTICIDES) के रूप में अनेक आ गये हैं। किसी अच्छे और सुरक्षित प्रोडक्ट का उपयोग करें– बस ध्यान रहे ब्रायलर, मुर्गी और ब्रीडर तक ना पहुंचे। ऐसा हुआ तो काफी नुक्सान हो सकता है। काम करने वालों को सचेत रहना होगा और अपने बच्चों को दूर रखना होगा।

आप जगह–जगह ट्रैप लगा सकते हैं, जिसमे रातभर इकट्ठा होते रहेंगे। सुबह उन्हें पानी के टब में डाल दें। मरने के बाद चील–कौवों को दे दें। अब ऐसे भी ट्रैप बॉक्स आ गये हैं जिसमे जैसे ही प्लेटफार्म पर पड़ें दाने को खाने पहुंचेंगे तो वह प्लेटफार्म बॉक्स या टब में भरे पानी में गिरा देगा।

कई पोल्ट्री फार्मर को मैंने देखा है कि वह सदैव चूहों को लेकर काफी चिंतित रहते हैं। प्रति चूहा मारने पर वह पोल्ट्रीमैन को 25 पैसे देते हैं। जिस कारण वह कई–कई ट्रैप लगाता है और रोज सुबह वह गिनती करवाकर एवं उसकी दुम काट कर फेंकता है। जब फार्म पर नई–नई यह मुहीम शुरू की गयी तो पूरी बाल्टी भर कर चूहे लाते थे। बाद में यह संख्या घट कर 10–15 रह गयी। इसका मतलब काफी लाभ हुआ। अब उनके पैसे भी बढाकर 50 पैसे कर दिए गए हैं।

गोरखपुर में लगभग 15 साल पहले यूनाइटेड फीड– गोण्डा ने एक पोल्ट्री सेमीनार रखा। वहां लेक्चर के दौरान चूहों पर बात आ गयी। काफी कुछ बता दिया। अंत में श्री सुधीर सिंह जो वहां के बहुत पुराने एवं सक्षम पोल्ट्री फार्मर थे उन्होंने चूहों को मारने का कुछ नया तरीका बताया जिसे जानने की जिज्ञासा जगी। उन्हें बुलाकर माइक दे दिया। उन्होंने बड़ा सरल एवं सस्ता उपाय बताया जो शतप्रतिशत कारगर है, यदि सही ढंग से अपनाया गया। इसमें उन्होंने सल्फास की गोलियों का उपयोग किया था, जिसे हम बारीक कपडे में गेहूं के ड्रम में

डालते हैं। यह बीज की दुकान या पंसारी के यहाँ मिल जाएगी। उन्होंने कहा पहले बिलों को शेड के अंदर और बाहर चिन्हित कर लें। ट्रीटमेंट सभी बिलों में एक साथ तेज रफ्तार से होना है। अब इसकी तैयारी करें। हर बिल के द्वार को 6-10" अंदर तक साफ कर हल्का पानी छिड़क दें। ध्यान रहे कि अंदर हाथ ना डाले, सांप बिच्छु का डर रहता है। हर बिल के द्वार के पास मिट्टी गीली करके तैय्यार रखें जिसमे एक या दो गोली सल्फास डाल कर तुरंत बंद कर दें। इसके ऊपर से ईंट या पत्थर का टुकड़ा रख दें ताकि मिट्टी हटाकर बाहर भागने में नाकाम रहें। नमी के कारण सल्फास की गैस बिल में बहुत तेजी से फैलेगी। इस जहरीली गैस के कारण चूहों को अपनी जान बचाने के लिए ताजी हवा चाहिए। चूहों को कुदरत ने दिमाग दिया है। वह सदैव बिल के दो रास्ते बनाते हैं। एक रास्ता किसी कारणवश बंद हो जाए तो वह दूसरे रास्ते का इस्तेमाल कर सकें। इसलिए शेड के अंदर या बाहर जितने बिल के द्वार हैं, उन सबको ठीक से बंद करना है। दूसरे या तीसरे दिन सभी बिल के अगल–बगल कोई नया बिल नहीं मिला तो समझ जाएं आपका जेहादी मिशन कामयाब हो गया अन्यथा कहीं से उनको ऑक्सीजन जरूर मिल गयी है और वह सब जीवित हैं। सुधीर सिंह ने जिस भरोसे से यह सब बताया, उसी भरोसे के साथ हम सब लोगों ने अपनाया।

अब आइये आपको दो बिल्लियों के चूहे के खिलाफ जेहाद की बात बता दें। दिल्ली में भटनागर इंटरनेशनल स्कूलों का बड़ा चेन है। इनका एक बहुत बड़ा सेंटर गुडगाँव मेहरौली रोड पर है जिसके पास काफी जमीन है। उसके कोने में दो बड़े शेड ब्रायलर के बनाये थे। उनके फार्म पर कुछ समस्या आ गयी। देखने के लिए जाना पड़ा। आश्चर्य हुआ एक बिल्ली एक पेन में 3 हफ्ते के चिक्स के साथ बैठी है–चूजे उसके पास आ रहे हैं, जा रहे हैं। वह बस बैठी उन्हें देख रही है। मैंने इंचार्ज से पुछा यह क्या पाल रखा है ? उसने बताया "एक पुराने कबाड़ में पड़े कूलर में इसकी माँ ने इसको जन्म दिया था। इसकी माँ 3 बच्चों को लेकर चली गयी और यह बेचारी जो माँ का दूध पीती थी म्यू–म्यू दो दिन से कर रही थी, मैं इसे यहाँ उठा लाया था। बहुत छोटी थी, अतः उसे शेड में छोड़ दिया कि अभी यह बच्चों पर हमला नहीं करेगी। ड्रॉपर से दिन में कई बार इसे दूध पीलाकर इसे बड़ा किया। जब वह अपने से खाने लगी तो खतरा लगने लगा कि कहीं यह हमला न कर दे। ध्यान रखा गया। एक दिन एक बच्चा गेट के बाहर निकल गया। यह लपकी और लाकर अंदर छोड़ दिया। उस दिन से भरोसा हो गया कि यह हमला नहीं करेगी और आज तक नहीं किया"।

5–6 महीने बाद फिर उस फार्म पर जाना पड़ा। अब वह माँ बन गयी थी और 3 बच्चों के साथ शेड में चक्कर लगाती रहती थी। बच्चे भी खेलने कूदने लगे थे। फीड स्टोर में उन्होंने एक बहुत छोटी सी खिड़की लगा रखी थी, जो आमतौर से खुली रहती थी। जिससे वह जब चाहे अंदर आ–जा सके। चूहों के बारे में पुछा उन्हें कोई दिखा नहीं था।

इसी प्रकार एक ब्रीडिंग फार्म पर जाना पड़ा। सुबह 12 बजे तक प्रोडक्शन ठीक था। उसके बाद शाम 5 बजे तक बहुत कम अंडा आया। ब्रीडर के फार्म पर गया शाम के 7 बज चुके थे और शेडों में लाइट जल रही थी। सुपरवाइजर साथ में था हम बाहर से ही शेड के अंदर देख रहे थे। एक से फिर दूसरे और तीसरे शेड में गए। तीसरे शेड में एक बहुत ही खूबसूरत मोटी–तगड़ी सफेद बिल्ली टहल रही थी। मुर्गियों पर कोई असर नहीं था। सुपरवाइजर ने मुझे वहीँ रोक दिया और "इसको अपना काम करने दें" यह कह कर मुझे दूसरे शेडों की और ले गया। पूरा राउंड लेने के बाद ऑफिस में आ गया लेकिन मेरे दिमाग में वह बिल्ली थी। मैंने पुछा "वहां तुमने रोक क्यों दिया?"

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सुपरवाइजर ने बताया "अगर उसे भनक लग जाती तो वह ऐसे गायब होती कि पता ही नहीं चलता किधर गयी और कहाँ से गयी, सिर्फ चौकीदार को देख वह नहीं भागती है"। मैंने फिर सवाल किया "शेड में ताला लगा हुआ है क्या कहीं से जाली खुली हुई है जिस रास्ते वह अंदर आ जाती है?"

सुपरवाइजर में जवाब दिया "पिछले 4 साल से जाली ही चेक करता आ रहा हूँ। कहीं भी खुला नहीं मिला। जंगली बिल्लियां भी आती हैं। आज तक अंदर नहीं घुस पाई"। "क्या यह 'जिन' है जो बिल्ली का रूप धारण कर अंदर घूमता है"? बहर हाल यह माजरा जो भी हो उसके हिसाब से 10 शेड में किसी में भी चूहे नहीं दिखे आज तक, हाँ फीड स्टोर में जरूर हैं, जहाँ ट्रैप लगाकर पकड़ते रहते हैं।

बिल्ली का यह दूसरा केस किसी चमत्कार से कम नहीं परन्तु यह कभी–कभी कहीं–कहीं होता है। पहला केस तो सामान्य या साधारण है। यह वास्तविकता है यदि छोटे बिल्ली के बच्चे मुर्गियों के साथ उनकी आँख खुलते ही रखा जाये तो अधिकाँश वह चूहे मारने का काम करेंगी या करेंगे, परन्तु कुछ आतंकी भी निकल सकते हैं जिनकी सम्भावना बहुत कम है। अगर हो तो उन्हें फार्म पर ही रहने दें, चक्कर लगाने दें, परन्तु शेड के अंदर न घुसने दें।

आपके सामने सभी कुछ प्रस्तुत कर दिया है जो पसंद आये उसे अवश्य अपनाएं और इस जेहादी मुहीम को सफल बनाएं।

चीन होता तो इसे पकड़ कर बेचा जाता। भारत सरकार को हमें अगाह करना चाहिए इसके लिए विश्व में बाजार तालाश करें। वैसे भारत में भी ट्राइब कहें या जाति कहें मौजूद है 'मुसहर' के नाम से जो इसे पकड़ कर पकाती और खाती है। चूहे को 'मूस' भी कहते हैं शायद इसलिए इनका नाम 'मुसहर' पड़ा है। बिहार और झारखंड में अधिकाँश यह रहते हैं। एक पोल्ट्री फार्म पर 3–4 मुसहर काम करने आये अच्छे और मेहनती थे, वह रोज ही पकड़ कर खाते थे।

एनकाउंटर न. 261-पोल्ट्री में 'टोटके' या (जुगाड़)अक्सर कैसे काम कर जाते हैं ?

अगर किसी ज्ञानी गुरु ने कोई आपको टोटका या जुगाड़ बताया है उसे इस्तेमाल (TRY) करने में क्या हरज है ? जब भी कोई बताता है उसे गंभीरता से ही केवल नहीं लेता बल्कि नोट कर लेता हूँ और समय मिलते, ट्राई कर के देख लेता हूँ। ऐसे कई टोटके जो कामयाब हुए पिछले भिन्न–भिन्न एनकाउंटर में लिखे गए हैं।

ऐसे ही एक नया टोटका पिछली गर्मी का मिला। लखनऊ के पास एक बड़े लेयर फार्म पर सुबह तक सब कुछ ठीक था परन्तु शाम को बहुत अधिक मोर्टेलिटी निकली। फार्मर का परेशान होना जरूरी था। उसका फार्म काफी अच्छा माना जाता है एवं परफॉरमेंस सदैव उसके यहाँ बहुत अच्छी रहती है। शायद इस तरह की समस्या वह पहली बार देख रहा था। इसलिए वह ज्यादा परेशान था। लखनऊ भागा जब तक डॉक्टर मिले –चेक किया और उसके हाथ में एक लम्बा चौड़ा पर्चा पकड़ाते, लखनऊ की दुकानें बंद हो चुकी थी। यह उसके लिए परेशानी का सबब ओर बन गया।

लखनऊ जाने से पहले हमारे प्रसिद्ध 'डॉक्टर टायम्युटिन' से सम्पर्क साधने के लिए फोन मिलाया पर सफल नहीं हुआ। दुखी मन से वापिस फार्म पहुंचा। इसी समय 'डॉक्टर साहब' जिनसे सम्पर्क के लिए बेताब था, फोन आ गया। उन्होंने सारी बात समझी। कहा "दो लेयर्स का पोस्टमॉर्टम करके फौरन फोटो भेजो"। उन्होंने भेजा उसे देखा और फिर डॉक्टर साहब ने पूछा कि "क्या यह सब मोर्टिलिटी दिन के 2–3 बजे के बाद हुई है"? जवाब "हाँ"था। "आज एका एक क्या तापमान बहुत बढ़ गया था"? इसका भी जवाब "हाँ" में था। डॉक्टर साहब ने कहा "देर हो गयी है इलेक्ट्रोलाइट तो मिलेगा नहीं, एक काम करो पास के कसबे में अगर पंसारी की दुकान खुली हो तो वहां से सारी 'जैम' (JAM) के जार उठा लो। 10–15 जार अभी पानी में घोल कर सबको लगा दो। इसी तरह कल 10–11 बजे लगा दो। कल शाम को फोन करना"।

फार्मर को काफी 'जार' मिल गए उसने फौरन लगवा दिए। शाम से अभी तक जो मोर्टिलिटी थी उसे निकाल दिया। दूसरे दिन सुबह मोर्टिलिटी ना के बराबर थी। पोल्ट्री के ब्रीडर और दूसरे दिग्गज यह ना समझें कि जाम स्कॉच–व्हिस्की वाला है। यह तो ब्रेड वाला 'जैम' था। दूसरे दिन शाम तक सब कुछ नॉर्मल रहा। अब बताइये यह टोटका कितना सफल रहा।

यह डॉक्टर साहब वास्तव में डॉक्टर नहीं हैं, यह तो उन्हें चाहने वालों ने 'टाइटल' दे रखा है। वैसे यह किसी डॉक्टर से कम भी नहीं है। यह और कोई नहीं आप सबके जाने पहचाने इंटरफेस के 'सब कुछ' श्री सुधीर कुमार मल्होत्रा हैं। वह फार्मर इतना परेशान था कि यह अपने एक–दो प्रोडक्ट 'ठोक' सकते थे, परन्तु इन्होने ऐसा कुछ नहीं किया। यह भी सराहनीये है।

Mr. Shabbir Ahmad Khan

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Elevate hatchery performance with
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At Petersime, we see a **dynamic and evolving service offering as an important cornerstone of our business**. Our goal is to ensure continuous improvement in our service delivery to customers, adapting to their ever-changing needs. With the **introduction of our new data-driven incubation support service**, we are taking our commitment to exceptional support to the next level.Our experienced incubation specialists analyseyour critical data, such as incubation graphs, OvoScan™ readings and alarm logs, to identify inefficiencies and uncover trends. In the hundreds of incubation graphs, they provide an extra pair of eyes to scan for anomalies, deviating incubator behaviour or potential issues. This approach allows you to concentrate on daily operations while we **provide valuable insights based on our analysis of the data from the EagleTrax™ Basic module**.

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Key benefits of our incubation support service

Petersime's incubation support service delivers value where it matters most:

- **Ongoing analysis of incubator data**: guarantee consistency in your incubation performance with an external pair of eyes making sure no sign of potential issues in the incubation process gets overlooked.
- **Expert insights three times a year**: detailed reports based on periodic analysis of the hatchery's incubation results, along with online sessions with a Petersime expert.
- **Customized solutions**: tailored recommendations based on the specific data and needs.
- **Maximized efficiency**: while incubation specialists handle the analysis, you can dedicate your time to operational priorities.

A commitment to Operational Excellence

This innovative service is part of Petersime's commitment to **empowering hatcheries through expertise, technology and customer care**. It complements a broader range of offerings, including 24/7 support, audits and training programs, all designed to ensure your hatchery performs at its best throughout its entire life cycle.

With Petersime's incubation support service, you gain a competitive edge, uncovering the insights needed to achieve optimal performance and drive consistent results.

Petersime's data-driven incubation support service Is designed to ensure no detail is overlooked while helping hatcheries achieve optimal hatchery performance.

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Petersime's new X-Streamer™ brings incubator intelligence and performance to the next level. The X-Streamer™ is the first intelligent incubator that turns data into maximum hatchery performance. It knows which eggs are on board and uses this knowledge to help you maximise incubation performance, while minimising operational costs.

This ensures you get the best economic return out of your hatchery; not just right now, but during its entire lifetime. Maximum profit for life is what we stand for.

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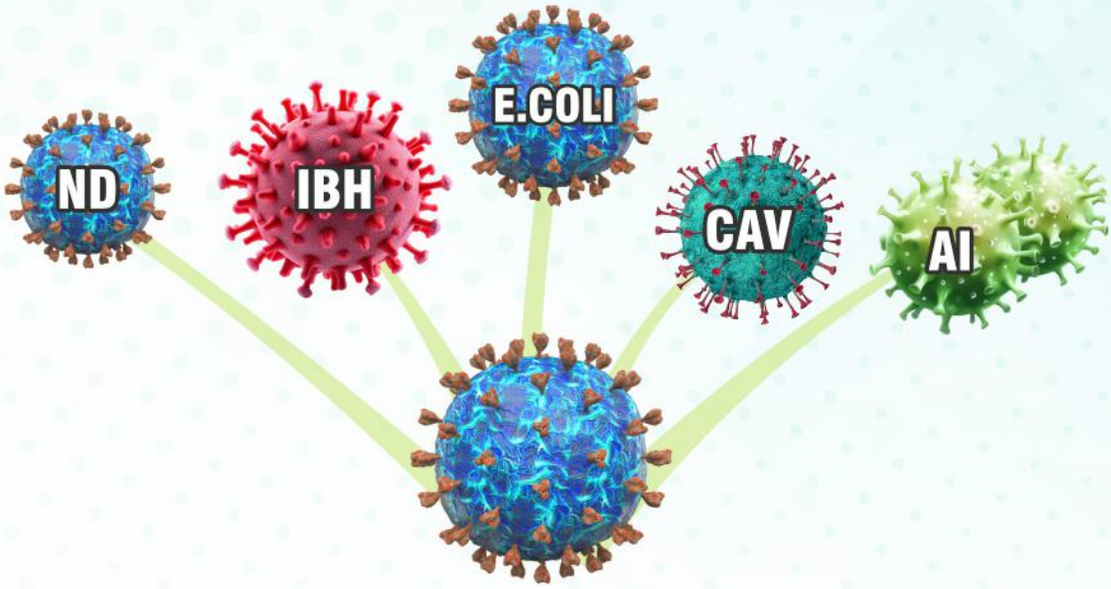

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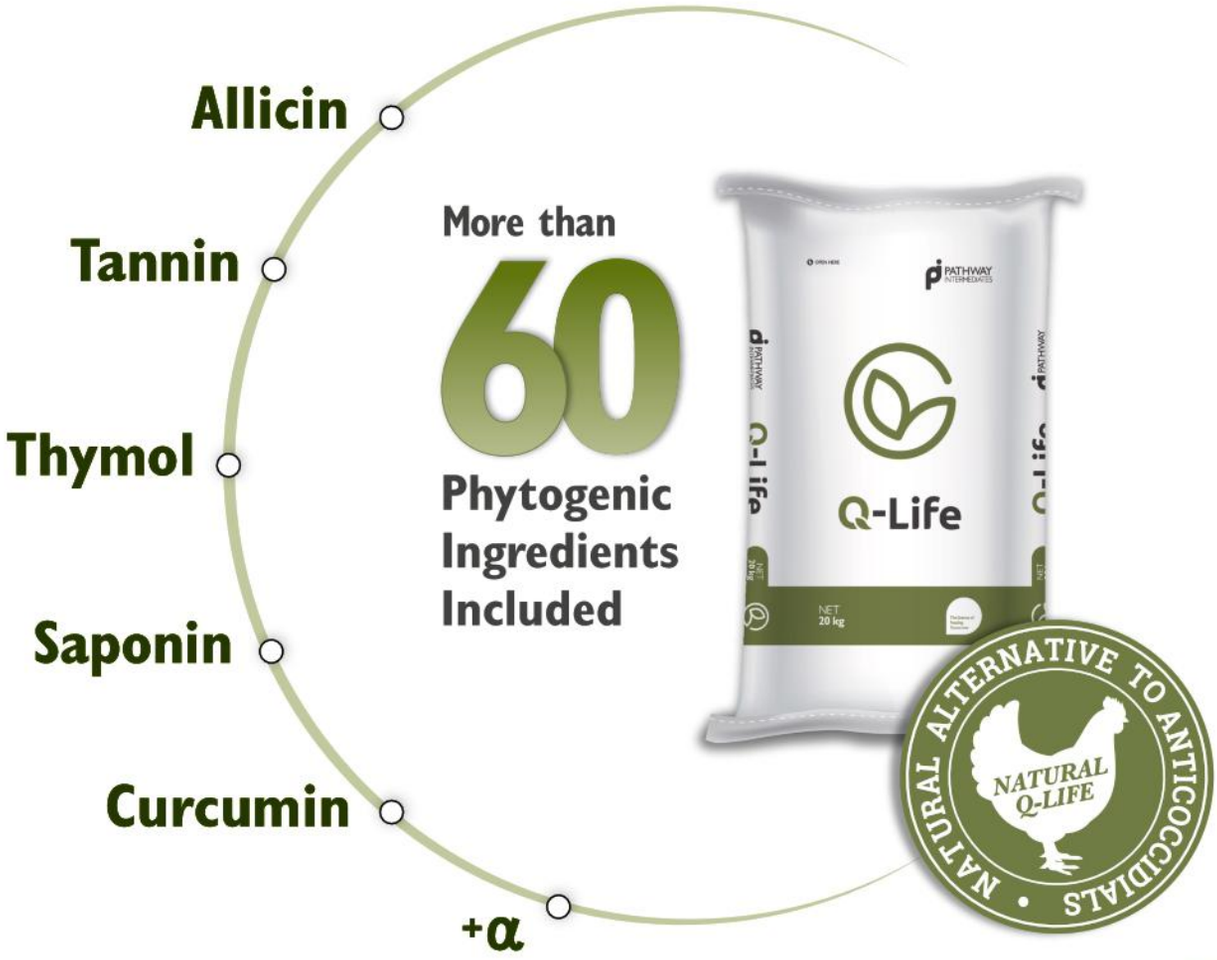

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Novus Launches CIBENZA®
XCEL Xylanase Enzyme Feed Additive in India

NOVUS officially announced the India launch of CIBENZA® XCEL Xylanase Enzyme Feed Additive, a scientifically optimized enzyme solution designed to enhance nutrient utilization in poultry diets.

The product launch was celebrated at an exclusive three-day event in Kovalam, Kerala in April 2025, where poultry industry leaders gathered to explore the theme **"Unlocking Nutrient Potential."** The event highlighted NOVUS' commitment to delivering precision enzyme technology backed by global science and regional validation.

The launch of **CIBENZA® XCEL Xylanase Enzyme Feed Additive** in India signifies more than a product release. It marks the regional launching of a globally trusted solution now backed by NOVUS' full-service technical expertise and brand promise.

"With the acquisition of Bio Resource International Inc. (BRI), NOVUS expanded its enzyme portfolio with reliable, science-based technologies that are more relevant than ever in today's cost-sensitive, performance-driven poultry sector," said **Dr. Manish Kumar**, Regional Director, South Asia at Novus. "We are proud to introduce CIBENZA® XCEL Xylanase Enzyme Feed Additive to our customers in India at a time when the industry is under significant pressure due to high feed energy costs. With maize and other energy sources reaching historically high prices, producers need innovative tools to protect their margins and maintain performance. The integration of a xylanase enzyme feed additive under NOVUS means customers can now expect not just innovation, but also consistent technical service and local support.

Designed to degrade both soluble and insoluble xylans across a range of raw materials, **CIBENZA® XCEL Xylanase Enzyme Feed Additive** addresses core challenges in energy availability, gut health, and feed efficiency. Regional and global trials showcased at the event confirmed measurable improvements in performance metrics critical to Indian producers.

"Enzyme solutions like this are pivotal in a market where 52% of maize production is consumed by the poultry industry and volatility in feed ingredients is the new norm," said **Dr. Koushik De**, Sales Director – Poultry South Asia. "**CIBENZA® XCEL Xylanase Enzyme Feed Additive** demonstrated improvements in uniformity, gut morphology, oxidative stress, and microbiota modulation—key indicators of resilience and productivity in broilers."

The launch seminar featured presentations from NOVUS global experts, including:

- **Alfred Blanch**, Executive Global Poultry Solutions Manager, who emphasized the critical importance of enzymes in modern feed efficiency.
- **David Torres**, Technical Services Manager – Americas, who shared trial data showcasing **CIBENZA® XCEL Xylanase Enzyme Feed Additive**'s consistent performance.

Complementing the technical agenda, the event also included a cultural immersion experience, allowing guests to explore Kerala's heritage and connect with NOVUS team.

Farmers in India looking to optimize poultry production should contact their local NOVUS representative for customized solutions that work for their unique operation.

Visit www.novusint.com/contact to contact your local rep.

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Essence Natura Successfully Participates in VIV Asia 2025

Essence Natura, proudly announces its successful participation in the VIV Asia 2025 in Bangkok, Thailand on March, 12 -14th. The exhibition provided a platform for Essence Natura to showcase its innovative phytogenic products and connect with industry professionals, potential clients, and partners.

The event saw a significant turnout of visitors, and Essence Natura received overwhelmingly positive feedback on its offerings. Key highlights of the participation include new business leads, partnerships, strategic meetings with existing associates, and ideas for future products.

"We are thrilled with the response and appreciate the opportunity to engage with our audience," said Dr. Puneet Tripathi, Executive Director, Essence Natura Pvt Ltd. "This participation has not only enhanced our brand visibility but also opened up new avenues for growth and collaboration."

Essence Natura looks forward to continued success and future opportunities to showcase its expertise and innovations.

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Indian delegation visits TECHNA in France: a deep dive into precision livestock nutrition

Early April, eight professionals from India's dairy and poultry sectors travelled to France to visit TECHNA, an international group recognized for its expertise in precision nutrition and natural health solutions for animal production. The delegation included nutritionists, consultants, and company owners.

Indian stakeholders were invited to discover how the company combines technical expertise, scientific research, and long-term partnerships to improve performance across livestock value chains.

A comprehensive approach to support Indian livestock challenges

During the visit, TECHNA showcased its ability to support local industries with tailor-made solutions adapted to evolving needs—such as phasing out antibiotic growth promoters, supporting animal health, increasing raw material knowledge for a more precise nutrition, and improving feed efficiency.

By addressing these challenges, TECHNA aims to support India in its journey toward optimizing its livestock production systems.

A multi-faceted programme: from R&D to on-farm applications

At the heart of the programme was a visit to EuroNutrition, TECHNA's experimental research centre. This was an opportunity for the delegation to discover how Techna evaluates the effectiveness of its nutritional solutions, and develops precise nutritional characterisations of raw materials through almost 200 digestibility and zootechnical trials each year.

During the trip, the delegation also explored several areas of TECHNA's expertise in product development:

- its phytogenic expertise, thanks to a dedicated team that formulates additives based on active compounds of plant origin that have been proven to improve animal health and performance
- its mastery of microencapsulation technology to improve the stability of feed additives and ensure optimal performance

In addition to R&D, the delegation experienced how TECHNA's solutions are applied in the field. **The program included visits to commercial and pilot farms, feed mills, and integrators across the dairy, poultry, and swine sectors.** These on-site experiences allowed the delegation to appreciate the practical applications of TECHNA's knowledge and tools, in precision feeding and performance monitoring.

Technical discussions and key learnings

The delegation's time at TECHNA was marked by insightful technical discussions on a variety of crucial topics, such as:

- Feed manufacturing technologies
- Ration balancing to optimize nutrient intake
- Data-driven herd management for improved performance monitoring
- The use of NIR (Near Infrared Reflectance) spectroscopy for raw material analysis
- Customized nutritional programs tailored to genetic evolution and market dynamics

The visit also provided a closer look at how digital solutions are integrated into livestock management systems, enabling better decision-making and more efficient production.

Strengthening bonds and looking ahead

More than just a technical visit, this initiative fostered mutual trust and set the stage for long-term collaboration. The fruitful exchanges opened the door to concrete projects. Backed by solid R&D and proven field expertise, TECHNA is well-positioned to support India's evolving livestock sector. This visit signals the start of promising partnerships, built on TECHNA's expertise and the drive of Indian stakeholders to advance toward more efficient production systems.

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Sudden Death Syndrome in Broilers

Pathogenesis, Risk Factors, and Current Mitigation Approaches

Sudden Death Syndrome (SDS) in poultry, primarily affecting fast-growing broiler chickens, is a metabolic disorder characterized by the sudden and unexplained death of healthy birds. It predominantly occurs in male chickens, particularly those raised in intensive production systems, and is most common between 2 and 4 weeks of age, with an incidence ranging from 0.5% to 5% of affected flocks[1]. Sudden Death Syndrome (SDS), also known as **Morte subita, Acute death Syndrome, Dead in good condition, Heart attack, or Lung Edema**, is a condition commonly observed in fast-growing broiler chickens[2]. SDS is sometimes referred to as **"flip-over disease"** because affected birds often flip onto their backs, dying with their wings outstretched and legs extended[2]. Affected chickens experience a rapid onset of imbalance, intense flapping, and muscular contractions lasting around 53 seconds before death[3].

Sudden Death Syndrome (SDS) in modern broiler chicken production represents a significant concern due to its impact on mortality rates and overall economic losses, particularly at the end of the fattening period[4]. SDS results in direct financial losses through bird fatalities and induces indirect costs, including uneven flock growth, higher feed conversion ratios, and increased labor and veterinary expenses. The industry's focus on achieving rapid growth, and feed efficiency to meet rising global poultry demand inadvertently intensifies the risk of SDS. Addressing this issue is crucial for both animal welfare and production efficiency, as well as for the sustainability and profitability of poultry operations. Mitigating SDS is vital for maintaining economic returns and meeting global food security needs. A comprehensive understanding of its etiology, pathogenesis, pathophysiological symptoms, and diagnostic strategies is necessary. Implementing targeted prevention measures and best management practices will help reduce SDS prevalence, safeguard flock health, and ensure long-term sustainability in poultry production.

Dr. Md. Emdadul Haque, Dr. Venket M. Shelke & Dr. Partha Das
Kemin Industries South Asia Pvt. Ltd.

Etiology and pathogenesis of SDS

Sudden death syndrome in broilers is influenced by various factors like nutrition, genetics, and environment. However, the primary trigger is acute cardiac arrhythmia, which causes fatal reactions in birds[1].

Genetic and Metabolic Influences

Rapid growth rates in genetically selected broilers significantly heighten the risk of ascites and sudden death syndrome (SDS) due to disproportionate metabolic oxygen demand[1]. This outpaces the development of cardiac and pulmonary systems, leading to functional insufficiency and increased SDS susceptibility[1].

SDS is recognized as a metabolic disorder wherein disturbances in metabolite or electrolyte homeostasis precipitate ventricular fibrillation, ultimately resulting in mortality[1]. Contemporary perspectives emphasize that SDS is primarily driven by metabolic dysregulation, not necessarily due to accelerated weight gain, but rather due to elevated systemic oxygen demands. This heightened demand induces disruptions in electrolyte equilibrium and systemic acid-base balance. Consequently, acute alterations in electrolyte concentrations and blood pH are considered critical triggers for the onset of SDS[1].

Figure 1: Symbolic image of dead birds on a farm representing sudden death syndrome[29]

SDS causes sudden mortality in broiler chickens, primarily due to the acute cardiac stress that leads to pulmonary oedema and respiratory failure[1].

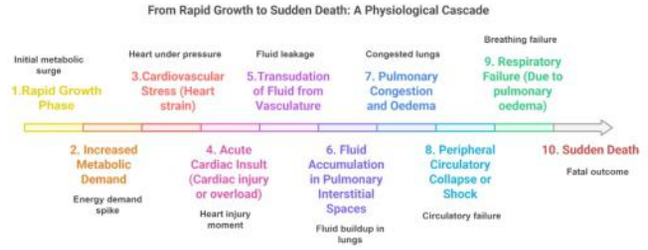

Figure 2: Schematic diagram of the physiological cascade for rapid growth to sudden death[1]

Modern, fast-growing broiler strains are increasingly prone to cardiovascular anomalies, contributing to higher mortality rates linked to cardiac dysfunction[21]. Sudden Death Syndrome (SDS), primarily attributed to cardiac arrhythmias, is common in these genetically selected birds[2]. The condition is exacerbated by accelerated muscle growth, heightening the risk of arrhythmic events[2]. Heritability studies suggest a strong correlation between SDS, body weight, and ascites incidence, highlighting genetic predisposition as a key factor[28].

Occurrence Patterns and Incidence Rates

The occurrence and incidence of SDS in broilers vary, typically affecting birds from 2-3 days of age to market age, with peak mortality occurring between 21-28 days[2,5]. **Males** are more susceptible, accounting for 60-80% of deaths, likely due to their higher growth rates and hormonal factors[7]. Mortality rates range from 0.5 to 5% in affected flocks[5]

Diet Texture and Composition

The form of diet affects feed intake, metabolic rate, and the risk of metabolic diseases like SDS. While mash diets reduce SDS incidence, they also slow growth, which is not ideal.

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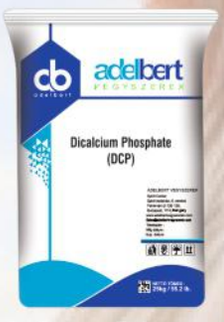
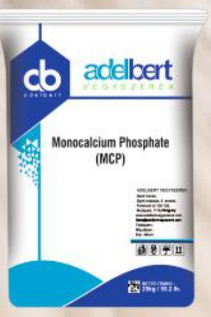


Dicalcium Phosphate (DCP)



Monocalcium Phosphate (MCP)

Sodium Bi Carbonate

Choline Chloride (CCL)

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75% - 60%

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Pelleted feeds increase feed intake and growth rate, raising SDS risk[9]. Some studies suggest that pelleting protein supplements, especially soybean meal, may produce toxins linked to SDS, but including meat meals may offer some protection against it[5]. However, this remains unclear.

Diet composition plays a crucial role in the incidence of SDS in poultry. Studies suggest that replacing carbohydrates with lipids, such as glucose, lipids, and corn starch, may influence SDS mortality[5]. Additionally, low-density diets have been found to reduce SDS mortality compared to high-density diets[10]. Furthermore, feed formulations with more wheat and less corn are associated with higher SDS incidence[5]. These findings indicate that diet composition, including energy sources, can impact SDS occurrence and body weight in poultry.

Nutritional factors

Protein & Amino Acid

Dietary protein appears to have a limited direct effect on Sudden Death Syndrome (SDS), with protein-deficient diets potentially reducing SDS incidence, though at the cost of growth and increased fat deposition[5]. High-protein diets with excess sulfur may promote acid secretion and lactic acid buildup, contributing to SDS. **Taurine,** an amino acid, influences heart health, and its deficiency could lead to heart failure and SDS, although its precise role remains uncertain[11]. Additionally, the use of meat meals in diets has been associated with a reduced SDS incidence, suggesting the presence of unidentified factors in meat meals that help mitigate SDS[5].

Lipids

The type and level of dietary lipids, particularly the balance between saturated and unsaturated fats, may influence the incidence of Sudden Death Syndrome (SDS) in broilers[12]. Studies show that broilers fed **saturated oils** have lower SDS occurrence, and those fed sunflower oil experience less mortality than those fed tallow[13].

Maternal intake of **n-3 polyunsaturated fatty acids (PUFAs)** influences offspring myocardial tissue composition, reducing Eicosanoid production and SDS risk[14]. High metabolic rates in broilers increase free radical formation, contributing to SDS[5]. **Melatonin** supplementation may reduce SDS by counteracting high-intensity light's inhibitory effect on melatonin production[5]. Additionally, low **Linoleic** and **Arachidonic acid** levels in heart tissue impair prostaglandin synthesis, increasing SDS susceptibility[5].

Carbohydrates and Lactate

The pathogenesis of SDS is significantly influenced by the type and availability of carbohydrates, rather than by proteins or fats[8]. Research shows that different carbohydrate sources, such as glucose and corn starch, impact mortality rates, likely due to their effect on lactic acid metabolism[5]. Elevated levels of **Lactate Dehydrogenase (LDH), Glutamic Oxaloacetic Transaminase,** and **Creatine Phosphokinase** are indicators of circulatory disturbances and are often associated with SDS[15]. Inadequate oxygen due to poor organ growth (heart and lungs) exacerbates lactate production, resulting in muscular contractions, imbalance, and ultimately, violent flapping, contributing to SDS onset.

Minerals

Stress conditions, such as lighting and stocking density, are proposed to increase **Catecholamine** secretion from the adrenal gland, elevating catecholamine and calcium ion levels in cardiac muscle, potentially leading to cardiac arrhythmias[6]. **Selenium** deficiency is also considered a cause of Sudden Death Syndrome (SDS) in broilers, likely due to its antioxidant properties[5]. Additionally, high dietary saturated fatty acids can bind with minerals like magnesium, calcium, and zinc, reducing their bioavailability, affecting the nervous system, and possibly causing SDS-like conditions[8].

Vitamins

There is limited evidence suggesting that vitamin deficiencies, particularly **B vitamins like biotin,** may influence the incidence of Sudden Death Syndrome (SDS) in broilers[5]. Higher SDS rates have been observed in flocks fed wheat, potentially due to biotin deficiency in wheat. Supplementing biotin through corn or wheat may reduce mortality, although the required amount is typically met with the diet's premix[5].

Excessive supplementation of **vitamin D3** in broiler diets, often aimed at preventing leg disorders, may paradoxically increase the risk of Sudden Death Syndrome (SDS)[1]. High vitamin D3 levels disrupt cardiac morphology and electrophysiology, promoting arrhythmias[1]. Coupled with rapid growth and mineral imbalances, this significantly elevates the susceptibility of broilers to SDS.

Stress

Recent studies suggest that stress is a major contributor to Sudden Death Syndrome (SDS) in broiler chickens, with arrhythmia-inducing stress playing a key role[1]. Stress can exacerbate SDS symptoms, and mortality may occur days after the stressor.

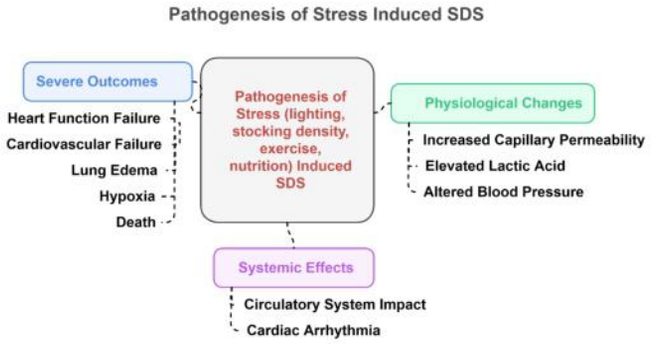

Figure 3: Pathogenesis and outcomes of stress-induced SDS[1]

Drugs

The pathogenesis of Sudden Death Syndrome (SDS) in broiler chickens related to anti-coccidiosis drugs, particularly Ionophores, involves several steps[16,17,5]

Ionophores like Monensin impact ion transport (Sodium, Potassium, and Hydrogen ions)

↓

Disruption of membrane permeability and acid-base imbalance

↓

Altered ion gradients and acid-base balance

↓

Degeneration of heart muscles due to an imbalance

↓

Increase susceptibility to Sudden Death Syndrome (SDS).

Pathophysiological Symptoms and Diagnosis of SDS

Identifying birds susceptible to Sudden Death Syndrome (SDS) remains challenging, as current methods, including electrocardiograms, temperature monitoring, and behavioral observations, are insufficient. Histopathological changes in the heart may help identify structural traits that predispose broilers to lethal arrhythmia[2], but further research is needed for a conclusive diagnosis.

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Clinical Signs

- Birds initially exhibited normal feeding, drinking, and walking behavior before death, followed by neck extension, squawking, and wing beating, with death occurring within minutes[6].
- All affected birds experienced a sudden onset of symptoms, including loss of balance, violent wing flapping, and strong muscular contractions, with seizures lasting less than one minute. Most birds emitted high-pitched cries or squawks during these episodes[18].

Post-mortem Findings:

Upon necropsy, a structure was found within the heart's blood, which was histologically identified as "Jelly clots" or "chicken fat clots," both of which are characteristic of post-mortem formation[6].

- **Lungs**: Exhibiting oedema.
- **Kidneys and Liver**: Slight congestion and subcapsular petechial hemorrhage. The liver appears enlarged with fatty infiltration.
- **Heart**: Firm and contracted, with enlargement. The ventricles are empty, and the atria are filled with blood clots, which are deemed to have a post-mortem origin.
- **Crop and Gizzard**: Containing recently ingested food.
- **Gall Bladder**: Empty, suggesting the bird had eaten before death.

Microscopic Lesions

- **Lungs**: Exhibiting varying degrees of vascular engorgement, with the presence of red blood cells (RBCs) and edema in both intestinal and interlobar connective tissues[6].
- **Liver**: At the portal triad, there is leucocyte infiltration, causing distortion and reduction in the lumen of the bile duct[6].
- **Heart**: Degeneration of myofibrils accompanied by leukocyte infiltration (primarily lymphocytes and heterophils). Edema is present, leading to the separation of myofibrils[6].

Biochemical studies

- Elevated blood **lactic acid** levels may contribute to Sudden Death Syndrome (SDS) in broiler chickens by damaging the cardiovascular system, increasing the risk of mortality[1,19].
- High **calcium ion** levels, along with increased **catecholamine** and **adrenaline**, have been observed in heart muscles of birds with sudden death syndrome, along with thyroid hormone changes[20,21].
- Elevated **creatine kinase** levels in broiler chickens, often seen under stress, serve as an indicator of cardiac disturbances and an increased risk of Sudden Death Syndrome (SDS), reflecting potential myocardial damage[21].
- Elevated levels of **lactate, lactate dehydrogenase (LDH), glutamic oxaloacetic transaminase (GOT)** and **creatine phosphokinase** in the cardiac muscle are key metabolic and molecular indicators of Sudden Death Syndrome (SDS) in broiler chickens, which can aid in identifying affected birds[15].

Molecular studies

- Caspase enzymes, particularly **caspase-3,** play a key role in regulating apoptosis and inflammation, with increased caspase activity observed in heart tissue damage, suggesting that measuring caspase-3 expression could help identify animals at high risk for Sudden Death Syndrome due to cardiac defects[2].
- Mutations in the **RYR2 (Ryanodine Receptor 2) gene,** which regulates calcium release in heart cells, have been linked to increased susceptibility to cardiac arrhythmia and Sudden Death Syndrome (SDS) in broiler chickens, suggesting that identifying these mutations could help reduce SDS mortality in poultry[22].

Prevention of SDS

- The form of feed, nutrient content, and feed additives may play a role in reducing Sudden Death Syndrome (SDS) mortality in broiler chickens, with some studies suggesting that mash feeding can slow growth and reduce cardiac defects, although other research found no impact of feed type on SDS incidence[1,10].
- Feed restriction has been shown to reduce the incidence of Sudden Death Syndrome (SDS) in broiler chickens, with studies indicating lower SDS mortality in restricted-fed birds compared to ad libitum feeding; however, the negative impact on growth performance and other factors limits its recommendation for commercial production[2].
- Limiting the energy level and nutrient concentration in feed can improve broiler welfare and reduce Sudden Death Syndrome (SDS) mortality, especially in older birds, though some studies suggest that diet type may have little effect on SDS incidence[1,10].
- Plant extracts, such as thyme oil and Echinacea purpurea juice, show potential in improving cardiovascular function and reducing mortality in poultry, including lowering cholesterol and triglyceride levels, and decreasing the risk of Sudden Death Syndrome, though further research is needed for practical application in poultry breeding[23,24].
- Supplementing broiler chicken diets with vitamins such as E, selenium, B-complex, or multivitamin electrolytes has been found effective in reducing the incidence of Sudden Death Syndrome[25].
- Probiotics have been shown to reduce blood lipid metabolites, potentially decreasing metabolic disorders and indirectly lowering the incidence of Sudden Death Syndrome in broiler chickens[26].
- Adding rapeseed oil or fish oil to broiler chicken diets, both rich in omega-3 fatty acids, can reduce the risk of Sudden Death Syndrome by preventing cardiac arrhythmia. A 3% rapeseed oil supplement significantly boosts EPA (Eicosapentaenoic acid) and DHA (Docosahexaenoic acid) levels in heart phospholipids, providing protection against SDS, with rapeseed oil being a more affordable option that doesn't impact meat aroma[1]..∴
- Supplementing broiler chicken diets with Guanidinoacetic acid (GAA) may help reduce the incidence of Sudden Death Syndrome by protecting against lactic acidosis, though it also negatively impacts growth, indicating that more effective SDS prevention methods are still needed[19].
- To reduce Sudden Death Syndrome (SDS) in broiler chickens, it is crucial to manage stocking density and ambient temperature[1].
- The photoperiod length significantly affects Sudden Death Syndrome (SDS) in broiler chickens, with longer periods beyond 10 hours increasing mortality, while appropriate lighting programs and increased melatonin secretion may help mitigate stress-related cardiac arrhythmia, reducing the risk of SDS[27].

Conclusion

Sudden Death Syndrome (SDS) in broiler chickens remains a complex issue influenced by a variety of nutritional, environmental, and genetic factors. While nutritional strategies, such as adjusting energy intake and providing appropriate vitamins and minerals, may help reduce SDS incidence, the overall impact is limited. Stress, particularly related to genetics, nutrition, and management, plays a central role in SDS development. Although current prevention methods can reduce SDS mortality, they often result in decreased production efficiency. Further research is needed to better understand SDS's underlying causes and develop effective prevention strategies that balance animal welfare and production profitability.

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IPEMA/Poultry India Champions Innovation and Collaboration at "VIP's 2nd National Symposium - The Poultry Summit: Innovate, Integrate & Thrive"

The Indian Poultry Equipment Manufacturers Association (IPEMA) / Poultry India is proud to have sponsored and supported the successful execution of **VIP's 2nd National Symposium**, titled **"The Poultry Summit: Innovate, Integrate & Thrive"**—a high-impact knowledge-sharing platform that brought together leading experts, policymakers, and stakeholders from across the poultry industry.

Held with the objective of advancing poultry science and business in India, the Summit featured a compelling **Keynote Address** by **Mr. Balaram Singh Yadav**, Managing Director of **Godrej Agrovet Ltd., Mumbai**, setting the tone for discussions on innovation, integration, and sustainability in the sector.

IPEMA Driving Poultry Sector Excellence

IPEMA//Poultry India, represented at the event by **Senior Member Mr. Anil Dhumal** and led by **President, Mr. Uday Singh Bayas**, reaffirmed its commitment to the growth and development of the Indian poultry sector. The IPEMA/Poultry India stall at the event showcased IPEMA members promotional brochures, serving as an engagement hub for visitors, entrepreneurs, and stakeholders. The event was also extensively covered by the **Poultry India official media channel**, amplifying the summit's message across social media platforms and reinforcing the association's mission to promote poultry excellence in India.

Key Technical Sessions and Thought Leadership

Topic 1: Unlocking Poultry Potential Through Genetics
Speaker: Dr. G. L. Jain, Geneticist and Principal Advisor, Venkys Group, Pune Dr. Jain delved into advancements in genetics, evaluating the impact of modern broiler and layer strains, immune status, organ development, and climate adaptability. His talk emphasized the importance of a collective approach in applying new genetic advancements to maximize business and production potential.

Topic 2: Navigating the Disease Challenges – A Deep Dive
Speaker: Dr. K. Jayaram, Senior Poultry Advisor, Coimbatore Focused on managing emerging and re-emerging poultry diseases such as ND, IB, AI, H5N1, ILT, and others. Dr. Jayaram highlighted the need for precision diagnostics, vaccine approval processes, and the current disease scenario across poultry segments.

Topic 3: Technology, AI, and Market Trends in Poultry
Speaker: Mr. Suresh Rayudu Chitturi, Chairman, International Egg Commission (IEC) & MD, Srinivasa Hatcheries Pvt Ltd, Hyderabad Covered revolutionary topics including AI, machine learning, real-time IoT farm monitoring, predictive analytics, packaging automation, and scientific marketing. Mr. Chitturi also addressed public myths, antimicrobial resistance (AMR), and the challenges of live bird selling.

Topic 4: Climate Challenges in Poultry Management
Speaker: Prof. Dr. N.K. Mahajan Discussed weather-related uncertainties, nutritional balance, heat and cold stress, biosecurity, vaccination strategies, and the economic implications of climate change on poultry operations.

Governmental Support and Recognition

Special online messages were delivered by:

- **Ms. Alka Upadhyaya (IAS)** – Secretary, Department of Animal Husbandry and Dairying
- **Shri Nitin Jairam Gadkari** – Hon'ble Minister of Road Transport & Highways, Government of India
- **Mr. Mahipal Dhanda** – MLA, Panipat, Haryana

Their messages reflected the government's acknowledgment of the poultry sector's critical role in India's nutritional and economic framework.

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Panel Discussion: Policy, Partnerships & the Future

The vibrant **Panel Discussion**, moderated by **Prof. Dr. P.K. Shukla**, President of Indian Poultry Science Association and Chairman of Scientific Panel -13 FSSAI, brought forward crucial themes such as:

- Strengthening poultry exports
- Need for MSP on chicken and eggs
- Proposal for a Poultry Development Board similar to NDDB
- Managing feed costs and ethanol policy impacts
- Vaccine approvals for HPAI, ILT, and aMPV
- Tackling misinformation and media responsibility in promoting poultry protein

Esteemed Panelists included:

- Dr. S.K. Dutta, Joint Commissioner, DAHD
- Ms. Kamna Barkataki, Director, Central Poultry Department
- Mr. K. Singaraj, President, Tamil Nadu Poultry Farmers Association
- Dr. Ajay Deshpande, President, VIP
- Mr. K.G. Anand, GM, Venkateshwara Hatcheries
- Mr. Nasir Hussain, Media professional, India Group (Kisan Tak)

The session concluded with the **felicitation of distinguished delegates, panellists, supporting associations, sponsors, and key stakeholders** for their contributions and participation.

A Message from IPEMA/Poultry India

"As a dedicated platform for innovation and advocacy in the poultry sector, **IPEMA/Poultry India** remains steadfast in its mission to support impactful events like '*The VIP's - Poultry Summit*' initiatives that unify thought leadership, science, and policy. We are honoured to sponsor and promote programs that drive transformation, knowledge sharing, and a sustainable future for Indian poultry," said **Mr. Uday Singh Bayas**, President, IPEMA/Poultry India.

Speaking further, **Mr. Uday Singh Bayas** introduced **PI. Confederation of Indian Poultry Associations (CIPA)**, stating: "We welcome the recognition of **PI.CIPA** as the unified voice of the poultry sector. The funds raised through **Poultry India** will be utilised by CIPA to support the collective growth and advancement of the poultry industry in India. These funds will be accessible to all major poultry associations across the country upon becoming members, subject to scrutiny and approval by the designated committee."

For more updates and event highlights, follow **Poultry India's official media channel** on social platforms.

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Alternative Raw Materials for Grain Shortages in the Poultry Industry

The poultry industry faces increasing challenges due to grain shortages, price volatility, and competition with biofuel production, driving the need for alternative raw materials in feed formulation. Traditional ingredients like maize, soybean meal, and fishmeal are becoming scarce and expensive, necessitating the exploration of locally available substitutes to ensure sustainable production. Alternative feed ingredients offer potential economic benefits and support sustainability goals by utilizing agricultural by-products and novel protein sources. Common alternatives include energy sources such as cassava, wheat bran, and rice bran; protein sources like canola meal, sunflower meal, and insect meal; and by-products such as distillers dried grains with solubles (DDGS) and palm kernel cake. However, the use of these alternatives presents challenges, including nutritional variability, anti-nutritional factors, and processing requirements. To maximize their potential, precise formulation based on digestible nutrients, enzyme supplementation, and quality control measures are essential. The integration of alternative raw materials requires a thorough understanding of their nutritional profiles, limitations, and optimal inclusion rates for different poultry production stages. Advances in feed technology, such as the use of exogenous enzymes like phytase, carbohydrases, and proteases, have improved the utilization of these ingredients. The poultry industry's ability to adapt to changing feed ingredient landscapes is crucial for maintaining economic competitiveness and meeting the growing global demand for poultry products. As the gap between local supply and demand for traditional ingredients widens, the exploration and incorporation of alternative feed materials become increasingly important for the future of poultry nutrition and production efficiency.

Prof. (Dr.) P.K. Shukla and
Dr. Amitav Bhattacharyya
Department of Poultry Science,
College of Veterinary Science and
Animal Husbandry, Mathura- 281001 (U.P.)

Best Alternative Raw Materials for Poultry Feed

Grain shortages, particularly maize, can significantly impact the poultry industry. Various alternative raw materials can be used to maintain feed quality and reduce costs. Below are the best options:

The poultry industry is increasingly adopting alternative raw materials for feed formulation to address grain shortages caused by climate change, biofuel competition, and price volatility. These alternatives provide cost-effective solutions while maintaining bird productivity and supporting sustainability. Among energy sources, cassava root meal stands out as an excellent substitute for maize due to its high starch content, though it requires detoxification to remove cyanogenic glucosides. Broken rice is another viable option, offering 7.7% crude protein and 3150 Kcal/kg of metabolizable energy, with lower mycotoxin contamination compared to maize. Sorghum, particularly low-tannin varieties, can completely replace maize, while barley and wheat bran serve as partial substitutes despite their higher fibre content. Protein alternatives include sunflower meal (SFM), canola meal, and dried distillers' grains with solubles (DDGS), which are rich in crude protein and essential amino acids. Novel options like insect meal, derived from fly larvae or earthworms, are emerging as sustainable protein sources that can replace up to 50% of fishmeal in formulations. By-products such as rice bran, palm kernel cake, and copra meal also contribute valuable nutrients but require enzyme supplementation to improve digestibility and overcome anti-nutritional factors like phytate and tannins. While these alternatives reduce reliance on traditional grains, challenges such as nutrient variability, high fibre content, and processing requirements must be addressed. Enzyme additives like phytase and xylanase enhance nutrient absorption and mitigate anti-nutritional effects, while precise formulation ensures balanced diets tailored to poultry production stages. Economically, the use of alternative raw materials lowers feed costs, mitigates price fluctuations, and supports local economies by utilizing regionally available resources. Environmentally, they promote waste management by repurposing agro-industrial residues and reduce deforestation linked to traditional grain cultivation. Despite these benefits, careful management is essential to optimize inclusion rates without compromising bird performance or gut health. As global demand for poultry products rises, the strategic incorporation of alternative feed ingredients will play a pivotal role in ensuring the industry's resilience, economic competitiveness, and environmental sustainability.

Combining multiple alternatives, such as cassava peels for energy and soybean meal for protein, can sustain poultry feed quality during grain shortages. Proper processing and supplementation are essential to maximize the nutritional benefits of these substitutes.

Main challenges in sourcing alternative raw materials for poultry feed

The poultry industry's shift toward alternative raw materials to combat grain shortages faces multifaceted challenges that hinder widespread adoption despite their economic and environmental promise. A primary issue is **nutritional variability**, as alternative ingredients like cassava, rice bran, and oilseed meals often exhibit inconsistent nutrient profiles (e.g., fluctuating protein, energy, and amino acid levels), complicating precise feed formulation and risking imbalances in poultry diets. This variability necessitates frequent quality assessments using advanced tools like near-infrared (NIR) spectroscopy to ensure consistency, yet many operations lack the infrastructure or expertise for real-time analytics, relying instead on outdated nutrient tables or spot samples that fail to account for batch-to-batch differences. Additionally, **anti-nutritional factors (ANFs)** such as phytate in rice bran, tannins in sorghum, and cyanogenic glucosides in cassava impair nutrient absorption, requiring costly detoxification or enzyme supplementation (e.g., phytase, xylanase) to mitigate their effects, further increasing production costs. High fiber content in alternatives like barley, sunflower meal, and palm kernel cake reduces digestibility, limiting energy intake and necessitating additives to improve feed efficiency, which strains already tight profit margins.

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Logistical challenges, including **seasonal availability** and unreliable supply chains, disrupt consistent feed production, particularly in regions dependent on locally sourced by-products like palm kernel cake or fruit pomace, which may only be accessible during specific harvest periods. Storage limitations exacerbate these issues, as bulkiness and poor stability (e.g., rice bran's susceptibility to rancidity) strain feed mill logistics, while blending materials from multiple sources in shared bins amplifies nutrient variability, undermining feed quality. **Economic constraints** further deter adoption, as alternatives often present a higher cost-to-nutrient ratio compared to traditional grains like maize and soybean meal, despite grain shortages. Competition with human food chains for resources like broken rice or legumes escalates prices, while processing demands (e.g., drying, de-hulling) and enzyme supplementation inflate operational costs, making alternatives economically unviable for small-scale producers. Limited bin space in feed mills complicates inventory management, forcing producers to prioritize high-turnover ingredients and accept quality compromises[1]. **Technical barriers** such as inadequate research on optimal inclusion rates, long-term impacts, and region-specific adaptability of novel ingredients (e.g., insect meal, DDGS) restrict their utilization, particularly in developing regions lacking R&D infrastructure. Broilers, with their short production cycles, are especially vulnerable to **performance dips** caused by even minor nutrient shortfalls, as slower growth and reduced feed conversion efficiency directly impact profitability. Socio-economic factors, including competition with biofuel industries and insufficient farmer incentives to prioritize feed crops over cash crops, further limit the scalability of alternative sourcing. While advancements in enzyme technology and precision formulation offer partial solutions, their implementation requires capital investment and technical expertise, which are often inaccessible in resource-limited settings. Collectively, these challenges underscore the need for integrated strategies—combining robust quality control, targeted supplementation, and policy support—to harness the potential of alternative raw materials without compromising poultry health, productivity, or economic viability amid growing global demand for sustainable protein sources

Addressing these challenges requires a multifaceted approach, including improved analytical techniques, use of feed additives, and careful formulation based on digestible nutrients rather than total nutrient content.

How can the poultry industry ensure consistent quality in feeds made from alternative raw materials

To ensure consistent quality in poultry feeds made from alternative raw materials, the industry must address variability, nutrient deficiencies, and processing challenges through integrated strategies:

1. Advanced Quality Control Measures

- **Frequent Nutritional Analysis**: Use near-infrared (NIR) technology at reception and during milling to assess raw material variability in real time. Handheld NIR devices enable rapid decision-making at intake, while in-line NIR monitors final feed quality.
- **Comprehensive Testing**: Analyze anti-nutritional factors (e.g., phytate, tannins), amino acid profiles, and digestibility alongside basic nutrients to refine formulations.
- **Supplier Collaboration**: Partner with reputable suppliers to ensure raw material consistency and implement strict quality standards.

2. Technological Integration

- **Moisture Management**: Use milling aids and sensors to optimize moisture levels during feed processing, preventing spoilage and improving pellet durability.
- **Precision Formulation**: Employ feed formulation software to adjust diets dynamically based on ingredient variability, ensuring balanced nutrient delivery despite raw material fluctuations.

3. Feed Additives and Processing

- **Enzymes**: Incorporate phytase (to improve phosphorus availability) and xylanase (to break down non-starch polysaccharides in fibrous ingredients).
- **Antioxidants and Probiotics**: Mitigate oxidative stress and enhance gut health, counteracting variability in alternative ingredients.
- **Heat Processing**: Reduce anti-nutritional factors in ingredients like legumes through extrusion or pelleting.

4. Storage and Logistics Optimization

- **Segregated Storage**: Store alternative ingredients from different sources separately to avoid cross-contamination and maintain uniformity.
- **Inventory Rotation**: Prioritize using ingredients with shorter shelf lives (e.g., rice bran) to minimize nutrient degradation.

5. Sustainable Sourcing Strategies

- **Local Byproducts**: Integrate regionally available agricultural residues (e.g., grape pomace, artichoke leaves) to reduce transport costs and carbon footprint while ensuring steady supply.
- **Diversification**: Blend multiple alternative ingredients (e.g., DDGS, sunflower meal, insect meal) to buffer against shortages and price volatility.

6. Lifecycle-Specific Formulations

- **Phase Feeding**: Tailor diets to broiler/layer growth stages (starter, grower, finisher) with adjusted protein and energy levels, leveraging alternative ingredients like DDGS in finisher phases.

By combining rigorous testing, technology-driven processing, and strategic ingredient management, the poultry industry can maintain feed quality while reducing reliance on traditional grains. This approach balances cost, sustainability, and bird performance.

How alternative raw materials affect the nutritional profile of poultry feed

The nutritional quality of poultry feed is essential for optimal growth, health, and productivity of birds. Traditionally, poultry feed is composed of energy-rich ingredients like maize and wheat, and protein sources like soybean meal and fishmeal. However, rising costs, environmental concerns, and competition for these resources have prompted the exploration of alternative raw materials. While these alternatives offer economic and ecological advantages, they also bring changes to the nutritional profile of poultry feed—both positive and challenging.

1. Protein Content and Quality

Protein is a vital component in poultry feed for growth, muscle development, and egg production. Alternative protein sources such as insect meal (e.g., black soldier fly larvae), single-cell proteins (e.g., yeast, algae, bacteria), and plant-based by-products (e.g., sunflower meal, cottonseed meal) can partially or fully replace conventional protein ingredients.

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Insect meal typically contains 40–60% crude protein and is rich in essential amino acids like lysine and methionine. However, its protein digestibility can vary depending on the chitin content in insect exoskeletons. **Single-cell proteins** such as algae or microbial biomass are excellent in amino acid balance and digestibility, but their inclusion levels must be carefully controlled due to high nucleic acid content. **Plant-based by-products** may have good protein content, but anti-nutritional factors (ANFs) like gossypol (in cottonseed meal) or tannins (in some legumes) can reduce protein utilization if not treated or supplemented with additives.

Thus, while alternative raw materials can maintain or even enhance protein levels, attention must be paid to amino acid balance, digestibility, and the presence of inhibitors.

2. Energy Contribution

Energy is primarily supplied through carbohydrates and fats in poultry feed. Maize and wheat are dominant sources, but alternative energy sources include cassava peels, sweet potato vines, and bakery waste. **Cassava and sweet potato by-products** provide fermentable carbohydrates but are generally lower in energy than maize and may contain cyanogenic compounds that need detoxification. **Bakery and food waste** are high in energy and palatable but may vary in consistency and shelf life.

When using these alternatives, the energy density of the diet might need to be adjusted with supplemental fats or oils to meet the birds' energy requirements.

3. Fiber Content

Many alternative feed ingredients, particularly agricultural residues and plant-based by-products, have higher crude fibre content than traditional feedstuffs. High fibre levels can reduce nutrient digestibility and feed conversion efficiency in poultry, especially in broilers. Layers may tolerate higher fibre better, and some fibres (e.g., from beet pulp or oat hulls) may even benefit gut health when used in moderation. Enzyme supplementation (e.g., xylanase, cellulase) is often used to mitigate the effects of fibre-rich ingredients by enhancing digestibility and nutrient availability.

4. Fatty Acid Profile

Alternative materials like insect meal and algae can modify the fat content and fatty acid composition of poultry feed and, subsequently, poultry products. **Insect meals** often contain medium-chain fatty acids like lauric acid, which have antimicrobial properties and may improve gut health. **Algae** can be rich in omega-3 fatty acids (e.g., DHA), which may enhance the nutritional value of poultry meat and eggs for human consumption.

Incorporating these ingredients can improve the lipid profile of the feed, offering functional benefits for both birds and consumers.

5. Mineral and Vitamin Levels

Alternative raw materials can influence the micronutrient profile of poultry feed. **Algae and seaweed meals** are often high in minerals such as calcium, magnesium, and trace elements like iodine and selenium. Some **agricultural by-products** (e.g., brewer's yeast) are rich in B-complex vitamins and other bioactive compounds that support immunity and metabolism.

However, variability in composition and the presence of mineral-binding substances like phytates may affect bioavailability. In such cases, enzyme supplements like phytase can help increase mineral utilization.

6. Anti-Nutritional Factors and Contaminants

Many alternative feed ingredients contain naturally occurring compounds that can interfere with digestion, metabolism, or health: **Tannins, phytic acid, trypsin inhibitors**, and **mycotoxins** are common in many plant-based by-products and unprocessed waste materials. **Proper processing** (e.g., fermentation, heating, or chemical treatment) can mitigate these effects, improving safety and nutritional value.

Therefore, the inclusion of alternative ingredients requires careful formulation, processing, and quality control to avoid negative impacts on feed quality and bird performance.

Alternative raw materials can positively or negatively affect the nutritional profile of poultry feed, depending on their source, processing, and inclusion levels. Many alternatives offer comparable protein and energy levels, introduce valuable fatty acids and micronutrients, and contribute functional benefits. However, they may also increase fiber, introduce anti-nutritional factors, or vary in nutrient composition.

To successfully integrate these materials, poultry nutritionists must adopt a balanced and science-based approach—utilizing feed analysis, supplementation, and processing technologies. When properly managed, alternative raw materials can maintain feed quality, support bird health, and enhance the sustainability of poultry production without compromising nutritional standards.

Specific supplements needed when feeding poultry with alternative materials

When feeding poultry with alternative raw materials, specific supplements are often necessary to ensure optimal health, growth, and production. Enzyme supplementation is crucial, with phytase being essential to improve phosphorus availability by breaking down phytate in plant-based feeds like rice bran and cassava pulp. Xylanase enhances the digestibility of non-starch polysaccharides (NSPs) in fibrous ingredients such as barley and wheat bran. Proteases boost protein digestibility when using alternative protein sources like legumes or distillers dried grains with solubles (DDGS). Essential trace minerals, including magnesium, calcium, phosphorus, zinc, iron, and manganese, must be supplemented to meet nutritional needs, especially when using by-products or novel ingredients. Vitamins, particularly antioxidants like vitamins C and E, are crucial to prevent feed spoilage and oxidative stress in poultry consuming alternative diets. Probiotics and prebiotics promote gut health and improve nutrient absorption, which is especially important when alternative feeds contain anti-nutritional factors or are less digestible. Phytogenic feed additives, derived from plants such as thyme, oregano, garlic, and cinnamon, enhance digestion, boost immunity, and reduce microbial loads in the gut. These include essential oils like carvacrol and thymol, as well as extracts from turmeric or black cumin seed. Organic acids improve gut pH balance and nutrient utilization, particularly when using high-fibre or by-product-based feeds. Nutraceuticals like omega-3, omega-6, and omega-9 fatty acids enhance growth performance and overall poultry welfare when traditional energy sources are limited. Crystalline amino acids are often necessary to balance amino acid specifications, especially when using protein alternatives that may be deficient in certain essential amino acids. By incorporating these supplements, poultry producers can mitigate the challenges associated with alternative raw materials, such as nutrient variability, anti-nutritional factors, and lower digestibility, while maintaining optimal bird performance and health.

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When feeding poultry with alternative raw materials during grain shortages, specific supplements are often necessary to ensure optimal health, growth, and production. These supplements address nutrient deficiencies, anti-nutritional factors, and feed efficiency challenges associated with alternative ingredients.

Environmental benefits of using alternative raw materials in poultry feed

As the global demand for poultry products continues to grow, so does the pressure on the agricultural sector to produce more feed efficiently and sustainably. Traditional poultry feeds, which often rely heavily on conventional ingredients like soybean meal and maize, contribute significantly to environmental challenges such as deforestation, water consumption, greenhouse gas emissions, and biodiversity loss. In response, researchers and industry professionals are exploring alternative raw materials for poultry feed that can help mitigate these impacts. The integration of such materials offers a wide array of environmental benefits, making it a vital step toward more sustainable poultry farming.

1. Reduction in Deforestation and Land Use Pressure

One of the most significant environmental concerns associated with traditional poultry feed is deforestation, Soybean cultivation for animal feed is a major driver of land-use change and habitat destruction. By incorporating alternative raw materials such as insect meal, algae, agricultural by-products, and food waste, the reliance on land-intensive crops like soy and maize can be reduced.

For example, black soldier fly larvae (BSFL) can be produced on organic waste and require significantly less land and water than soybean cultivation. Their use can relieve pressure on ecosystems that are currently exploited to meet the demand for conventional feed crops.

2. Lower Greenhouse Gas Emissions

Livestock production is a major contributor to global greenhouse gas (GHG) emissions, and feed production accounts for a large share of those emissions. The cultivation, harvesting, processing, and transportation of traditional feed ingredients generate considerable CO_2, CH_4, and N_2O emissions.

Alternative raw materials such as insects, single-cell proteins (e.g., yeast or bacteria-based meals), and algae offer a much smaller carbon footprint. Insects, for instance, can convert organic waste into high-quality protein with much lower emissions compared to conventional protein sources. Algae can be cultivated using CO_2, even helping to sequester carbon from the atmosphere. Utilizing such alternatives could significantly reduce the poultry industry's contribution to climate change.

3. Improved Waste Management and Circular Economy

Many alternative feed materials can be derived from organic waste, including food scraps, agricultural residues, brewery by-products, and expired produce. By converting waste into feed, poultry producers can contribute to a more circular economy, where waste streams are valorised instead of being discarded.

This approach helps reduce the volume of organic waste ending up in landfills, where it would otherwise decompose anaerobically and release methane, a potent greenhouse gas. Using food industry by-products such as wheat bran, rice husk, or spent grains not only diverts waste but also adds value to what was once considered low-utility biomass.

4. Conservation of Water Resources

Traditional feed crops such as maize and soy require vast amounts of water for irrigation. Water scarcity is a growing global concern, especially in arid regions where agriculture already competes with domestic and industrial needs.

Alternative feed sources like BSFL, food waste-based feeds, or microbial proteins often require minimal water inputs. Insects, for example, derive most of their moisture from the organic waste they consume, drastically reducing the need for freshwater in feed production. Reducing the water footprint of feed ingredients is crucial in adapting poultry farming to the realities of climate change and water scarcity.

5. Enhanced Biodiversity Protection

Intensive monoculture farming for conventional feed ingredients contributes to biodiversity loss by replacing diverse ecosystems with single-crop landscapes, often managed with heavy pesticide and fertilizer inputs. These practices degrade soil health, pollute water bodies, and negatively impact pollinators and other wildlife.

By utilizing diverse feed sources such as underutilized legumes, seaweeds, and fermented agricultural by-products, poultry producers can reduce the demand for monocultures. Additionally, sourcing local feed ingredients can encourage more varied agricultural systems, promoting biodiversity and ecosystem resilience.

6. Reduction in Chemical Inputs

The cultivation of soy and maize typically involves the use of synthetic fertilizers, herbicides, and pesticides. These chemicals can lead to soil degradation, water contamination, and disruptions in local ecosystems.

Alternative feed materials, particularly those derived from waste streams or non-chemical-intensive sources, help reduce the reliance on agrochemicals. Algae, for instance, can be grown without fertilizers on non-arable land, and insect farming requires minimal external inputs. This shift not only improves the environmental footprint of feed production but also contributes to more sustainable agricultural systems overall.

7. Promotion of Local Feed Production

Many countries import large quantities of soybean meal and maize to meet their poultry feed needs. This reliance on imports contributes to high transportation emissions and supply chain vulnerabilities.

Using locally available alternative feed materials, such as cassava peels, palm kernel cake, or local legumes, can significantly cut down on transportation-related emissions. It also encourages local economies and reduces the environmental costs associated with global feed transport logistics.

8. Potential for Soil Health Improvement

The cultivation of alternative crops and the use of agricultural by-products can also benefit soil health. For example, rotating traditional crops with legumes or other nitrogen-fixing plants used in alternative feeds can enhance soil fertility. Moreover, integrating crop residues into feed reduces the need for burning, which is a common practice in some regions and contributes to air pollution and GHG emissions.

Insects fed on organic waste also produce frass (insect manure), which can be returned to the soil as a nutrient-rich organic fertilizer, closing the nutrient loop in agricultural ecosystems.

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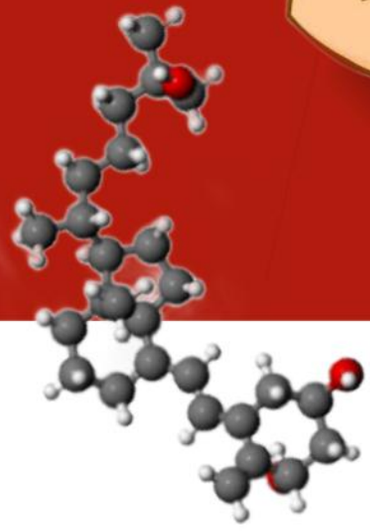

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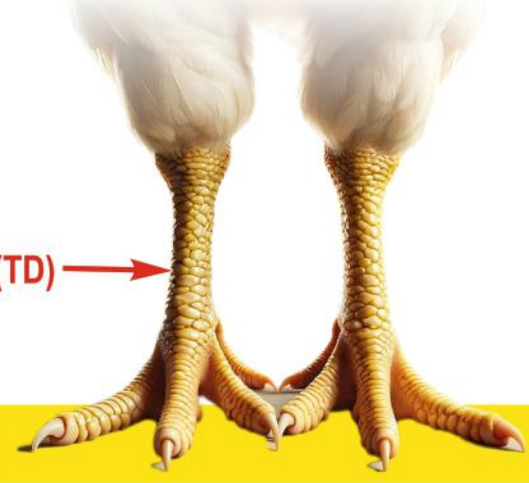

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The environmental benefits of incorporating alternative raw materials into poultry feed are substantial and multifaceted. From reducing deforestation and greenhouse gas emissions to enhancing waste management, conserving water, and protecting biodiversity, these alternatives present a pathway to a more sustainable poultry industry. While challenges remain in terms of scalability, regulatory approval, and consumer acceptance, the long-term environmental advantages make a strong case for innovation and investment in this area.

As the world seeks to balance food security with ecological preservation, transitioning to alternative feed sources in poultry production offers a promising solution. Stakeholders—including farmers, feed manufacturers, policymakers, and consumers—must work together to support research, infrastructure development, and education efforts that facilitate this sustainable shift.

Economic benefits of using alternative raw materials in poultry feed

The poultry industry is one of the fastest-growing agricultural sectors worldwide, driven by rising demand for affordable animal protein. However, feed costs represent the largest expense in poultry production, accounting for up to 70% of total production costs. Traditional feed ingredients like soybean meal, maize, and fishmeal are subject to price volatility, import dependency, and environmental concerns. In this context, integrating alternative raw materials into poultry feed formulations offers not only environmental but also significant economic advantages. These benefits span cost reduction, price stability, local economic development, waste valorisation, and long-term sustainability.

1. Reduction in Feed Costs

One of the most direct and measurable economic benefits of using alternative raw materials in poultry feed is the potential for cost reduction. Traditional feed ingredients are often expensive due to high demand, global supply chain constraints, and import tariffs. Alternative feed ingredients such as agro-industrial by-products, insect meal, food waste derivatives, and local crop residues can be obtained at lower prices or even for free in some cases.

For instance, incorporating by-products like wheat bran, rice bran, palm kernel cake, and brewery spent grains can significantly lower feed formulation costs without compromising nutritional quality. Additionally, using black soldier fly larvae (BSFL), which can be cultivated on organic waste, provides a cost-effective protein source. Studies have shown that substituting a portion of conventional protein sources with BSFL can reduce feed costs by 10–30%, depending on scale and local availability.

2. Stabilization of Feed Prices

The reliance on imported soybean meal and maize makes many poultry producers vulnerable to global price fluctuations influenced by climate change, trade policies, geopolitical tensions, and currency instability. This volatility affects the financial predictability and long-term planning of poultry operations.

Alternative feed ingredients, particularly those sourced locally or regionally, offer greater price stability. Because these materials are often by-products or waste streams, their availability and cost are less tied to international markets. For example, cassava peels, sweet potato vines, and maize stover are commonly available in many tropical countries and provide a more stable and predictable feed supply chain, protecting farmers from international market shocks.

3. Enhancement of Local Economies

Using alternative feed materials promotes the development of localized feed production systems. This reduces dependence on imports and keeps money circulating within local economies. Smallholder farmers, agro-processors, and waste management businesses can all benefit economically from the development of alternative feed value chains.

For instance, by supporting insect farming enterprises or feed processing units that utilize agricultural waste, poultry producers can contribute to job creation, rural development, and income diversification in their communities. This also aligns with national goals in many countries to boost agricultural value addition and reduce reliance on external inputs.

4. Utilization of Low-Value and Waste Resources

Many alternative feed ingredients are derived from underutilized or waste materials, which would otherwise incur disposal costs or create environmental burdens. Transforming these materials into poultry feed creates value from waste, turning liabilities into economic assets.

For example, food processing industries generate large volumes of peels, pulp, and trimmings that are often discarded. By redirecting these materials into animal feed, businesses can reduce waste management expenses and potentially earn revenue through sales or partnerships with feed manufacturers. Likewise, farmers who previously burned crop residues or paid for their disposal can now profit from selling them as feed ingredients.

This waste-to-feed model not only generates additional revenue streams but also encourages more efficient resource use across the agricultural and food sectors.

5. Lower Transportation and Logistics Costs

Importing traditional feed ingredients entails high transportation and logistics costs, including freight, port charges, storage, and inland distribution. These costs are passed on to poultry producers and, ultimately, consumers.

In contrast, sourcing alternative feed ingredients locally reduces logistical expenses and shortens supply chains. For instance, using locally grown legumes, oilseed cakes, or by-products from nearby agro-processors can drastically cut transport costs. This benefit is especially significant in remote or landlocked regions where access to global markets is limited or expensive.

Reduced transportation costs also mean lower carbon emissions and a smaller environmental footprint, aligning economic efficiency with sustainability goals.

6. Support for Small and Medium Feed Enterprises

The incorporation of alternative feed ingredients opens up opportunities for innovation and entrepreneurship in feed formulation and production. Small and medium-sized enterprises (SMEs) can develop niche feed products tailored to local conditions, such as high-fibre feeds, low-cost protein supplements, or region-specific feed blends.

These SMEs can capitalize on locally available raw materials and lower operational costs compared to large-scale industrial feed producers reliant on imported commodities. This democratization of feed production promotes competitive pricing, enhances market diversity, and fosters innovation in feed processing technologies.

7. Improved Profit Margins for Poultry Farmers

Reducing feed costs directly improves the profit margins of poultry producers. Lower input costs mean higher net income per bird, allowing producers to reinvest in their operations, expand production, or buffer against market fluctuations.

In small-scale or subsistence-level poultry farming, even modest reductions in feed expenses can significantly affect household income and food security. Additionally, farmers can pass some of the savings to consumers through more affordable poultry products, enhancing market access and competitiveness.

8. Increased Resilience and Risk Management

Economic resilience in poultry farming depends on diversifying input sources and minimizing exposure to external risks. Alternative feed ingredients help producers hedge against risks such as droughts, supply chain disruptions, or geopolitical tensions that affect traditional feed imports.

Moreover, resilient feed systems enable continuous production even in adverse conditions, reducing the likelihood of stock losses or price hikes due to feed shortages. This stability benefits not only producers but also the broader poultry value chain, including hatcheries, processors, retailers, and consumers.

9. Opportunities for Research, Development, and Innovation

The development and commercialization of alternative poultry feeds stimulate investment in research, development, and education. Universities, agricultural research institutions, and private companies can explore novel formulations, improve nutrient profiles, and develop cost-effective processing methods.

Innovations such as fermentation, enzyme supplementation, and thermal processing can enhance the nutritional value of alternative feed ingredients, making them more economically viable. These advancements can lead to intellectual property generation, patents, and the creation of knowledge-based enterprises, further contributing to economic growth.

10. Long-Term Economic Sustainability

In the long run, transitioning to alternative feed materials supports economic sustainability in the poultry sector. Relying on finite or environmentally damaging resources is not economically viable in the long term. As regulations around environmental impact, land use, and carbon emissions tighten, feed producers and poultry farmers who have adopted sustainable practices will face fewer compliance costs and market restrictions.

Moreover, consumer demand for ethically and sustainably produced animal products is increasing. Poultry producers using eco-friendly feed inputs may gain access to premium markets, certifications, and export opportunities, thereby enhancing their economic outlook.

The economic benefits of using alternative raw materials in poultry feed are broad, ranging from immediate cost savings to long-term resilience and profitability. By reducing dependency on volatile global markets, lowering production costs, valorising waste, and promoting local value chains, alternative feed sources represent a strategic investment in the economic future of poultry farming.

As the sector faces increasing pressure to balance productivity with sustainability, integrating alternative feed resources offers a practical and profitable solution. With the right policies, infrastructure, and awareness, these economic benefits can be maximized to support both industry growth and environmental stewardship.

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VIV Select Türkiye Poultry Expo in Istanbul – A Grand Success

Ricky Thaper (www.rickythaper.com)

The 11th edition of VIV Select Türkiye, from April 24 to 26 at the Istanbul Expo Center, Istanbul, Türkiye, was a remarkable success, solidifying its position as the premier international trade fair for poultry technologies in the region. Being organised by HKF Trade Fairs and VNU Exhibitions Europe, VIV Select Türkiye 2025 had brought together over 15,000 plus industry professionals from across the globe, including poultry breeders, feed millers, equipment manufacturers and pharmaceutical companies. The event featured more than 250 exhibitors spanning in three halls, showcasing the latest innovations in poultry breeding, meat processing, feed production, veterinary instruments and poultry farm Equipment's. This time there was significant participation from delegates from South Asia, representing the feed millers, poultry breeders and pharmaceutical firms. The visitors found the exhibition to be highly informative, gaining insights into cutting-edge technologies and logistical advancements.

VIV Select Türkiye 2025 had received substantial support from esteemed industry organisations, including BESD-BİR (Association of Poultry Meat Producers and Breeders), WPSA (World's Poultry Science Association), GLADER (Food Laboratories and Food Inspectors Association), and the Republic of Türkiye Ministry of Agriculture and Forestry Poultry Research Institute, among others. The participating companies are from Belgium, China, France, Germany, India, Iran, Israel, Italy, South Korea, Mexico, Poland, South Africa, the Netherlands, the United States besides Türkiye. VIV Select Türkiye continue to focus on innovation, bringing together buyers and sellers of the latest technologies and products to ensure the success of trade visitors' businesses.

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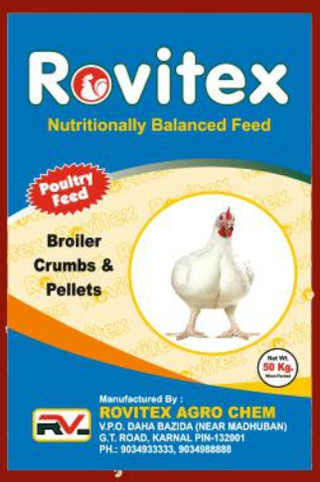

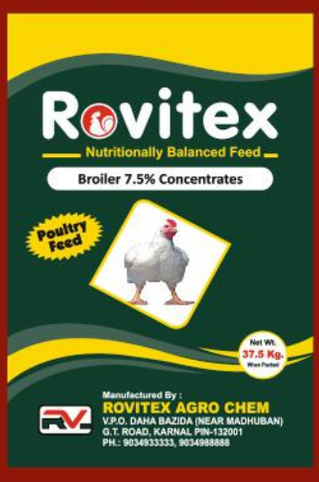

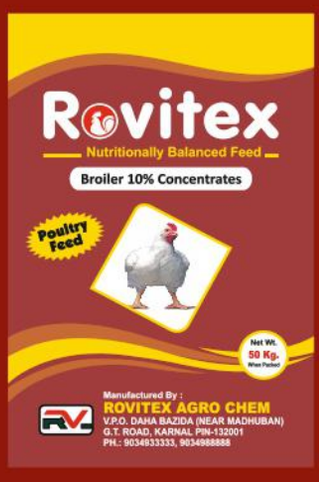

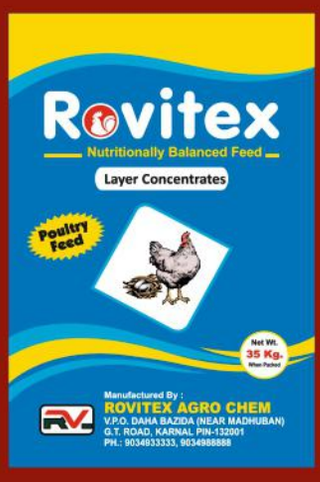

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Sustainable Animal Health with Phytogenic Innovations:

Dr. Eckel Leading the Way- Ricky Thaper

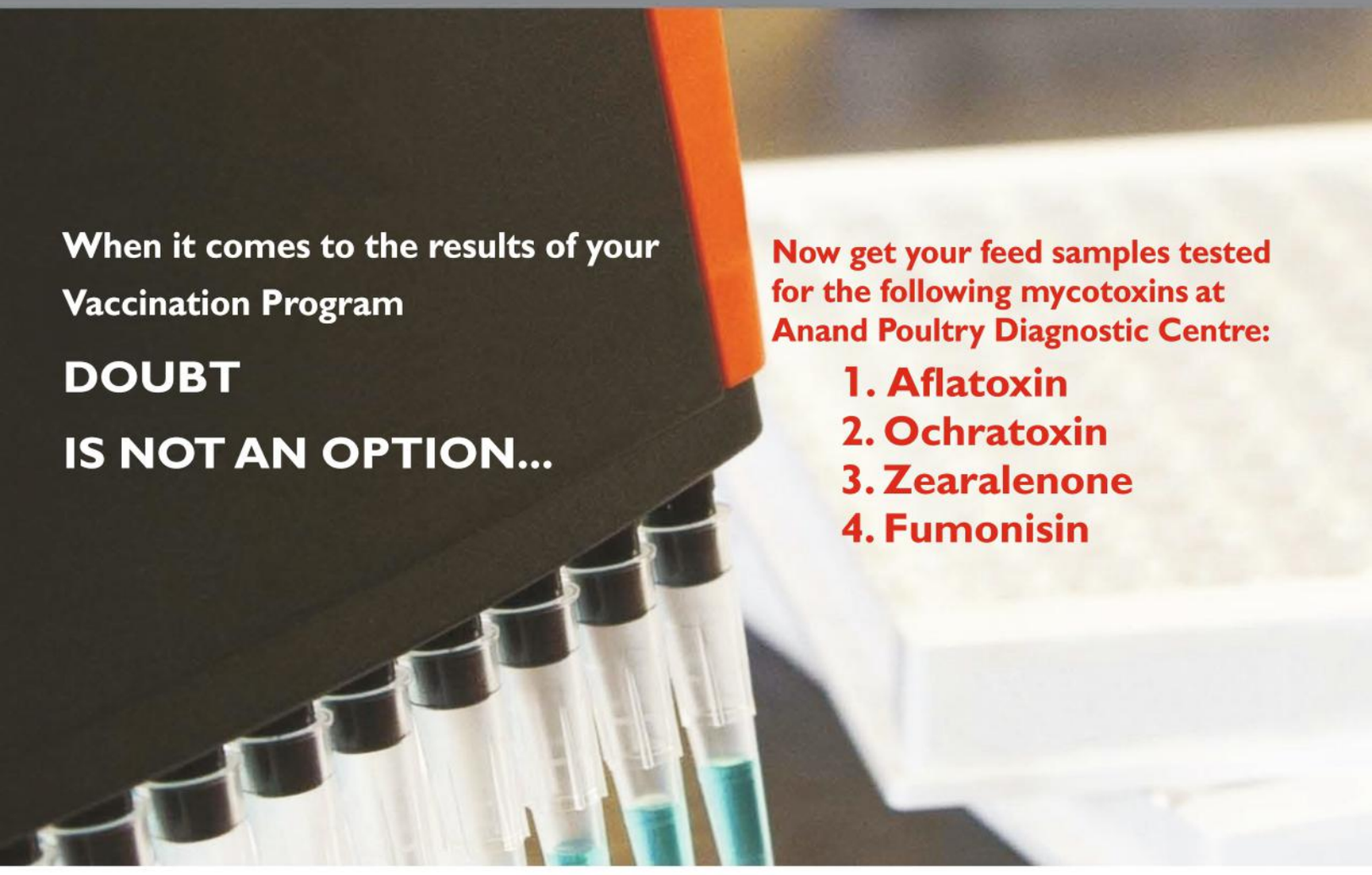
(www.rickythaper.com)

One of the main challenges in modern animal farming is sustainably improving animal health and welfare. Animal health directly impacts food quality and animal productivity. Healthy birds/animals lead to better product quality, reduced treatment costs, more consistent yields, improved farm management and greater customer satisfaction. In an era where climate change frequently affects animal productivity, natural resources are limited, and the global trade landscape continues to evolve, **Dr. Eckel Animal Nutrition GmbH & Co. KG**, based in **Niederzissen, Germany**, has taken a pioneering step toward supporting sustainable, resilient and successful livestock farming. During my recent visit to Germany, I had the opportunity to explore their state-of-the-art manufacturing facility, witnessing the innovation and commitment behind their global success.

Founded in 1994 by **Dr. Antje Eckel**, the company was established with a vision to make animal nutrition healthier, more welfare-oriented and sustainable. Over the past three decades, Dr. Eckel has grown from a family business into a globally recognized provider of alternative feeding solutions. Dr. Antje Eckel has also served in various international roles promoting animal health. A key contributor to the company's growth is **Dr. Bernhard Eckel**, Vice President – Sales, who has been associated with the company since its inception.

Further strengthening the leadership is **Dr. Viktor Eckel**, Managing Director – Products & Innovation, who combines his passion for life sciences and technology in product development. Also part of the team are **Mr. Theo Eckel**, Head of Purchasing and **Ms. Klara Eckel**, who leads business development initiatives and serves as an authorised signatory.

The Importance of Gut Health - The animal gut is a complex ecosystem hosting diverse microorganisms that evolve with their hosts. Each section of the gut houses distinct microbial communities that shift throughout the animal's life. In poultry, microbial colonisation begins at hatching and is influenced by the hen and the environment. Feed composition also plays a significant role in shaping the microbial profile and by extension, long-term health. Managing gut health isn't simply a battle between good and bad bacteria. Some microbes typically seen as harmful may play beneficial roles under specific conditions, while even beneficial ones can cause harm if imbalanced. A **stable microbial balance** is vital for maintaining animal health and performance. Gut health disturbances caused by poor feed quality or disease can severely impact productivity.



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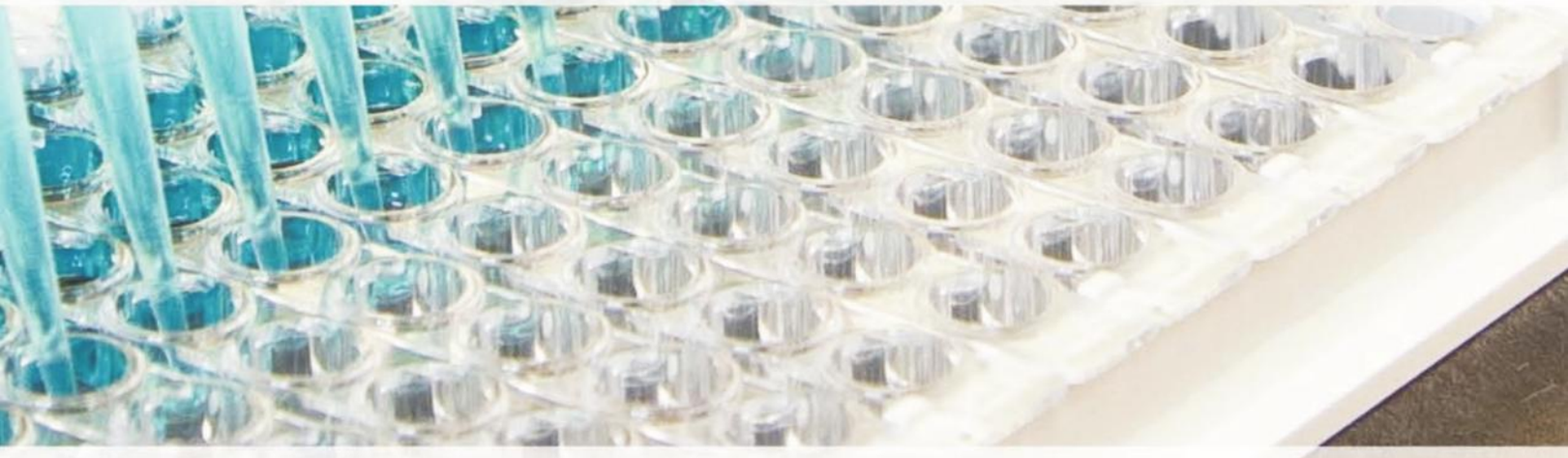

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Phytogenics: A Natural Alternative - This growing concern has fuelled demand for **natural, effective alternatives**—among which phytogenics play a leading role. Derived from herbs, spices and plant extracts, phytogenic feed additives offer a selective, plant-based approach to enhancing gut health, boosting immunity and improving digestion. Unlike AGPs, phytogenics target only harmful microbes while preserving the beneficial ones, ensuring a healthier intestinal environment. They also possess **anti-inflammatory, antioxidant and immune-boosting properties**, further supporting animal well-being.

With three decades of expertise in phytogenic feed additives, **Dr. Eckel** has become one of the global leaders in sustainable animal nutrition. The company focuses on identifying powerful plant-based compounds that can fully unleash nature's potential to improve animal performance. Their additive solutions cover **poultry, swine, ruminants, aquaculture and pets**, with more than 10% of annual revenue invested in R&D.

Global Reach with Local Commitment - From its German headquarters, Dr. Eckel supplies products to Europe, CIS countries, and the Middle East. Through its **Bangkok office**, the company serves customers across Southeast and South Asia. With a skilled marketing team of 70 professionals from over 20 countries, their solutions are now available in more than **40 countries** worldwide. Dr. Eckel's products are manufactured to strict German quality standards, with **over 75% of raw materials sourced from within the EU**, ensuring short supply routes, flexible processes, and reduced environmental impact. This results in better animal welfare, high-quality products, and improved profitability for farmers.

Ms. Jessica Rheindorf, Head of Marketing discussed about Dr. Eckel's products availability in different part of world. **Dr. Elisabeth Holl,** Senior Technical Manager, updated on Dr. Eckel products. **Dr. Muhammad Umar**, Technical Sales Manager- Key Accounts gave a nice presentation on "Profitable Production and Sustainable Success- Your Phytogenic Solutions in Poultry". Ms. **Keerthana Giriprasad**, Technical Sales, discussed about feed additive market. **Ms. Ina Hickmann,** Junior Marketing Manager updated us about their activities. These phytogenic products offer a game-changing approach to sustainable animal nutrition. With participation in leading global poultry and livestock exhibitions, Dr. Eckel is expanding its reach and showcasing its innovative solutions to diverse markets.

Growing Focus on India - With India's poultry industry growing at 7–8% annually, the company sees immense potential for collaboration. "Our solutions can support the sustainable growth of the Indian poultry sector," said **Dr. Bernhard Eckel**. "Together with our partners in India, we want to help farmers improve productivity through gut-health-focused, natural solutions," added **Dr. Antje Eckel**. Dr. Eckel Animal Nutrition GmbH & Co. KG is looking forward to working with strong partner to promote healthier animal farming practices in Indian poultry, dairy, and aquaculture. Those interested can contact the company directly (https://www.dr-eckel.de/en)

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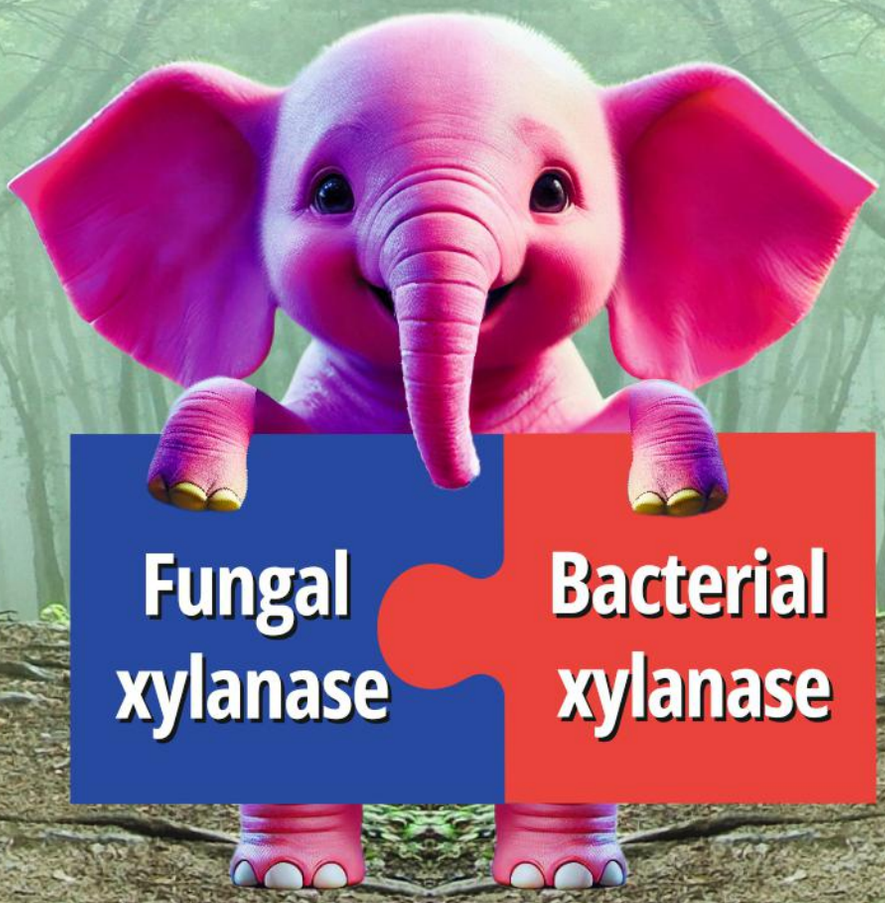

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ARTICLE

Common Parasites and their Harmful effect on Birds

Alok Kumar Singh[1*], Deepali Tiwari[2], Pradeep Kumar[3], Jagriti Srivastava[4] and Nitin D. Hirani[5]

Numerous Parasite causes various diseases in poultry birds and most prevalent problem caused by parasites are mainly by ectoparasite. Parasites are group of arthropods which all animals carry specific parasites which evolve to live on adapted environment of its host. Parasites cause economic losses in poultry industry so main aim of poultry keeper is to reduce parasite to low level to minimize farm losses.

There are mainly two types of parasites i. e. internal parasite which lives inside host body and external parasite which live outside host body.

I. Internal parasites

A. Helminths

(I) Round worms:

(1) Gapeworm

- *Syngamus trachea* i. e. Gapeworm lives in trachea or windpipe of poultry where it lay eggs and coughed and excreted to transmit disease to other susceptible birds.
- This worm is known as gapeworm since it produce gasping signs in birds where affected poultry show open mouthed breathing known as gapes.
- Incidence of parasite in small flocks has decreased in recent years.

***(2) Capillaria* worm**

- These are tiny worms known as hairworm which live in intestine. It can complete lifecycle with or without intermediate host mainly earthworm is involved.
- Signs of infestation includes gastrointestinal (GI) signs like diarrhoea, emaciation, haemorrhagic enteritis, decrease egg production with mottled eggs and if untreated may lead to death of birds.

(3) *Heterakis gallinarum*

- It is commonly referred as caecal worm which lives in caecal pouch of birds where plant fermentation of feed takes place.
- This parasite act as carrier of *histomonas meleagridis* which causes black head disease in poultry but also affect chicken.
- Transmission occurs by ingestion of caecal worm eggs present in litter by birds. *Heterakis* eggs sometimes get affected by protozoa *histomonas* and these infected carried by earthworm which causes severe infestation in flock.

(4) Ascarid worm

- Roundworms also called ascarids are most common intestinal parasite found in poultry.
- These parasites are species specific so little chance of cross reactivity among poultry species.
- Ascarids has simple lifecycle and get complete within 35 days and mainly affect digestive capacity and block intestinal lumen due to excess roundworms

(5) Trichostrongylid worm

- These parasite lives in intestine of host causing digestive issues

(II). Tape worms

- Correctly cestode which are flatten, ribbon shaped, segmented worm.
- As worm increase in size segment break off to excrete in faeces and appears as grain of rice.
- These worms have indirect lifecycle and snails, slugs, beetle, earthworm act as intermediate host.
- Affected birds remain unthriftiness; lose weight and if in huge amount cause heavy mortality in flock.

B. Protozoan Parasites

(1) Histomonas *meleagridis*

- It is single celled, free living protozoa which causes blackhead disease in turkey.
- This parasite causes infection in turkey, peasant, quail, peacock, guinea fowl etc. affecting liver causing bright yellow diarrhoea.
- *Heterakis gallinae* act as intermediate host of *Histomonas* where concurrent infection occurs in host.
- Regular deworming of birds with suitable dewormer may cause reduce incidence of blackhead disease in poultry.
- Immediate action should be taken once symptoms appear in bird like diarrhoea as disease may end up leading to death within 2 days.
- Treatment is done mainly by dimetridazole mixed in water but banned for welfare of turkey, duck ie from meat producing species.

(2) *Hexamita meleagridis*

- It is protozoa found in gut of chicken causing diarrhoea, unthriftiness in chicken, turkey, pheasant, and poultry.

(3) *Trichomonas gallinae*

- Another protozoon which causes oral canker in turkey, hens, pheasant.
- White or yellow colour cheesy substance get deposited in oral cavity, throat which can transmit infection bird to bird through feed and water.
- Always check for this before buying birds and keep drinker clean and vitamin A should be supplemented in feed.

II. External parasites

(1) Red Mite (*Dermanyssus gallinae*)

- Red in colour, 1 mm blood sucking parasite which causes anaemia in hens.
- Parasite mainly feed during night which causes its easy control and can transmit disease from bird to bird.
- Mites can be detected by whitish powder seen on cracks, crevices, on wooden surfaces and eggs with tiny spots of blood over surfaces.
- Mites can survive for almost year without feeding and remain grey in colour after hunger it feed on host blood and turns red. Severe blood loss of animal causes anaemia, debility and sometimes death.

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- Red mites are nocturnal feeders but live on roof of hut ie of hen house and during day hours it hide from sunlight and crawl during night time for feeding mainly these places provide suitable hiding place and difficult to remove mites.
- Either replace roof with onduline sheet which is corrugated bitumen sheet as it prevent mites concentration over area or by clear perspex on top to prevent breeding place for mites due to high light. Avoid wild birds in poultry house as can carry mites with them so vigilance is required.
- Breeding cycle of red mites are for 10 days starting from laying egg , batch to breeding mainly during summer bright weather where mites can survive for month without blood feed and turns grey and after finding suitable host feed immensely on their blood causing severe blood loss in host.

Prevention and control

- Synthetic permethrin can be effectively used to control red mite population. It can be sprayed on birds before suspected for mite infestation. Herbal products are least effective hence not preferred.
- Some breeder prefers flea powder for dust bath but does not show good result in control.
- Blow lamp can be used to remove mites from cracks and crevices. Pyrethrum based flea powder to be sprayed on roof and suspected areas for control of red mite population.
- Diatomaceous earth (DE) can be used effectively to kill mites as it dessicate exoskeleton of red mites. Hence proper approved licensed DM to be used for control of mite population.

(2) Northern fowl mites (*Ornithonyssus sylviarum*)

- These mites are similar to red mites in shape and size. But they complete there entire lifecycle in bird body hence survival depends host, so early complete there lifecycle and severly affecting host health leading to ultimate death if remained untreated.
- Mites generally hide near ear canal and mainly in crusted area in animal hence proper spraying over surface by pyretherium based powder for control is required.
- Cockerels are majority affected birds infested birds look dirty with patches and anxious with stunted growth hence proper inspection should be done to control spread of infection to other birds.

Prevention and control

- These mites generally spread from birds to birds not carried by wild birds to premises hence it is not major route of spread.
- There is no licensed product for spraying hence diamateous earth can be used.
- Susceptible species birds should be checked regularly for parasite specially white feather birds which appears as dirt tinge stain mainly under tails mites hide promptly.
- Proper isolation and suggested treatment to be done for control.

(3) Common chicken louse (*Menopon gallinae*)

- This louse is flat, yellow, fast moving, about 2 mm long mainly seen under vent or under wings.
- These mites move quickly over host body and feed on host feather debris and skin. And is host specific and complete it's lifecycle on host without biting human beings.
- Menopon gallinae is less life threating than other mites as it does not effect host health severly but affect during mating as mite eggs cluster appears as sugar sprinkled near vent area which act as barrier during mating between birds.
- For control pick up eggs by plucking or clipping feather and safely discard it to safe place as egg can hatch falling on ground can act as source of infection to other birds.
- Dusting with louse powder will control louse infestation which worse in winter, autumn. Heavy infestation causes decrease in egg production and causes listlessness.

Prevention and control

- Dust with pyrethrum based louse powder.

(4) Scaly leg mites (*Cnemidocoptes mutans*)

- Scaly mites causes intense irritation by burrowing under scales of legs which initially white film replaced by white or yellow debris over legs.
- In heavy infestation these crust reduce blood supply to limb causing necrosis and gangrenous limb, whitish areas can be easily detected initially.
- Affected limbs are foul smelling like musty, dead mice which should be treated.

Prevention and control

- Mites infection can be controlled by dipping legs in petroleum jelly which cutoff oxygen supply to mites ultimately leading to death of mites.
- Earlier diesel or kerosene oil used but it affects bird health.
- Organic control is by dipping birds leg once in week in wide open surgical spirit jar which is repeated for 3 weeks.
- Generally scales and crust are mounted once in a year so along with feathers mites drop off which should be removed from area. Heavy infested leg may take year to look normal again.

(5) *Cnemidocoptes*

- *Cnemidocoptes gallinae* (depluming mites), mainly affect feather portion of body and causing itching and are easily pulled out by birds while, *Cnemidocoptes mutans* (scaly mites), affects leg region and causes irritation and inflammation and displace the scales. Occasionally cause feather loss around head and neck region.
- Applying louse powder
- Louse powder is effective in spraying by one person it suitable technique is used hold bird with one hand and hand downward or place on back over applying table and with other hand rub powder over chest and suspected areas over vent, under wings, abdomen, back and neck.
- Thoroughly apply powder for complete application and proper precaution should be taken by applicator as wear gloves and wash hands afterwards with suitable disinfectant.

Economic impact

- Internal and external parasite causes economic losses which should be minimize for maximum outcome.
- Proper examination of birds in flock before introduction into new click to be done
- In case of suspected birds licensed product to be used for control and eradication.
- Birds health should be noticed early for better eradication and maximum outcome from bird farming.

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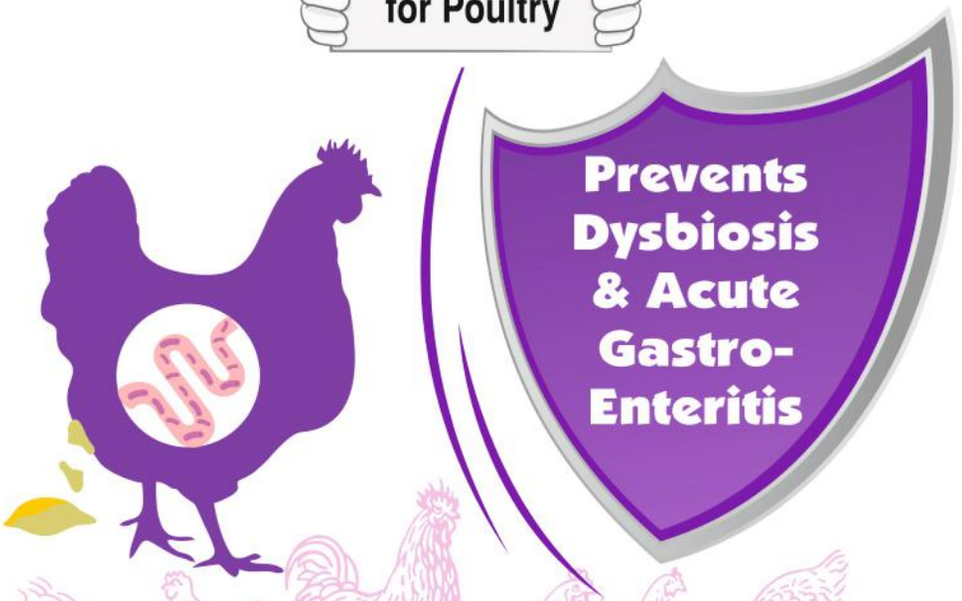

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ARTICLE

HUVEPHARMA®

Finding the Future: Why Sustainable Feed is the Backbone of Poultry's Green Revolution

Mr. O. P. Singh
Managing Director, Huvepharma SEA

Dr. Priyanka Kamble
Sr. Marketing Manager, Huvepharma SEA

The poultry industry is at a crossroads. As the world demands more protein, it also demands more responsibility. Consumers are asking not just **what they eat**, but **how it's produced**. And while sustainability conversations often focus on farms and animal welfare, one of the most significant - and often overlooked - contributors to the industry's environmental footprint lies upstream: **the feed mill.**

The Carbon Reality Check

According to a comprehensive 2022 study on Spanish poultry production by Harrison T., a staggering **71% of total GHGe in the chicken meat value chain originates from feed alone**.

Here's the breakdown:

GHGe by chain stage

- Breeder farms – 17%
- Hatchery – 5%
- Broiler farms – 71%
- Slaughterhouse – 7%

GHGe by source (origin)

- Feed – 71%
- Feed combustion – 8%
- Electricity – 10%
- Water treatment – 4%

That's not just a statistic—it's a wake-up call. It tells us that the most impactful change we can make starts *before* the chicks even hatch. Feed millers, you're no longer just part of the supply chain—you are now at the forefront of climate action.

For feed millers, this presents both a challenge and a tremendous opportunity. The sustainability of our entire industry hinges on how feed is formulated, sourced, and delivered. It's time to shift from traditional practices to **climate-smart feed manufacturing**. This is not just about reducing emissions — it's about future-proofing poultry production and leading the charge toward a greener, more responsible food system.

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Why Sustainability in Feed Matters

The production of poultry feed, comprising grains, proteins, additives, and supplements, is energy-intensive and resource-hungry. From crop cultivation and fertilizer use to transportation and feed processing, every step emits greenhouse gases (GHG).

Feed alone can account for up to **60–70% of the total carbon footprint** of poultry meat and egg production.

The Coming Shift: Feed Sustainability is Becoming a Competitive Advantage

Europe's sustainability regulations are tightening. Retailers and global food chains are setting stricter sustainability targets.
Investors are evaluating ESG (Environmental, Social, Governance) credentials. If you're a feed miller in 2025, the message is clear: **sustainable operations are no longer optional—they're strategic**.

Forward-looking feed manufacturers are already:

- Running **Life Cycle Assessments (LCAs)** to identify and mitigate emissions.
- Investing in **automation and data intelligence** for process optimization.
- Redesigning feed strategies aligned with **Net Zero** commitments.
- Engaging in **cross-sector collaborations** to drive ecosystem-wide impact.

The Wider Context - Other Drivers!

Sustainability isn't just a buzzword in the boardroom anymore - **it's a business requirement woven deep into the supply chains of the world's biggest food brands**. From **Nestlé and McDonald's to Burger King (RBI), Carrefour, and Ahold Delhaize**, global giants are reshaping the poultry industry with bold climate commitments.

Many have pledged to cut **greenhouse gas emissions (GHGe) by up to 50% by 2030,** with full **net-zero targets set for 2040 or 2050** under the Science Based Targets initiative (SBTi).

What's driving this urgency? For some, **livestock emissions make up as much as 74% of their total GHGe footprint**, with poultry playing a major role. These brands are also tightening standards around **deforestation-free sourcing, animal welfare (like cage-free eggs and "star chicken"), and antimicrobial resistance (AMR)** - all of which flow upstream to feed producers.

And let's not forget - **these fast food chains, FMCG brands, & retail giants are among the world's largest buyers of poultry meat & eggs**. So, aligning your feed production with their sustainability expectations isn't just an environmental obligation - **it's a smart business strategy** to stay relevant & competitive in an evolving, climate-conscious market.

This means that **every ingredient, every additive, and every supplier decision matters more than ever**. If your feed isn't future-ready, your place in the premium poultry supply chain may be at risk & your products might soon be off the menu at the world's biggest food tables.

Supplier Accountability and Carbon - Neutral Products

Feed manufacturers are encouraged to collaborate with suppliers who prioritize sustainability:

- **Transparent Supply Chains**: Engaging with suppliers who provide transparent data on the environmental impact of their products ensures informed decision-making in feed formulation.
- **Carbon-Neutral Additives**: Selecting feed additives and supplements from companies that offer carbon-neutral or low-emission products contributes to reducing the overall carbon footprint of poultry feed.

Two Ingredients are common in all our Products

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Feed Additives: The Silent Carbon Carriers

Feed additives are essential for optimizing animal health, performance, and nutrient utilization. But did you know:

Many synthetic feed additives (like amino acids, enzymes, or vitamins) have **higher per-kilogram CO_2 emissions** than the main feed ingredients?

This is because their production often involves:

- **High energy use in chemical synthesis** or fermented in high-energy environments
- Use of **non-renewable energy sources**
- **Global transportation and packaging emissions**

A Smarter Choice: Additives That Cut, Not Contribute

Feed Manufacturers are often focus on macro-level formulation, but the sourcing of additives and supplements plays an equally critical role. Many additives, enzymes and premixes are produced with energy-intensive processes.

Now imagine this:
You're still delivering the same performance, health, and efficiency to the flock - but your **additives contribute *zero or near-zero* emissions**.

That's the power of **sustainably manufactured feed additives**. Therefore, partnering only with reputable, sustainability-focused suppliers-those are actively measure and minimize the carbon impact of their products-is essential.

Strategy for Feed Millers: From Compliance to Leadership

1. **Audit your feed** — Know your ingredient-wise carbon intensity.
2. **Source smarter** — Prioritize regional, sustainable, and certified materials.
3. **Scrutinize your additives and Supplements** — Ask for carbon disclosures, LCAs, and sustainability reports.
4. **Build partnerships** — Work with suppliers who align with your net-zero goals.
5. **Label your progress** — Carbon-transparent feed is coming fast. Be the first, not the last.

The Next 5 Years: Call to Action

The Time to Lead is Now

The poultry sector is at an inflection point. Sustainability isn't a trend—it's the ticket to long-term resilience. Feed millers must lead this evolution, not follow it. By reformulating, measuring, and sourcing responsibly, the poultry feed industry can drive real change in reducing the sector's environmental footprint.

Together, let's feed the world responsibly, This is not just a sustainability goal, but a responsibility to future generations.

Sustainability is no longer about doing less harm. It's about doing more good.

The question is: **Are you ready to feed the future, sustainably?**

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Empowering Communities

The SEC India Journey

FROM THE SEC CENTER LEAD'S DESK
DR. P. E. VIJAY ANAND (SEC/USSEC)

On April 3, 2025, the Soy Excellence Center's (SEC) Global Advisory Panel (GAP)—featuring experts from the U.S. soy industry—and the Regional Advisory Council (RAC), representing India's animal husbandry and soy food sectors, launched the final instalment of the "Feed Formulation Lab" series in Bengaluru. The event marked a successful demonstration of SEC India's "Community Assurance" initiative, focused on providing ongoing professional development across animal feed and human food sectors. This initiative is paving the way for the next generation of industry leaders.

The session, titled **"Feed Formulation Lab – Part 3"**, was inaugurated by SEC Chairman Mark Read, Vice-Chair Anne Meis, and GAP member David Williams (Michigan Soybean Committee), alongside USSEC representatives Kevin Roepke, Brent Babb, and Kellie Gypin. Also present were members of the Regional Advisory Council and emerging women leaders from India's poultry industry, who contributed to the dynamic learning environment.

Designed to prioritize practical learning, the event minimized presentations and maximized hands-on experience with Best Mix software. Over two intensive days, 46 participants engaged in exercises that merged animal nutrition expertise with modern software tools. Each participant completed the program with a certificate and a free trial of Best Mix software to reinforce their learning.

Expert guidance was provided by Sirri Kayhan (USSEC Country Representative for Turkey) and Kemal Burak Kayhan (Director, Feedback Yazilim), who delivered structured modules on best practices and common pitfalls in software-based feed formulation. The training emphasized decision-making, formulation accuracy, and the unique attributes of U.S. Soy. Additional insights were shared by Dr. Susil Silva and Dr. N.C. Manju, who covered critical aspects of soy differentiation and raw material quality's impact on feed outcomes.

The lab not only delivered valuable technical skills but also provided participants access to SEC's digital community—a gateway to ongoing learning, rewards, and career development. This successful event underscored SEC's mission to empower professionals and build trust through impactful, hands-on education

What SEC Members have to Say

Syam Sundar Dasari,
Business Manager, Optima Life Sciences

It is important to gain certificates and merits, but what **matters for me the most is the knowledge**. Nutrition plays an important role in Aquaculture, and I wanted to broaden my horizons in the field. So, I decided to apply for a spot in SEC India course, and I was confident the knowledge gained here will help me a lot in my future career.

I really enjoyed the online course it was well planned and easy for me to follow.

I could finish everything with enough time, learn about the topics and not feel over loaded and rushed. Moreover, I really like this course because of its literature and Quizzes which are straight forward.

The course has equipped me with updated skills, making me more competent and adaptable in my professional role. Engaging in learning aligned with my interests has led me to greater job satisfaction and a sense of accomplishment Completing the course positions me as a more attractive candidate for promotions or new job opportunities, demonstrating my commitment to continuous learning. Employers value professionals who invest in their development, enhancing their competitiveness in the job market The course likely provided opportunities to connect with peers and industry experts, fostering valuable relationships that can lead to collaborations and career opportunities.

The course has been a valuable investment in my personal and professional development, equipping me with the basic knowledge and mind set to thrive in my career.

Dr. Mahesh Yepuri
Category Head – AHN (Animal Health & Nutrition)
Coromandel international Limited

I have 17 years of industry experience across Dairy, Poultry, Pet Food, and Animal Nutrition segments— specializing in feed, feed additives, and supplements across both domestic and international markets. My objective in enrolling in the India SEC Aquaculture Production & Management – Basic Level course was to build foundational knowledge in aqua culture, particularly in the context of fish and shrimp nutrition and feed strategies.

At Coromandel, we are committed to entering and expanding our footprint in the Aqua segment. This course aligns with our vision to launch: Fish & Shrimp Feed, Aqua Supplements, Exclusive Formulated Organic/Inorganic Fertilizers for Pond Care, Pond Health & Nutrification Solutions

Participation in this program has given me a strong baseline to support these initiatives. I look forward to continued engagement with the US Soy Excellence Centre (SEC), including participation in advanced programs and leveraging the SEC online learning platform to enhance business decisions in the aquaculture domain.

A standout feature of the course was the insights shared by esteemed international faculty. I am grateful for their structured approach and practical knowledge Their expertise, delivered through a concise and well-organized curriculum, made complex topics approachable and actionable. This program marks my first formal step into aquaculture learning and has significantly enhanced my domain understanding. It was a truly enriching online program with valuable learning.

Bridging Skills and Success:

SEC Training Powers India's Poultry and Feed Sectors Forward

Building on the momentum of their online learning journey, young professionals from India's poultry and feed milling industries convened in Cochin on April 24–25 for the second edition of the Soy Excellence Center (SEC) in-person Intermediate Courses. The 82 participants — 42 from the poultry sector and 40 from feed milling — earned their place through dedication, performance, and active participation in SEC's dynamic digital learning community.

Over the course of two intensive days, participants expanded their technical expertise, deepened their industry knowledge, and engaged with seasoned experts, culminating in the awarding of official course certificates — a significant milestone in their professional development. This achievement marks not the end, but a pivotal step in their ongoing learning journey within SEC's vibrant global digital ecosystem, powered by the U.S. Soy industry/ USSEC.

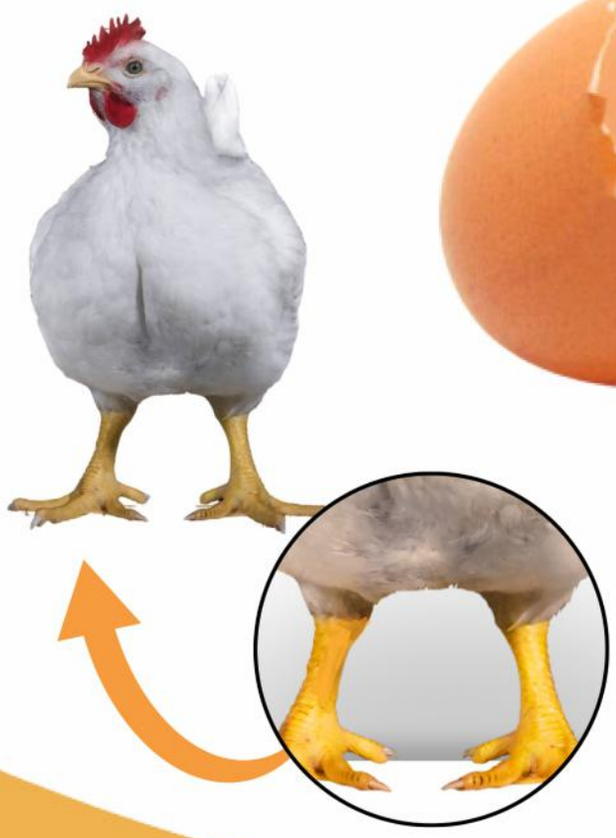
FROM THE SEC CENTER LEAD'S DESK
DR. P. E. VIJAY ANAND (SEC/USSEC)

The Feed Milling Intermediate Course featured a comprehensive curriculum spanning 11 core modules. Topics included quality assurance, grain storage management, batching systems, pelleting techniques, particle size optimization, extrusion processing, and feed mill design. The sessions were delivered by industry veterans Mr. Meenakshisundaram Kanakaraj (Consultant – Feed Milling) and Mr. V.P. Sakthivel (Consultant – Quality Assurance and Control), who provided actionable insights based on extensive hands-on experience.

Simultaneously, the Poultry Intermediate Course offered an equally robust learning experience, addressing key topics such as hatchery and brooding management, poultry nutrition, broiler and layer production, biosecurity, health and disease prevention, processing, and supply chain management. Participants gained from the expertise of Dr. Darur Allappa (Consultant – Poultry) and Dr. V. Malathy (Professor, Karnataka Veterinary Animal and Fisheries Sciences University), whose knowledge and enthusiasm fostered insightful discussions and innovative thinking.

As these professionals return to their respective organizations, they bring with them more than just certificates — they carry enhanced technical skills, sharpened problem-solving capabilities, and a renewed commitment to driving innovation and excellence in their fields. Their continued engagement with SEC's digital community ensures they remain at the forefront of industry advancements while championing the use of U.S. Soy.

SEC proudly celebrates the achievements of these emerging leaders and looks forward to their ongoing contributions as they continue to lead, learn, and inspire across India's poultry and feed milling sectors.



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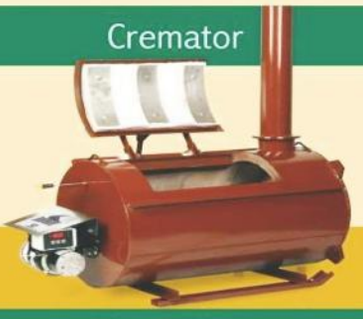

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Legend SERIES 14

In our journey we visited many faces with our poultry industry legends, and one among them is

Prof. DR. A.S. RANADE

Former Head, Department of Poultry Science
& Associate Dean,Mumbai Veterinary College, Mumbai
KNP College of Veterinary Science, Shirval, Distt.- Satara

1. **Are you originally from Mumbai ?**

   Yes, I am originally from Mumbai. Borne and brought up in Mumbai.

2. **What is the best thing you liked in your journey** ?

   The best thing in my journey was that I could do what I wanted to do since childhood. I always intended to be a teacher and I could do that, was the best thing that happened in my journey.

3. **What is the right motivation you liked in the journey?**

   The motivation was the right opportunity to start the job in the college way back in 1987, which made my dream to be a teacher come true. Besides, some of the teachers I got trained from since the beginning was the real motivation to choose this as a career.

4. **Why you choose Poultry / Livestock profession?**

   My maternal uncle in the family, my Mamaji, is a veterinarian and he was working in State Government of Maharashtra as Veterinary Officer. Since childhood I was exposed to this field when I used to visit him during vacations.

5. **As compared to others in the industry, how you feel you are different?**

   I don't know and can't comment about others but I can definitely say that that I did my job most honestly and with sincerity.

6. **Please tell us about your family.**

   I come from a Maharashtrian middle class family. My father used to work in Indian Railways and my mother was a primary school teacher. My wife, Manjusha is a musician, Sangeet Visharad and M.A in Indian Classical Music and she is also a school teacher

7. **What you thought about you to be leader in livestock industry?**

   I don't know if I am a leader or not but dedication towards the work that one does will help him/her to be among the topper.

8. **What you dream to the next generation entered in this business?**

   I think there has been a tremendous change in the profession and the industry. The next generation is lucky to have access to many new technologies and changes in every field. However, the challenges have also increased which they have to face. Moving with time, adapting to changing scenarios will help them to achieve their dreams.

9. **What is your favourite eatery / food**?

   I have a sweet tooth and basically I like typical Maharashtrian Vegetarian food, though, I enjoy eggs, and chicken prepared in particular style with gravy.

10. **What are your hobbies?**

    I like to listen to the music, especially Indian classical music and all sort of film music. I enjoy watching cricket.

11. **Anything you would like to add**.

    I want to acknowledged the co-operation and support from my Students and Poultry Sector during my journey.

From :
Dr. Ramesh Sikka
Founder Member
Anand Sikka Veterinarians Foundation (India)
+91 98909-63144 sikkaramesh44@gmail.com

Pullorum Disease In Poultry

Pullorum disease is a highly infectious and fatal bacterial disease of severe septicaemic nature, chiefly affecting newly hatched chicks up to 2-3 weeks and also been noted in turkeys, pheasants, ducks and other wild birds. This disease is highly prevalent and distributed worldwide, leading to severe economic losses in poultry industry due to high chick mortality up to 100%, reduced egg production, poor hatchability, fertility and the cost of medication, vaccination and eradication programs. Historically, pullorum disease was known as "bacillary white diarrhoea." It is caused by Salmonella enterica serovar Gallinarum biovar Pullorum—a gram negative, non-motile and non-sporing rod-shaped organisms.

Dr. Pokyem Ering & Dr. Himani Ravi

Modes of Infection

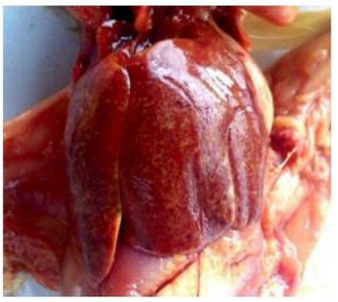
The principal modes of transmission include both vertically from infected eggs laid by carrier hens which survive the disease and become long-term asymptomatic carriers of *Salmonella* Pullorum and transmit it to their progeny in eggs, the organisms being in the yolk and horizontally by direct contact with infected birds, ingestion of contaminated feed and water can also amplify the outbreak after the chick's hatch. Fomites such as Clothing, tools, equipment and machinery can carry the pathogen from one flock to another.

Clinical Signs

Pullorum disease usually affects chicks less than 3-4 weeks of age and are heaviest during 2-3 weeks. If birds are hatched from infected eggs, some chicks may die in the shell, and dead and dying chicks can be found soon after hatching. The clinical signs of Pullorum disease vary depending on the age of the bird. In young chicks, symptoms usually appear within the first few days after hatching such as lethargy and weakness, loss of appetite, huddling, drooping wings, ruffled feathers, respiratory distress, dehydration and chalky white and pasty diarrhoea leading to soiled vents. Adult birds may not show noticeable symptoms, and arthritis affecting various joints, especially the hock, has been described in some outbreaks. Birds that survive Pullorum disease may be underweight and they may not mature into fertile adults, result in decreased egg production, fertility and hatchability of eggs. Infections in poultry > 4 weeks of age are served as carriers, spreading the infection to their offspring and other flock members.

Post Mortem Lesions

Upon necropsy, recently hatched birds affected by Pullorum disease exhibit several characteristic lesions, particularly in the digestive, respiratory, and reproductive systems. These include enteritis, peritonitis, hepatomegaly, Splenomegaly, congested lungs and unabsorbed yolk sacs. Birds that survive pullorum disease often have typhlitis with hard, cheesy material in the cecum and small greyish-white necrotic foci in the liver, spleen, lungs, heart and other viscera. The anterior chamber of the eye contained exudates in birds with ocular lesions. Birds that die per-acutely may have no gross lesions. Infected hens may show ovarian regression, atrophied follicles, or caseous deposits.



Diagnosis

Pullorum disease can be diagnosed by isolating *Salmonella* Pullorum from dead or carrier birds. At necropsy, organisms consistently recovered from various internal organs, such as the liver, spleen, heart, kidneys, lung, yolk sac, cloacal contents and the ovary and oviduct. *Salmonella* Pullorum can be cultured on selective media such as MacConkey, brilliant green and xylose lysine deoxycholate agars. Isolated organisms can be identified and differentiated with biochemical and serological tests and PCR.

Serological test can be diligent as a flock test in control programs. Field testing of chickens is possible with the rapid whole blood plate agglutination test, rapid serum agglutination test, tube agglutination test, microagglutination, immunodiffusion, hemagglutination and ELISAs.

Specialized techniques including loop-mediated isothermal amplification assays, plasmid profile analysis, pulsed field gel electrophoresis, PCR-restriction fragment length polymorphism (RFLP), multi-locus variable-number tandem-repeat analysis (MVLA) may be useful in epidemiological investigations.

Treatment and Control

There is no effective treatment for Pullorum disease, making control and prevention essential for poultry management. Key strategies include reporting of the suspected infections with *Salmonella* Pullorum to the local or national authorities, purchased of live birds and eggs from certified Pullorum disease-free breeders, strict biosecurity measures and implementing hygiene protocols, disinfecting equipment, and restricting farm access are also important in excluding organism. Wild birds, rodents and poultry mites should be controlled and excluded from the facility. The infected flocks should be quarantined and repeatedly conducting serological tests in breeding flocks helps identify and remove carriers and infected individuals to prevents the spread of the disease. The entire flock should be depopulated and the premises are cleaned and disinfected before restocking. Vaccination with effective vaccines to the breeder flock is one of the most effective strategies to prevent the disease.

Conclusion

Pullorum disease is an important disease and remains a serious threat to poultry farming due to high morbidity and mortality rate, especially in regions lacking stringent disease control measures. Disease can transmit both vertically and horizontally. Antimicrobial treatment helps to reduce the mortality however, treated birds remain carriers. Therefore, treatment of Pullorum disease is not advisable. Farmers and poultry industry stakeholders must prioritize biosecurity, regular testing, and responsible breeding practices to mitigate the spread of this infectious disease. Continuous efforts in disease surveillance and poultry management are crucial in maintaining healthy flocks and ensuring sustainable poultry production.

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Bentoli Hosts Annual Business Meet 2025 in Gangtok, Sikkim

Bentoli Agrinutrition, a global leader in animal nutrition and feed additive solutions, successfully hosted its **Annual Business Meet 2025** in the scenic backdrop of Gangtok. This annual flagship event brought together cross-functional teams from Sales, Marketing, and Leadership to align on strategic priorities, review performance, and chart a path for future innovation.

The serene Himalayan landscape set the tone for high-impact discussion, collaborative learning, and team synergy. The four day event was focused on driving strategic clarity, operational excellence, and a shared vision for growth.

Day 1: Vision, Review and Strategic Alignment

- The event was opened with the keynote addresses by Mr. William Robinson and Mr. Edward Robinson, reaffirming Bentoli's mission-driven approach and long-term value creation.
- **Dr. Sushanta Saha** presented a comprehensive review of FY 2024–2025, outlining milestones, challenges, and key takeaways.
- **Dr. Victor Suresh** outlined core focus areas of 2025, highlighting scientific rigor, and customer-centric innovation.
- Mr. Sanjeev Bharadwaj led a deep-dive into sales performance, supported by insights from Regional Sales Managers on market dynamics and growth strategies.

Day 2: Marketing Momentum & Innovation Spotlight

- **Dr. Jayanta Bhattacharya** introduced the **Marketing Blueprint for FY 2025**, focusing on campaign strategy, digital engagement, and channel growth.
- Dr. Sushant Mhatre unveiled Bentoli's next-gen product innovations tailored for high-performance livestock systems. A hands-on product demonstration and Q&A session further deepened team understanding of the innovation roadmap.

Recognizing Excellence:

A highlight of the meet was the Awards Ceremony on April 8, celebrating top performers across sales, marketing, and R&D. Prestigious accolades including *Champion of Champions*, *Platinum Champion*, *Gold Champion*, *Specialty Champion*, *Premix Champion*, and *Club 100* were presented, reinforcing Bentoli's culture of excellence and recognition.

Driving the Vision Forward

The Business Meet underscored Bentoli's core values—**Integrity, Innovation, and Impact**—and set a clear direction for expansion across Asia and beyond. The leadership concluded the event with a powerful message: **"2025 will be a year of bold moves. Let's lead with purpose, execute with precision, and deliver meaningful outcomes for our customers and communities."**

About Bentoli®

Bentoli® is a global provider of high-quality feed additives and consultative solutions for the animal and aquaculture industries. Specializing in preservatives, processing aids, and nutritional additives, the company partners closely with feed manufacturers and livestock operators to deliver measurable improvements in performance and profitability. With active R&D, dedicated trial farms , and manufacturing plants in North America and Asia, Bentoli combines innovation with deep industry insight to offer tailored, results-driven solutions. Its global reach is supported by a strong network of sales offices and distributor partners, earning its reputation as a trusted name in animal nutrition.

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Bentoli Enters Sri Lanka Market
with Landmark Event – Bentoli Accord 2025

Bentoli in strategic partnership with **Neochem**, marked its official entry into the Sri Lankan market with the successful launch of bentoli Accord -Sri Lanka 2025 held at **Hotel Ramada by Wyndham, Colombo**.

The event brought together over 50 key stakeholders including leading feed millers, integrators, poultry farmers, and industry consultants, making it a pivotal gathering for the region's animal nutrition sector.

Mr. Steffan Blaze opened the event with a warm welcome, followed by a corporate overview and strategic vision for Sri Lanka delivered by Dr. Jayanta Bhattacharyya. The sessions spotlighted Bentoli's commitment to bringing innovative, performance-driven solutions to the region.

Technical Session Highlights:

- Dr. Abhijit Mishra presented on *"Nutritional Modification for Optimum Performance"*, sharing evidence-based strategies for enhancing poultry productivity.
- Prof. K. Samarasinghe delivered an insightful session on *"Maximizing Feed Efficiency through Gut Health Optimization"*, highlighting the critical role of gut integrity in flock performance.

Dr. Jayanta Bhattacharyya also introduced Bentoli's product portfolio tailored for feed mill and farm efficiency, sparking strong interest and engagement from the audience.

The event concluded with a cultural performance celebrating Sri Lanka's heritage, followed by a vote of thanks from Mr. Deepal De Alwis.

Bentoli thanks its partners, speakers, and attendees for making this milestone event a success. With Neochem, Bentoli is set to drive innovation, collaboration, and growth in Sri Lanka's poultry and animal nutrition industries.

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PVS Group: A Vanguard in Sustainable Animal and Aqua Healthcare

PVS Group proudly stands as India's foremost manufacturer and exporter in the animal and aqua healthcare domain, distinguished by its unwavering commitment to innovation, sustainability, and excellence. With a comprehensive portfolio of scientifically formulated solutions, the Group addresses the evolving needs of the poultry, veterinary, and aquaculture sectors—enhancing productivity while promoting ecologically responsible practices.

The acronym PVS encapsulates the Group's core domains—**Poultry, Veterinary, and Shrimp (Aqua)**—reflecting its deep-rooted dedication to advancing livestock and aquatic health on a global scale.

With a formidable footprint across both domestic and international markets, PVS Group has emerged as a trusted partner in the animal health industry—renowned for its stringent quality standards, cutting-edge manufacturing capabilities, and resolute focus on client-centric innovation.

In a recent and prestigious engagement, PVS Group had the privilege of hosting the Core Team of the Poultry Federation of India at its world-class manufacturing facilities in Vijayawada. The esteemed delegation included: Mr. Ranpal Dhanda – President, Mr. Sanjeev Gupta – Vice President (HQ), Mr. Ravinder Sandhu – Secretary, Mr. Ricky Thaper – Joint Secretary

As part of the visit, the delegation also toured the corporate headquarters, engaging in meaningful and productive discussions surrounding PVS Group's latest innovations. The dialogue underscored the Group's expansive and evolving product portfolio, which spans feed additives, therapeutic formulations, farm management solutions, and high-efficacy disinfectants—all meticulously designed to support holistic animal and aquatic health management.

This visit marked a pivotal moment, reaffirming PVS Group's leadership in the sector and its dedication to collaborative advancement and knowledge sharing within the animal health ecosystem.

As the Group continues to scale new heights, it remains steadfast in its mission: to elevate the standards of animal and aqua healthcare through research-driven innovation, ethical practices, and an enduring commitment to excellence.

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FAMSUN Animal Feed Seminar 2025

A Landmark Industry Event that Set New Benchmarks

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The **FAMSUN Animal Feed Seminar 2025**, held at **Radisson Blu Plaza Hotel, Banjara Hills, Hyderabad**, marked a significant milestone in India's animal feed industry. The two-day event, organized by FAMSUN South Asia, brought together more than 50 industry professionals, including leading clients, technical experts, and partners from the **poultry and cattle feed sectors**.

With **every seat filled** and an **active YouTube live broadcast** for virtual attendees, the seminar was a true convergence of innovation, knowledge, and collaboration. The event has been widely appreciated for its content depth, practical relevance, and the quality of interactions, earning it a place as one of the most talked-about feed industry events in recent times.

The seminar was designed to offer first-hand, actionable insights to feed mill owners, plant managers, nutritionists, and technical professionals.

Mr. George, President of FAMSUN South Asia, opened the event with a warm welcome:

"This seminar is not just a gathering — it's a platform to share knowledge, explore innovation, and strengthen our partnerships. With industry demands evolving, FAMSUN remains committed to supporting our customers with the latest in feed technology and plant performance solutions."

Expert Sessions that Delivered Impact

FAMSUN invited its top global and regional experts to lead insightful, highly engaging technical sessions focused on optimizing every stage of feed production:

- **Mr. Joseph**, Feed Technology Expert, spoke on:
  - *Optimal Processing of Poultry & Cattle Feed* – Discussing the right equipment selection, pellet quality parameters, and key process control points.
- **Mr. Alan**, Process Optimization Specialist, shared insights on:
  - *Process Loss Control* – Techniques to reduce waste using process analytics, maintenance, and plant audits.
- **Mr. Jack**, Animal Nutrition Specialist, delivered sessions on:
  - *Animal Nutrition & Livestock Productivity* – Linking feed formulation with animal health and output.
- **Mr. Artur**, Global Service Operations Leader, concluded the expert sessions with:
  - *Service Excellence & Operational Uptime* – Sharing global best practices for plant maintenance, performance tracking, and ensuring consistent operation.
- **Mr. Arun Kumar**, Business Head – FAMSUN India, presented a special session on:
  - *FAMSUN Machinery & Smart Plant Solutions* – Offering an overview of advanced feed machinery, automation systems, and turnkey plant innovations tailored to Indian conditions. His session highlighted the role of integrated design, energy efficiency, and intelligent control systems in driving superior output and long-term sustainability.

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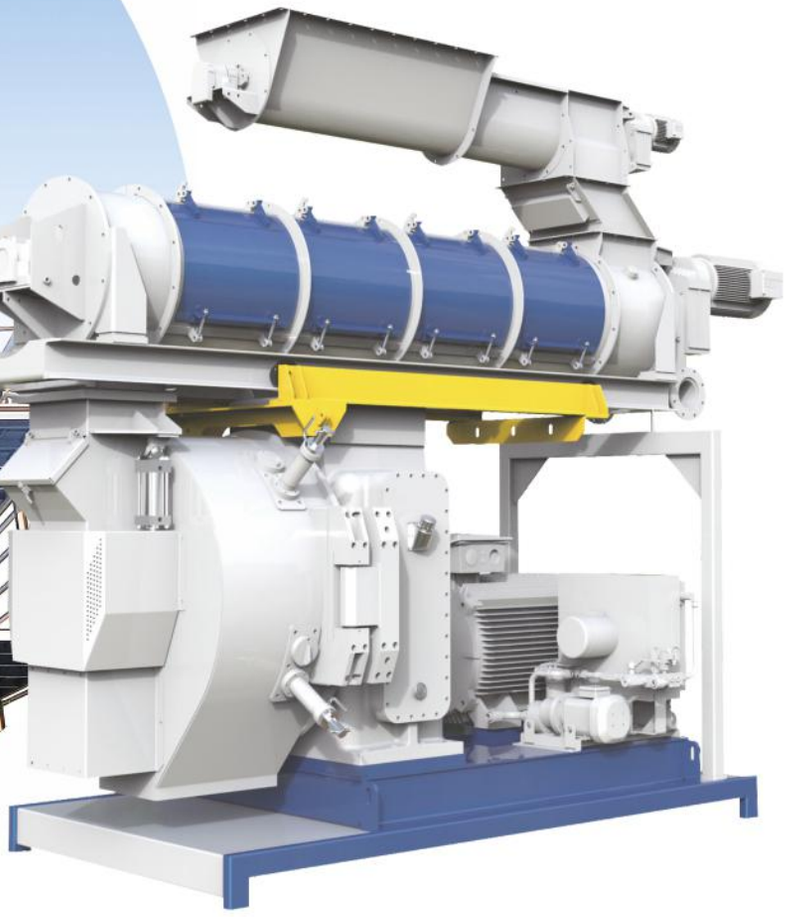

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Leading Clients Added Strength and Credibility

The seminar saw the enthusiastic participation of several industry-leading clients, whose presence made the event even more impactful. Among them were **Godrej Agrovet**, **Suguna Foods**, **Venkateshwara Hatcheries (Venky's)**, **IB Group** and **Amul.**

A highlight of the event was the **testimonial video from Godrej Agrovet** and **Heritage**, where their delegates shared their appreciation for the event, praised the speakers, and gave thoughtful suggestions for future seminars. Their kind words reflect the real value FAMSUN is delivering across India's feed landscape.

Engagement, Experience & Hospitality

FAMSUN ensured the experience went beyond knowledge-sharing. From personalized welcome kits to smooth logistics and top-notch hospitality, the Radisson Blu venue offered the perfect setting for two days of rich engagement.

Networking over meals and breakout sessions allowed clients, consultants, and experts to build stronger connections and exchange ideas in an informal, collaborative environment.

The overwhelmingly positive feedback from both in-person and online participants has inspired FAMSUN to roll out similar seminars in other regions, along with **focused webinars, plant visits, and hands-on workshops** throughout the year.

Ms. Rong, **Vice Country Head from FAMSUN's** global leadership, added:

"The response here reaffirms our belief that knowledge sharing drives progress. We're proud to be a trusted partner to the Indian feed industry and will continue building platforms for innovation and exchange."

Looking Ahead

The overwhelming success of the **FAMSUN Feed Seminar 2025** stands as a testament to the collective ambition of India's feed industry — to grow smarter, operate more efficiently, and deliver superior value across the poultry, cattle, and aqua sectors.

As the curtains draw on this milestone event, one thing is clear: **this is just the beginning**. FAMSUN remains firmly committed to being more than a technology provider — we are a long-term partner in progress, innovation, and transformation.

With renewed inspiration and strengthened partnerships, we look forward to hosting the next wave of seminars, technical workshops, and knowledge-sharing platforms in the months to come.

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Mycotoxins in the food chain:

Understanding risks and exploring mitigation strategies

By Dr. Maloshrie Bora, Program Manager , Feed Safety, Trouw Nutrition South Asia

The safety of animal feed is increasingly compromised by a confluence of global challenges, notably mycotoxin contamination. These toxic metabolites, produced by molds such as Aspergillus and Fusarium, pose significant health risks to livestock and, by extension, to humans consuming animal products. Contributing factors include a shortage of quality raw materials, exacerbated by supply chain bottlenecks and geopolitical disruptions. Climate change further intensifies the issue by altering temperature and precipitation patterns, creating favorable conditions for mold growth and mycotoxin production. Additionally, inadequate storage and transportation facilities, often lacking proper ventilation and climate control, facilitate the proliferation of these harmful fungi. Together, these elements underscore the urgent need for comprehensive strategies to mitigate mycotoxin risks and ensure feed safety.

Even the smallest lapse in post-harvest handling can swiftly trigger the formation of harmful secondary metabolites like mycotoxins. Factors such as delayed drying, inadequate moisture control, and poor storage conditions can create an environment conducive to fungal growth, leading to rapid mycotoxin accumulation. For instance, aflatoxin contamination in maize has been linked to improper drying and storage practices, highlighting the critical importance of stringent post-harvest management to ensure food safety.

Mycotoxin contamination poses a significant threat to various stakeholders in the agricultural and food sectors, including farmers, feed producers, food processors, public authorities, and end consumers. These toxic compounds adversely affect animal health by impairing the gastrointestinal tract, suppressing the immune system, and disrupting nutrient absorption, leading to decreased productivity and increased susceptibility to diseases. Implementing a comprehensive 360-degree mitigation strategy—encompassing prevention, detection, regulation, and education—can effectively address this multifaceted issue and safeguard public health and economic interests.

The "Big 6" mycotoxins—aflatoxins, ochratoxins, fumonisins, zearalenone, deoxynivalenol (DON), and T2 toxin—are among the most prevalent and toxic secondary metabolites produced by molds affecting agricultural commodities. These toxins impact various species differently; for instance, aflatoxins primarily affect liver function in mammals, while zearalenone exhibits estrogenic effects leading to reproductive issues in ruminants and pigs. The incidence and severity of mycotoxin contamination are influenced by environmental factors such as temperature, humidity, and rainfall, which can create conducive conditions for mold growth and toxin production. Not all mycotoxins are equally toxic across species; for example, DON is highly toxic to swine, whereas poultry are less affected. Climate change exacerbates the problem by altering weather patterns, potentially increasing the prevalence and distribution of mycotoxins in crops.

Aflatoxins occur worldwide in feed and feed stuffs which results in severe economic loss to poultry and livestock industries. The extent of Aflatoxin contamination varies with geographic location, farming methods and the susceptibility of commodities to fungal invasion during pre-harvest, storage, and processing periods. Numerous studies showed negative effects of Aflatoxin in broiler chickens including a decrease in the efficiency of feed utilization and body weight gain, liver damage, poor immune response, and increased mortality. Aflatoxin is shown to induce pathological alterations in important organs such as the liver, kidneys, and lymphoid organs. Furthermore, thetransmission of aflatoxin B1(AFB1) and its metabolites from feed to animal edible tissues and products, such as the liver and eggs, becomes particularly important as a potential hazard for human health. Given the global economic importance of Aflatoxin, many strategies have been tried to minimize their negative impact. A successful prevention strategy must be economical and capable of eliminating all traces of toxin without leaving harmful residues and should not impair the nutritional quality of the commodities. Extensive research has been carried out using adsorbent (binder) materials that adsorbs to Aflatoxin molecule by means of ion exchange and thereby preventing their absorption into blood circulation. Among various binding agents, clays and yeast cell wall materials are the most tested. Silicates are the main group of clays that are studied extensively in terms of Aflatoxin binding. These include tectosilicates (zeolites), 1:1 phyllosilicates (kaolinite), 2:1 phyllosilicates (smectites, vermiculites, chlorites, micas) and sepiolite. All silicates, however, are not the same in terms of their ability to bind Aflatoxin and among the above, smectites have shown greater binding efficacy against Aflatoxin. The ability of smectite clays to bind mycotoxins depends on pH in the gut, molecular arrangements, and its geographic region of origin. Smectite clays possess high Aflatoxin adsorption capacity due to its high surface area, ion exchange capacity, and ability to swell in the presence of water, and the efficacy has been proven in vivo in broiler chickens. The leading hypothesis on the bonding mechanism between adsorbed aflatoxins and smectites is the electron donor–acceptor (EDA) model. Other models such as selective chemisorption, H-bonding, and bonding through furan rings were proposed. The supplementation of smectite clay in feed to aflatoxin challenged broilers considerably reduced the magnitude of toxic effects of aflatoxin and improved growth and immune response. Hence, smectite clay could be successively used in feed to ameliorate the toxic effects of aflatoxins in broiler chickens.

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- Reinforces the immune system

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Aflatoxin B1 (AFB1), deoxynivalenol (DON) and ochratoxin A (OTA) are ones of the most common and dangerous mycotoxins. AFB1, produced mainly by Aspergillus, is one of the most poisonous toxins, which is classified as Group I carcinogen by the World Health Organization due to its hepatoxicity, immunotoxicity, mutagenicity, genotoxicity, and carcinogenicity on variety of animals. DON, produced by many Fusarium molds, contamination in feeds induces anorexia, emesis, and damage to intestinal barrier and immune function in animals through suppressing the synthesis of nucleic and proteins . OTA, a toxic metabolite from Aspergillus and Penicillium molds, possesses hepatoxic, nephrotoxic, neurotoxic, immunotoxic, and teratogenic effects on liver and kidney. Long-term epidemiological investigations have shown that most of the global feed is exposed to more than one mycotoxin, and mycotoxin contamination of food and animal feed is a worldwide problem. Meanwhile, when three mycotoxins co-existed in the poultry feeds, their interaction have been further associated with significant alterations in the productivity and profitability of animals. Therefore, development of remediation strategies to prevent or mitigate the mycotoxicosis is imperative.

Trouw Nutrition's TOXO® range offers a suite of mycotoxin binders designed to mitigate the negative effects of mycotoxin contamination in animal feed. These products are formulated to support animal health and performance by reducing the bioavailability of harmful mycotoxins. These products are part of Trouw Nutrition's comprehensive approach to mycotoxin risk management, aiming to ensure feed safety and optimize animal health and performance.

TOXO®-MX: Precision for Aflatoxins

TOXO®-MX is a specialized binder formulated to combat aflatoxins, particularly Aflatoxin B1, which can adversely affect dairy cows and other livestock. By incorporating purified smectite clays, TOXO®-MX effectively reduces the bioavailability of aflatoxins in the gastrointestinal tract. This reduction leads to a significant decrease in the excretion of Aflatoxin M1 in milk, ensuring compliance with regulatory standards and safeguarding consumer health. Additionally, TOXO®-MX enhances feed efficiency, as evidenced by improved milk production per kilogram of dry matter ingested in dairy cows.

TOXO®-XL: Comprehensive Protection Against Fusarium Mycotoxins

TOXO®-XL is an advanced binder designed to address the challenges posed by Fusarium-related mycotoxins, such as trichothecenes and fumonisins. This product combines smectite clays with specifically selected glucose biopolymers and purified β-glucans, which work synergistically to reinforce intestinal barrier function and modulate the immune response. The result is a comprehensive solution that not only binds and eliminates mycotoxins but also mitigates performance impairments caused by their exposure.

TOXO®: Broad-Spectrum Mycotoxin Binder

TOXO® serves as a versatile, broad-spectrum mycotoxin binder suitable for various animal species. It utilizes smectite clays to effectively reduce the bioavailability of a wide range of mycotoxins, including aflatoxins, ochratoxins, and zearalenone. By preventing the absorption of these toxins, TOXO® helps maintain animal health and performance, making it an essential component of comprehensive mycotoxin risk management strategies.

Collectively, the TOXO® product range represents a holistic approach to mycotoxin risk management, integrating advanced scientific formulations to protect animal health and ensure the safety of the food chain.

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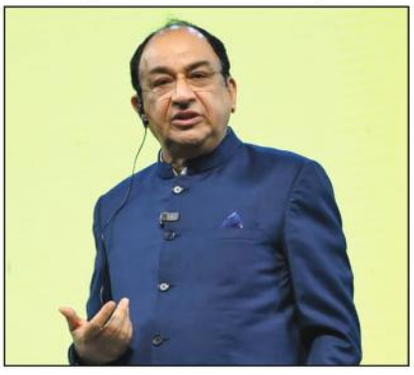
IB Group Hosts India's Largest Poultry Conclave with Traders from Across the Country on the First Day

The first day of the Poultry Conclave, organized by IB Group at Hotel Omaya Garden in Raipur, saw the participation of nearly 3000 poultry traders. The traders were trained on modern methods to advance their poultry business and grow their ventures.

Addressing the event, the Managing Director of IB Group, Bahadur Ali, stated that in line with Prime Minister Narendra Modi's vision of a developed India by 2047, IB Group is working towards making Chhattisgarh a "Protein Hub" by 2035. He added that IB Group has already connected millions of people to the poultry business across the country, with the goal of raising awareness about protein consumption in India, similar to the importance placed on it in countries like Europe and the USA, ensuring better health for the general population.



Growing Awareness of Chicken Protein in India

Bahadur Ali mentioned that there is an increasing trend towards chicken protein in the country. Both central and state governments are supporting industries of all sizes, and efforts are underway to distribute protein to rural areas, where IB Group is playing a leading role.

IB Group Expands Employment Opportunities in Villages

Bahadur Ali also revealed plans to open a chicken protein shop for every 1500 people. Currently, the company has a team of around 300 people working on developing poultry farms and expanding chicken protein shops under the "Transformation Project" across villages. This initiative aims to increase people's income and provide employment opportunities in rural areas. The group is also offering subsidies to encourage poultry businesses.

Expansion Plan to Achieve Goals

He further explained that, in support of the vision of the central government and Chief Minister Vishnu Deo Sai of the state, the company is focusing on rural development. Under the "Expansion Plan," IB Group aims to provide subsidies for 1000 vehicles to small poultry businesses, with a total subsidy of 21 crores over three years. Bahadur Ali also pointed out that many small traders in the poultry sector have been naming their shops in arbitrary ways, and there are plans to help them rebrand their shops for a more professional image. The company is working to encourage the use of names like "Chicken Protein Centers" to enhance the business's credibility.

Introducing Technology in Poultry - Zoya Afrin

Zoya Afrin Alam, Director of IB Group, was also present at the event. She urged poultry traders to incorporate technology into their businesses, emphasizing that adopting advanced poultry methods is essential to compete globally.

Second Day of the Conference to Feature Poultry Farmers

On the second day of the conference, poultry farmers from across the country will gather at Hotel Omaya Garden in Raipur. They will receive information on how modern poultry farming can contribute to providing protein nutrition across the nation.

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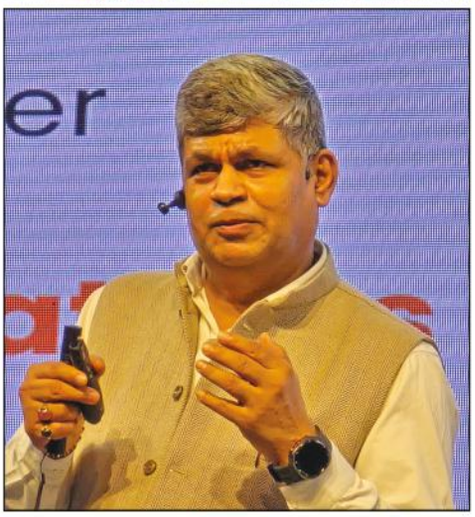
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Antimicrobial Use Stewardship Principles Lemontech & Rai Chicken

TRANSFORM

Transformational Strategies for Farm Output Risk Mitigation (TRANSFORM) is a United States Agency of International Development (USAID) project led by Cargill with collaborating partners including the International Poultry Council (IPC) and Heifer International. The antimicrobial use stewardship principles were developed by the IPC to drive global change throughout the animal agriculture industry by guiding actions to avoid the need to use, but when needed, ensure proper use of antimicrobials. By generating support from the global poultry industry of science-based principles to address antimicrobial use, the industry is acting to combat antimicrobial resistance (AMR) and reduce its impact on global health security.

Antimicrobial use stewardship recognition – private sector leadership

TRANSFORM is pleased that private sector leaders recognize the need to act in advancing antimicrobial use stewardship principles. Through 2025, 42 private sector organizations have acted to support the stewardship principles, reaching over 140 countries, and representing over 40% of global poultry meat production spanning all sectors of poultry production from fully integrated systems to small farms.

International Poultry Council (IPC) is extremely pleased to announce that Rai Chicken, Amritsar, Punjab has adopted the antimicrobial use stewardship principles of IPC. On behalf of Rai Chicken, Amritsar the Partner of company Mr. Kuljas Rai Arora signed the adoption certificate in the presence of Mr. Gaurav Rai Arora, Partner, Mr. Varun Rai Arora, Partner, Mr. AP Singh, Venky's and Dr Jeetendra Varma, IPC India Lead.

The Lemontech Group, based at Kharagpur, West Bengal also adopted the IPC Principles on AMU Stewardship and the adoption certificate was signed by the Chairman, Mr. Anil Kumar Kedia in the presence of Mr. Lokesh Kedia, Managing Director, Mr. Prafulla Kumar Sahoo, General Manager, Mr. Ravi Prasad Sharma, Production Manager along with Mr. Bajrang Verma, Gen Secy KCC and Dr Jeetendra Verma of IPC.

By adopting or endorsing the principles, organizations are committed to encouraging or taking action that centers around four key points. First, organizations agree to take a risk-based approach around each instance of antimicrobial use and consider why, when, which and how much to administer. Second, organizations agree to adopt farm management practices that improve animal health and would reduce the need for antimicrobial use. Third, organizations commit to using antimicrobials only in compliance with national authorizations and, fourth, that antimicrobials critically important for human medicine should only be used under a supervising veterinarian's diagnosis and oversight.

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Bridging Academia and Industry

IPEMA Proudly Supports IVA-WV Best Thesis Awards Ceremony on World Veterinary Day 2025

IPEMA

The Indian Poultry Equipment Manufacturers Association (IPEMA)/ Poultry India proudly partnered with the Women Vet Wing of the Indian Veterinary Association (IVA-WV) and Bihar Animal Sciences University (BASU) to organize the prestigious **Best Thesis Award Ceremony** on the occasion of **World Veterinary Day 2025**. The event, held on **26th April 2025** at **BAMETI, Patna, Bihar**, witnessed a distinguished gathering of academicians, industry leaders, policy makers, and budding scientists, bridging academia and industry on a significant platform for collaborative growth.

In his address, **Mr. Uday Singh Bayas**, President of IPEMA/ Poultry India, expressed immense pride in supporting an initiative that honors excellence in veterinary and animal sciences. He stated, "Recognizing and celebrating the finest minds in veterinary and animal sciences is not just a ceremonial gesture—it is an investment in India's future."

With over **340+ thesis submissions** reviewed by a panel of 40 distinguished experts, and the recognition of **67 PhD theses** and **78 MVSc theses**, the event showcased the scientific rigor and innovation flourishing across India's premier institutions, including IVRI, NDRI, TANUVAS, and GADVASU.

The ceremony was graced by Dr. N. Vijaya Lakshmi, IAS, Additional Chief Secretary, Department of Animal and Fish Resources, Government of Bihar, who lauded IPEMA's efforts in uniting the industry through initiatives like the Poultry India Expo. She acknowledged the platform's importance in fostering development and collaboration in the poultry sector and personally accepted the invitation for the 17th Poultry India Expo (26–28 Nov 2025, Hitex, Hyderabad), assuring full support from her department.

Dr. Jeetendra Varma, President of the World Poultry Association, delivered a powerful keynote address emphasizing the immense growth potential within the global poultry sector. He underlined how adopting professional practices not only strengthens the industry but also plays a crucial role in driving economic development and supporting nation-building efforts.

Dr. Inderjeet Singh, Hon'ble Vice-Chancellor, BASU Patna, in his Presidential Address, highlighted the rising achievements of women in various fields and encouraged students by discussing promising career opportunities in the **Animal Sciences** sector. His words further set the tone for a day dedicated to celebrating academic excellence and gender empowerment.

The event also saw inspiring speeches by **Mr. Ranjit Kumar Singh**, President, Bihar Poultry Breeder Association & Oval Agrotech, and **Dr. J. K. Prasad**, Dean, Bihar Veterinary College (BVC) Patna, whose words motivated the young veterinarians to strive for professional excellence and contribute to national development.

Special appreciation was extended to **Dr. Nidhi Rawat**, National Convenor, Women Vet Wing, Indian Veterinary Association, for her outstanding efforts in conceptualizing and flawlessly organizing the event, ensuring its success and impact.

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Delivering the Overview of the Indian Poultry Industry, Mr. Bayas emphasized the crucial role of veterinary research and innovation in advancing the poultry and livestock sectors. He stated, "Your work - whether it's in improving animal health, advancing disease control, innovating feeding systems, or ensuring sustainable production - directly impacts our national food security, rural livelihoods, and economic resilience."

Adding to the day's highlights was the unveiling of the book *"Frontiers of Veterinary & Animal Science: A National Compendium of Excellence, Innovation, and Outstanding Research,"* a tribute to the outstanding research contributions from across the nation.

The program concluded with the heartfelt recognition of awardees, felicitation of dignitaries, and a stirring call for continued collaboration between academia, industry, and policy-makers to shape a resilient and progressive future for Indian veterinary sciences and agriculture.

On behalf of IPEMA and Poultry India, **Mr. Uday Singh Bayas** congratulated all awardees, contributors to *Golden Frontiers*, and the entire organizing committee for their dedication, passion, and commitment to excellence.

Jai Hind. Jai Kisan. Jai Vigyan.

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Vitamin E: Irreplaceable Nutrient in Animal Diets

Summary

The multiple essential functions of vitamin E in animal nutrition were reviewed in the article 'Vitamin E: more than natures most powerful antioxidant. Vitamin E is the most effective lipid-soluble chain-breaking antioxidant, it maintains the tissue's structural integrity, supports neural growth and reproduction as well as modulating immunity. It also enhances meat quality, the nutritional value and the organoleptic properties of meat and eggs.

This article will review the current scientific knowledge behind the hypothesis of replacing vitamin E with other compounds. Phytochemicals, emphasis polyphenols, have been extensively studied for their antioxidant properties in human nutrition and health but overall results failed to prove their antioxidant properties. The current research focus has shifted to other functionalities like signaling molecules or gut health influencers. In addition, the bioavailability of polyphenols is generally low, making their potential effect in the body questionable. In animal nutrition, a partial replacement of dietary vitamin E with polyphenol-based extracts has been proposed, claiming antioxidant properties and immune function. As human-oriented trials did not prove such an effect, by analogy, currently animal research tends to look in the same direction. Thus, vitamin E should be considered a key player of the antioxidant system in living organisms, and it cannot be recommended to replace this essential nutrient in the diet with polyphenols. It remains to be elucidated if dietary polyphenols can play a role in gut ecology and health of monogastric animals.

Can we replace Vitamin E functionalities?

As described in the article "Vitamin E: more than nature's most powerful antioxidant", vitamin E possesses multiple functionalities, most of them centered around its well documented and proven effect as free radical scavenger, hence a very peculiar antioxidant function. In addition, the multiple functionalities of vitamin E reflected with most symptoms of deficiency related to disorders of the cellular membrane, due to the oxidative degradation of polyunsaturated fatty acids, indicate that vitamin E is the most effective lipid-soluble, chain-breaking antioxidant in the living organism. In human nutrition, plant phytochemicals, a large group of compounds including polyphenols, have attracted the attention of the scientific community for many years. Being present in many food items and wine, their function has been associated with antioxidant properties: but is it true?

Polyphenols are a family of around 8,000 compounds usually clustered as flavonoids – the largest family - and non-flavonoids (*Manach et al., 2004*). Amongst different functionalities attributed to polyphenols, their antioxidant properties have attracted the interest of scientists. In addition, consumer interest on these compounds started because of the so-called "French paradox", the apparently paradoxical epidemiological observation that French people have a relatively low incidence of coronary heart disease (CHD), while having a diet relatively rich in saturated fats. It has been suggested that France's high red wine consumption is a primary factor in the trend because of one of the components of red wine potentially related to this effect is resveratrol, a polyphenol. It has however been shown that the amount of resveratrol and other polyphenols absorbed by drinkers of red wine is minimal and that it is unlikely to explain the paradox (*Ferrières, 2004*). Despite several years of epidemiological and intervention studies, the evidence for *in vivo* antioxidant effect of polyphenols in red wine remains confusing and equivocal (*Halliwell et al., 2005; Croft, 2016*).

For some years, and sometimes still today, *in vitro* measurements of antioxidant efficacy of polyphenols and other substances has been extensively used. Values of antioxidant capacity measured for example with the ORAC (oxygen radical absorbance capacity) technique have been used by private companies to promote their products - and by consumers to guide their food and dietary supplement choices – and published by independent bodies. Later it has been recognized that in vitro measurements do not reflect the in vivo properties and rankings based on in vitro assessments have been withdrawn and not considered scientifically sounding (*USDA, 2016*).

The main reason for the discrepancies between in vitro and in vivo can, according to most scientists, be ascribed to the low bioavailability of polyphenols and hence the very limited plasma concentration, clearly insufficient for exerting significant antioxidant effects in the system (*Halliwell et al., 2005*). In fact, maximal concentration of flavonoids in plasma after absorption via the gastrointestinal tract would not exceed 1mmol/L (*Halliwell et al., 2005*). This concentration is far below the total plasma antioxidant capacity in humans, which measured by a range of assays is >103 mmol/L (*Halliwell and Gutteridge 2007*).

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Some authors have drawn quite straightforward conclusions stating that dietary flavonoids cannot be significant antioxidants in humans (*Frei, 2009*). In July 2008, the FDA republished guidance for industry using antioxidant claims and stated that "as only dietary vitamins A, C and E are verified as physiological antioxidant nutrients, just these vitamins-not polyphenols-qualify for an antioxidant nutrient claim" (*FDA, 2009*). The same position has been taken in Europe by the European Food Safety Authority in different opinions (*EFSA, 2010*).

It has been postulated that the increased antioxidant capacity measured in vivo in blood after ingestion of polyphenols could be caused by the increased concentration of plasma antioxidants like urates, an effect which cannot not be considered only beneficial since elevated urate level may be a risk factor for some diseases (*Halliwell, 2003*).

There are clear gaps in human nutrition between observational studies and intervention trials using food extracts or pure polyphenol compounds (*Croft, 2016*). Most recent hypothesis are based either on considering polyphenols signaling molecules, playing a role in anti-inflammatory processes or on assessing the effect of these molecules on gut microbiota (*Williamson and Clifford, 2017*).

What about the research and the results obtained with the use of polyphenols in animal nutrition?

First of all, it must be noticed that in animal nutrition most of the research has been conducted with the use of mixtures of many polyphenolic compounds – like those found in grape or pomace extracts – more than single flavonoids, which is predominant in human intervention studies.

Moreover, most animal studies did not measure bioavailability in different animal species. Most studies have applied in vitro measurements like ORAC ex vivo techniques as assessment of the antioxidant capacity of the extracts used: hence in both cases bioavailability has not considered.

Finally, most of the intervention studies in poultry and swine have compared performance and some other parameters like meat quality such as oxidative stability of muscles of animals receiving medium-high levels of vitamin E against other fed with diets containing polyphenols and still a generous supplementation with vitamin E. In these studies, vitamin E was partially replaced with grape or pomace extracts but most of the time maintaining a dietary vitamin E level much above minimum requirements (*Lipinsky et al., 2017*).

The lack of statistical significance on animal performance, and in parallel same oxidative stability of meat measured with Thiobarbituric Acid Reactive Substances (TBARS) technique has been taken by some authors as demonstration that these citrus fruit extracts can effectively replace part of vitamin E. It is not surprising that a reduction of some 30% of generous vitamin E supplementation does not exert impact on performance in healthy animals, as vitamin E levels above physiological requirements are not expected to enhance growth. Moreover, the claimed protective effect on meat oxidative stability by grape or pomace extracts could have been indirectly caused by the presence of higher uric acid concentration or of other substances - a known consequence of dietary polyphenols - interfering with techniques like FRAP and TBARS. In general, those techniques are not considered reliable for investigating antioxidant activity in vivo, and therefore studies on polyphenols claiming antioxidant activity in vivo based on this technique should be taken with serious caution.

In a recent and extensive review of intervention studies with polyphenols in poultry and swine (*Lipinski et al., 2017*) it has been concluded that "*polyphenols exert an ambiguous effect on nutrient digestibility and animal performance*". Not considering possible interference of secondary metabolites on meat quality parameters the authors postulate an effect on this aspect but, having observed results when associated with vitamin E, it remains unclear what intervention is really driver of the beneficial effects. Final recommendation calls for additional research on polyphenols in animal nutrition.

Given their low absorption, it seems likely that the gut it the primary site for antioxidant action of polyphenols. Gut health has become a subject of increasing interest in pig and poultry research. The gut is the main site of potential exposure to pathogens, and when gut function is impaired because of infectious diseases, nutrient digestion and absorption is affected, which compromises animal performance.

It was recommended already in 2005 that greater attention of the biological effects of the polyphenols and their metabolites in the gastrointestinal tract should be given (*Halliwell et al, 2005*). A recent review (*Bradbury et al. 2018*) still attributes antioxidant functionalities to polyphenols more for historical reason but focuses most on gut health modulating properties, including the composition of the commensal microflora towards higher proportion of beneficial bacteria; and anti-bacterial effects on pathogens. In their survey, *Dueñas et al. (2015)* summarized studies in animals with the effect of polyphenols on the modulation of the intestinal microflora. For instance, in pigs, the administration of tea polyphenols increased the levels of lactobacilli whilst diminishing the levels of total bacteria and Bacteroidaceae (*Hara et al., 1995*). Furthermore, some studies have obtained a positive effect of dietary polyphenol-rich plants on performance of pigs, and this effect has been ascribed to an alteration in the microbial composition and anti-inflammatory effects on the intestine. In the colon, polyphenols are broken down to metabolites, of which the microbial degradation results in high concentration of phenols rather than flavonoids (*Halliwell et al, 2005*). Theoretically, an antioxidant function of polyphenols may protect vitamin E and C from oxidation when present in the small intestine prior to their absorption, however, this requires more well-controlled studies to verify this.

Conclusion: there is no replacement for vitamin E

To the best of our knowledge, no subsequent studies are available addressing the importance of polyphenols for monogastrics that could lead to different conclusion than stated in an interesting and extensive paper on this topic (*Surai, 2013*), and in agreement with findings in human nutrition: "*antioxidant properties of polyphenols/flavonoids observed in in vitro systems are convincing but…. antioxidant activities of polyphenols/flavonoids in in vivo biological systems are not straightforward depending on multiple factors like the efficiency of absorption, the active concentrations in the target tissues, which are extremely low and metabolic transformation*".

It looks reasonable to conclude that the functionalities of vitamin E are peculiar and its supplementation in feed is recommended at higher levels than minimum requirements in order to benefit of its multiple functionalities. Based on the existing knowledge we would like to remind that the network of antioxidants in the body does not call for replacement of one antioxidant with another but supply all the required elements for the antioxidant system to ensure an efficient protection of the body towards oxidative stress.

About the Authors

This Feed Talks article has been developed by our dsm-firmenich Animal Nutrition & Health experts, demonstrating our collective commitment to delivering valuable and accurate information.

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CLFMA Hosts Strategic Session on "Poultry in India: Current Challenges & the Way Forward" in Collaboration with the U.S. Grains Council and Bihar Poultry Farmers Association (BPFA)

The Compound Livestock Feed Manufacturers Association (CLFMA) of India, in Collaboration with the U.S. Grains Council and with support from the Bihar Poultry Farmers Association (BPFA) successfully hosted a seminar at Patna. The seminar, themed "Poultry in India: Current Challenges & the Way Forward," brought together more than 60 participants, including feed manufacturers, poultry farmers, nutritionists, grain suppliers, and researchers from across the region.

The seminar opened with a welcome address by Ms. Nayantara A Pande, Marketing Specialist, U.S. Grains Council, followed by a keynote on "Poultry in India and The Potential" by Mr. Divya Kumar Gulati, Chairman, CLFMA of India. He highlighted the urgent need for collective action to address rising feed costs and market volatility, stressing that strategic collaborations will be pivotal in driving sectoral resilience.

Mr. Divya Kumar Gulati, Chairman, CLFMA of India, shared, "The Indian poultry industry is at a critical crossroads, where timely interventions and strategic collaborations are essential to overcoming the challenges posed by rising feed costs, supply chain disruptions, and market volatility. According to a recent Crisil Ratings report, the industry's profitability is expected to dip by 50 basis points in the 2025-26 fiscal year, largely due to the rising prices of key feed ingredients like maize and soybean, which account for 90% of total feed costs. However, revenue growth is still projected to rise by 8-10%, driven by strong demand and consumption. Events like these provide an invaluable platform for exchanging insights, fostering collaboration, and exploring sustainable solutions that will not only benefit our sector but also contribute to the nation's economic resilience."

The seminar was anchored by engaging sessions led by leading voices from the Indian poultry and feed sectors.

Key Discussions & Insights:

- **Mr. Amit Sachdev, Regional Consultant, U.S. Grains Council,** shared an overview of India's feedstock situation and its global implications.
- **Mr. Reece H Cannady, Director, U.S. Grains Council,** presented on "U.S. Sorghum: A Potential Solution" to current grain supply challenges.
- **Dr. Pankaj Kumar Singh, Professor and Head of Animal Nutrition Department and Deputy Director Research, Bihar Animal Sciences University,** elaborated on "Recent Advances in the Use of DDGS in Livestock and Poultry Feed," advocating for research-led adoption of DDGS to offset feed costs and improve efficiency.

A panel discussion on "Navigating the Indian Poultry Sector's New Normal" was moderated by Mr. Amit Saraogi (MD, Anmol Feeds), and featured an esteemed panel including Mr. Divya Kumar Gulati, Mr. Pawan Kumar, Mr. B. M. Sahni (MD, Patliputra Feeds), Mr. Pawan Kumar (President, BPFA) and Mr. Amit Sachdev. The discussion focused on the urgent need for sustainable feed alternatives, policy clarity, and building long-term supply chain resilience.

The seminar successfully highlighted critical issues facing India's poultry industry, from volatile feed grain markets to the need for strategic partnerships. It reinforced CLFMA's position as a vital advocate for industry advancement, enabling dialogue between farmers, academia, and global stakeholders to build a more sustainable and robust poultry ecosystem.

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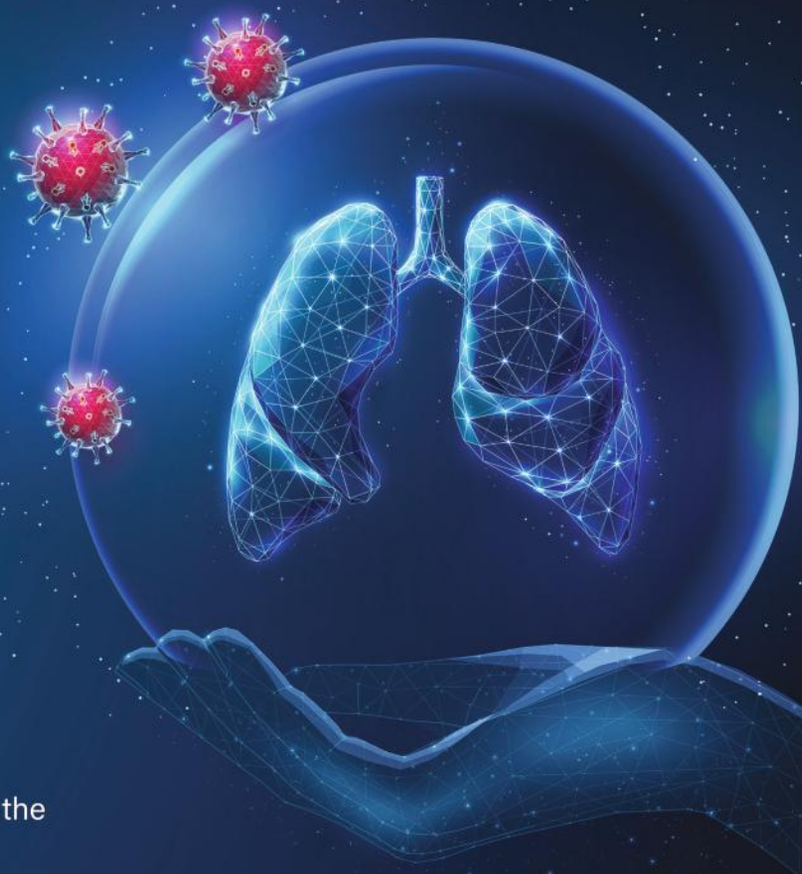

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Novel Ways to Improve Gut Health

and Nutrient Absorption Technical session organized by Venky's India Limited

Venky's India Limited Organized Technical Seminars in second week of April at Kochi (7th April), Raipur (9th April), Varanasi (10th April) and Lucknow (11th April). Dr. Christian Luckstadt (Technical Director Feed ADDCON), expert in animal nutrition from Germany was the guest speaker. The theme of the seminars was "**Novel Ways to Improve Gut Health and Nutrient Absorption.**" Dr. Prasad Kulkarni, Incharge South Asia Feeds ADDCON was technical support in all the Seminars.

Dr. Christian began his talk by emphasizing the importance of gut health in poultry performance. He also demonstrated how the microbiome develops in the gut and its relevance. AGP's negative consequences on human and animal health have been explained. Furthermore, he discussed the role of acids in poultry, with a focus on sodium diformates.

Dr. Christian subsequently showed other efficacy studies of **Acidomix® DF plus** on layer and broiler birds conducted in multiple countries, including India. Acidomix DF Plus has an important role in lowering faecal pathogenic microbiota count, resulting in improved performance and reduced antibiotic use. Many investigations have demonstrated that lowering the faecal count of coliform bacteria reduces the danger of cross-infection and improve flock performance. Other broiler trials have demonstrated significant improvements in gut morphology. **Acidomix® DF plus** enhances nutrient digestion, resulting in enhanced egg quality and a lower number of damaged eggs. Dr. Christian articulated gut eubiosis and its correlation with intestinal immunity which becomes indispensible need for the bird heath today.

He closed his session by stating that gut health and high performance can be obtained without AGPs and with gut acidification with perfect gut acidifier like **Acidomix® DF plus** which can reach the small intestine at maximum concentration.

Following his presentation, Dr. Vishwas Sagajkar (Deputy General Manager sales and marketing) and Dr. Akhil (Technical Manager) translated and explained the concepts in their respective states' native languages, Hindi and Malayalam.

Along with this in Raipur, Dr. Sunil Nadgauda (Deputy General Manager-Technical) has described about Biosecurity solution for current disease challenges.

In Kochi, Dr. N. Baburaj (Deputy General Manager-South zone) has stressed upon vaccination in current disease challenges like LPAI.

All of the seminars were attended by field veterinarians, broiler breeders, integrators, and layer farmers. Dr. Vishwas Sagajkar gave an introductory session about the novel concept and speaker in Raipur, while in Kochi. Mr. Shaji Huda (Zonal Manager) greeted everyone. In Varanasi and Lucknow, Mr. H.S. Padda (Deputy General Manager, North Zone) introduced and addressed everyone. Mr. Shashi Bhushan Kumar (Assistant General Manager, North Zone), Dr. Rakesh Yadav (Zonal Manager), Dr. Binay Yadav, Mr. Sushil Singh, Mr. Bhupendra Singh, and Mr. Shivam Singh, Mr. Abhishek Gupte (Zonal Manager Sales Central Zone) and Ashutosh Singh (Raipur), while Mr. G. Chinnaraj (AGM Sales), Mr. Shaji Huda (Zonal Manager), Mr. Sachin P, Mr. Ajay K, and Dr. Akhil R in Kochi made the necessary arrangements.

In Kochi, seminar was conducted in Hotel Port Muziris. Mr. Shaji Huda (Zonal Manager) conducted introductory session. All the arrangements were done by Mr. G. Chinnaraj (AGM, Sales), Mr. Sachin P, Mr. Ajay K, and Dr. Akhil R.

In Raipur, Seminar was conducted in Hotel Babylon. Dr. Vishwas Sagajkar (Deputy General Manager, Marketing) gave an introductory session about the concept and speaker. All the arrangements were done by Mr. Abhishek Gupte (Zonal Manager) and Mr. Ashutosh Singh (Regional sales manager). Seminar in Raipur was guided by Mr. H. G. Murade (Deputy General Manager, Sales West and central zone).

North zone seminars were conducted at the Fern residency, Varanasi and The centrum Hotel, Lucknow. In both the places Mr. Harjit Padda (Deputy General Manager, North zone) has given introductory

speech. Arrangements were done by Dr. Rakesh Yadav (Zonal Manager), Mr. Bhoopendra Singh, Dr. Binay Yadav in Varanasi and Mr. Sushil singh , Mr. Shivam Singh in Lucknow.

In the end, Dr Vishwas Sagajkar thanked everyone for attending the seminar and concluded with a positive note. The seminars were guided by Dr. Deepak Khosla, General Manager Sales and Marketing, Venky's India Limited.

The seminar received a massive response from poultry farmers, veterinarians, and consultants. In all the seminars queries from the participants were discussed in detail.

Farmers and veterinarians were happy with the novel concept and significance of gut acidification in improving performance of poultry.

Mycotoxins in Poultry Feed: A Silent threat to Poultry Production

Sanket Rajkumar Dhapse, Mokshata Gupta* and Raju Kushwaha
Department of Animal Nutrition, DUVASU, Mathura (U.P.) – 281001

India's poultry industry has experienced significant growth in recent years, driven by increasing demand for eggs and chicken meat. In the financial year 2022-23, the country produced approximately 138.38 billion eggs and 4.995 million metric tons (MMT) of poultry meat, accounting for 51.13% of the nation's total meat production.

However, this rapid expansion faces challenges, notably the contamination of poultry feed by mycotoxins. Mycotoxins are harmful substances produced by certain fungi that can contaminate feed and pose serious health risks to poultry. This issue is not just limited to India but is a global concern, affecting both animal health and economic stability. Even at subclinical levels, mycotoxins can impair poultry health by damaging the gastrointestinal tract, liver, and kidneys, leading to reduced feed efficiency and compromised immune responses. These health issues result in decreased productivity, with studies indicating a potential 10.5% reduction in production performance due to mycotoxin exposure. Economically, mycotoxin contamination leads to significant losses across the poultry sector. Producers face increased costs from reduced feed efficiency, impaired growth rates, and lower reproductive performance. Processors and consumers are also affected, as the overall quality and safety of poultry products decline. Addressing mycotoxin contamination is crucial to ensure the sustainability and profitability of the poultry industry. The primary mycotoxins affecting poultry include:

1. Aflatoxins (AFB1,AFB2,AFG1,AFG2)
2. Ochratoxins (OTA)
3. Fumonisins (FB1,FB2)
4. Trichothecenes (DON,T-2 toxin)
5. Zearalenone (ZEA)

Maximum suggested level of mycotoxins

In India, the Bureau of Indian Standards (BIS) has set a maximum permissible level of aflatoxin B1 at 20 µg/kg or 20 ppb in all animal feeds including poultry feed. Indian regulatory bodies do not specifically define the regulatory limits for additional mycotoxins found in chicken feed, including ochratoxin A (OTA), Fumonisins (FB_1, FB_2), deoxynivalenol (DON), T-2 toxin, and zearalenone (ZEA). However, Industry frequently uses international recommendations to handle these mycotoxins. For example, when it comes to these mycotoxins in complete poultry feed, the European Union (EU) suggests the following recommendation values:

Ochratoxin A (OTA)	100 ppb
Fumonisins ($FB_1 + FB_2$)	20 ppm
Deoxynivalenol (DON)	5 ppm
Zearalenone (ZEA)	500 ppb

Effects of mycotoxins in poultry

1. Aflatoxins– cause liver damage, immunosuppression, and poor growth.
2. Ochratoxins– causes kidney damage, reduced egg production, and immunosuppression.
3. Fumonisins– Affect liver, immune system, and nutrient absorption.
4. Trichothecenes– Damage the gut, suppress immunity, and cause feed refusal.
5. Zearalenone– Disrupts reproduction and reduces hatchability.

Control and Treatment

- ***Pre-harvest control*:** Preventing mycotoxin contamination in crops starts at the farm level with good management practices. Farmers can reduce the risk by improving irrigation systems, using fertilizers wisely, rotating crops, and choosing fungus-resistant varieties. Controlling pests also helps in minimizing fungal growth. Another effective method is replacing harmful aflatoxin-producing fungi with non-toxic strains, reducing the chances of contamination right from the start.
- ***Post-harvest control*:** Proper storage conditions are essential to protect harvested grains and feed from damage caused by insects and mechanical handling. Maintaining the right temperature, good air circulation, and proper moisture levels helps prevent spoilage. To further protect stored feed, chemical preservatives like sorbic acid and propionic acid are commonly used worldwide. These help in preventing mold growth and keeping the feed safe. In addition to these methods, advanced techniques such as gamma irradiation can be used to improve feed safety and quality.
- ***Treatment*:** Managing mycotoxin toxicity in poultry involves several strategies to reduce its harmful effects. A high-protein diet helps improve liver function and boost immunity. Supplements like N-acetylcysteine (NAC) act as antioxidants, aiding in detoxification, while choline and methionine support liver protection and toxin removal. To prevent mycotoxins from being absorbed in the gut, binders such as bentonite, activated charcoal, and yeast cell walls are commonly used. Additionally, vitamins A, C, E, and B-complex help reduce oxidative stress, while probiotics and prebiotics promote gut health by breaking down toxins. For liver health, silymarin, selenium, and curcumin support liver regeneration, and enzymes like esterases and lactonases assist in breaking down toxins. Ensuring proper hydration and electrolyte balance also helps flush out toxins from the body.

Conclusion

Mycotoxin contamination in poultry feed is a serious yet often overlooked threat to poultry production. It affects bird health, reduces productivity, and causes significant economic losses. Preventive measures, proper storage, and effective treatments are essential to minimize its impact. Addressing this challenge is crucial for ensuring the long-term sustainability and profitability of the poultry industry.

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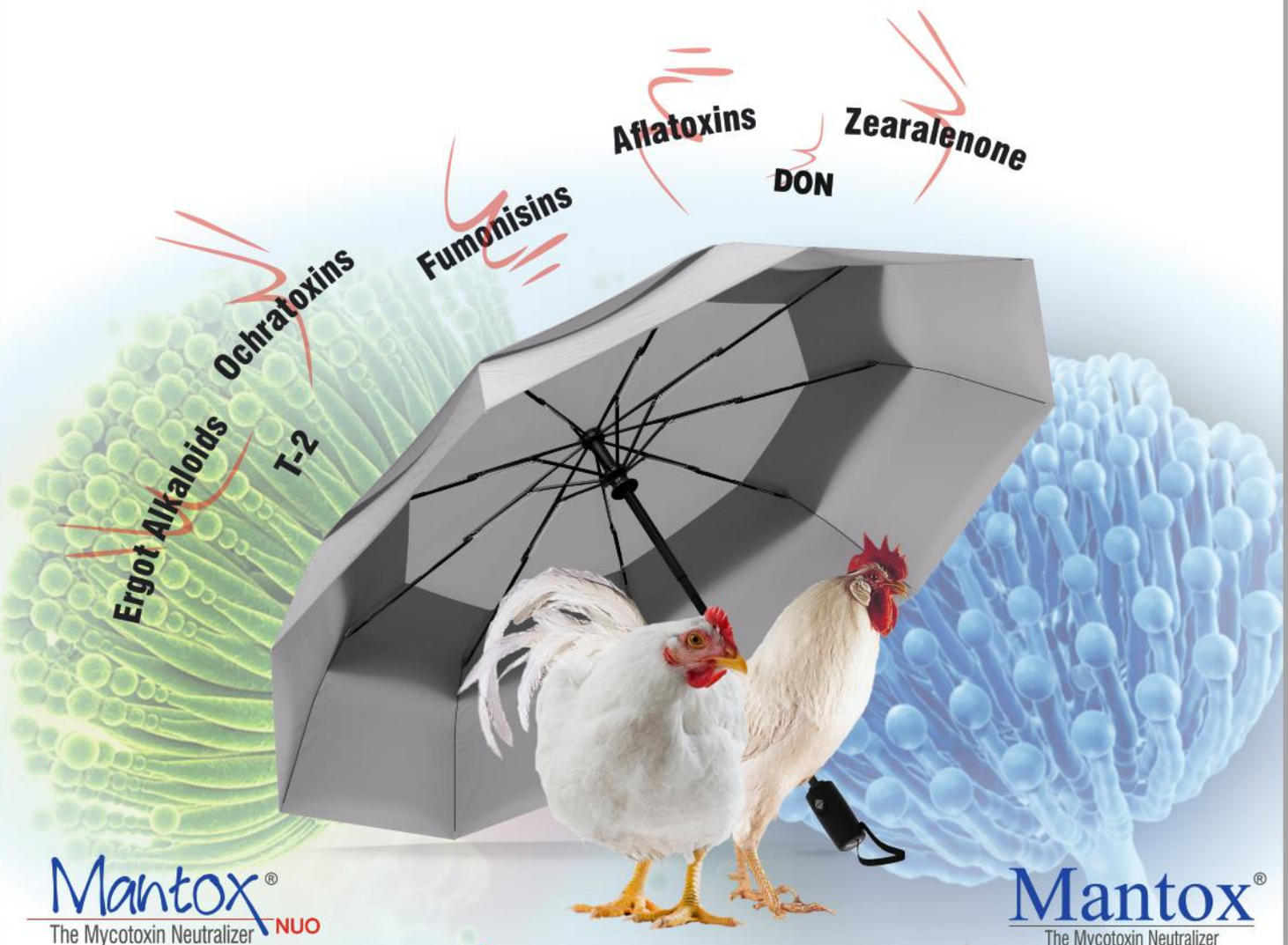

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Remarkable Participation of INDIAN HERBS at VIV ASIA Bangkok, Thailand, 12-14 March, 2025

INDIAN HERBS

INDIAN HERBS, The global leader in the Herbal Animal Health Care Products Industry since 1951, made a remarkable impact at **VIV ASIA 2025, held in Bangkok, Thailand**, from March 12th to 14th. The event was a resounding success, drawing business partners, customers, consultants and poultry nutritionists from around the world. Our sales and marketing team warmly welcomed all visitors, fostering meaningful discussions and collaborations.

The event served as an excellent platform to engage with customers, distributors and industry leaders on a global scale, reinforcing our commitment to herbal solutions for sustainable animal health and nutrition. We showcased our latest innovations and phytogenic solutions to address industry challenges. The enthusiasm and interest from our partners reaffirmed the growing demand for scientifically validated herbal solutions in the global animal health sector. We extend our sincere gratitude to everyone who visited our booth, shared valuable insights and contributed to making this event a tremendous success.

As a pioneer of Veterinary Ayurveda, **INDIAN HERBS** has consistently led the way in developing cutting-edge phytogenic feed supplements and healthcare products for over seven decades. Our dedication to innovation keeps us at the forefront of phytogenic research. Guided by the philosophy of 'Traditional Glory and Modern Science,' we are committed to transforming herbalism into a dynamic, scientifically validated and evidence-based discipline. Our phytogenic solutions offer superior efficacy at a lower cost, providing natural alternatives to synthetic products, free from side effects and residual toxicity.

Recognizing the evolving challenges in the animal industry, **INDIAN HERBS** has developed natural alternatives in key areas such as antimicrobial growth promoters (AGPs), nutritional supplements, immunopotentiators, metabolic stimulants, gut enhancers, respiratory antiseptics, anti-stress agents, and adaptogens. Our phytogenic solutions leverage the synergistic effects of plant-derived bioactive compounds, enabling animals to reach their full genetic potential while enhancing growth, immunity and disease resistance. Utilizing advanced scientific techniques, we have successfully deciphered the safety, efficacy and mechanisms of action of our products.

Our extensive product portfolio consists of over 230 products for poultry, cattle, swine, equine, aqua and companion animals. We adhere strictly to quality norms and regulatory compliance, with a strong focus on research and development. Our R&D and QC laboratories, equipped with state-of-the-art scientific instruments, ensure product quality and consistency. We rigorously pursue herbal standardization and phyto-analytical profiling while validating product safety and efficacy through scientific trials in collaboration with global research institutes and veterinary universities.

INDIAN HERBS products are natural, safe, effective and environmentally friendly, eliminating the need for a withdrawal period. As concerns grow over the adverse effects of synthetic medicines, veterinarians, poultry nutritionists and stakeholders are increasingly seeking clean and green alternatives to produce chicken and eggs free from residues. Our herbal solutions have gained widespread acceptance in the global poultry industry. **INDIAN HERBS** remains steadfast in its mission to promote natural solutions for improved animal health and production performance.

Currently, **INDIAN HERBS** successfully markets its products in over 50 countries worldwide. Our R&D Centre, approved by the Ministry of Science and Technology, Government of India since 1986, is equipped with cutting-edge facilities for the standardization and quality control of herbal products.

Our stall at VIV ASIA 2025 attracted a significant number of global visitors, including feed millers, integrators, large-scale farmers, consultants, nutritionists and distributors. The technical team of **INDIAN HERBS** diligently addressed all visitor inquiries to their satisfaction. Reaffirming our vision and commitment to sustainability and global well-being, **INDIAN HERBS** continues to support the animal healthcare industry with innovative, antibiotic-free, residue-free and environmentally friendly phytogenic solutions, ensuring feed-to-food safety.

We extend our heartfelt appreciation to our customers, patrons, scientists and well-wishers for their unwavering support, cooperation and guidance. We look forward to continuing our journey of delivering nature's finest solutions for animal health and strengthening our global partnerships.

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Presentation

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ARTICLE

Scientific Feeding of Broiler Chickens

The objective of scientific feeding of broiler chickens is to achieve good growth and feed conversion efficiency, good skeletal health and survivability and quality meat at shorter period of time as per nutrient requirements. A simple definition of dietary nutrient requirement is the daily amount of a nutrient necessary to meet a healthy animal's needs for maintenance, activity, growth and reproduction without any change in body reserves. The term "requirement" suggests that there is a fixed amount of a nutrient required by an animal where no further increase in performance will occur when an animal is fed an additional amount of that nutrient. Although, nutrient requirement is expressed accurately in gram per kg of live weight, but in case of poultry group feeding is done and the nutrient requirement is expressed in terms of percent or per kg feed. The CP requirement is expressed as CP percentage and energy is expressed as Metabolisable Energy (ME) kilo calorie /per kg feed. ME is used to express energy requirement because it is easier to estimate the losses of energy through faeces and urine in combination since there is a common opening for faecal and urinary losses called as cloaca and it is difficult to separately estimate the faecal losses only. Feeding scientifically, broilers grow at a rapid rate and reaches to about 1.8 to 2.0 kg at 5 weeks of age with an average feed conversion of 1.5-1.8 kg at 2 kg live weight.

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Growth phases of broiler chickens: The broilers are generally reared under three phases, i.e. 0-10/14d (pre-starting phase) and 10/14-21/24d (starter phase) and after 21/24d of age (finishing period) or even upto 8 weeks of age to produce larger broilers (roasters). The large broilers are suitable for production of different value added products. The basic purpose of phasing out is to provide nutrients as per need depending upon the growth rate and type of growth. During pre-starter and starter phases the growth is at fastest rate (about 15 to 20 times of initial body weight) and the growth is mainly due to deposition of protein and minerals. Thereafter, during finishing phase, the growth rate is about 2 to 3 times of its weight on 21st day and the growth is mainly due to protein, minerals and fat. After 6 weeks of age the growth of protein and minerals continues but their rate of deposition is decreased, while fat deposition rate is further increased. Therefore, more of protein, amino acids and minerals per unit energy is required during pre and starting phase, and with age their concentration in diet is decreased. The concentration of energy is rather increased with age. Feed conversion efficiency (FCE) is an important parameter in broiler production. FCE of the young chick (0 to 3 weeks of age) is largely dependent upon adequate amino acid nutrition, while in the older broilers (3-6/9 weeks of age) it is more dependent upon dietary ME. This is the reason that a gradual increase in dietary energy with increasing broiler age and body weight is advisable.

Energy in broiler diets: The poultry industry is a major consumer of energy in the form of cereals, protein cakes/meals and edible oils.Energy is the most expensive part of poultry diet and is also the most wasted. Therefore, accurate measurement of dietary energy is of economic importance to the poultry industry. As the broilers grow at rapid rate, the concentration of all the nutrients in their diets is higher to support conversion of feed nutrients to body tissues. They require high energy as carbohydrates and fat, and also protein. But to prevent utilization of protein for energy, energy to protein ratio should be maintained. Increasing the dietary energy level causes increased gain and improved feed efficiency. Increasing the dietary energy concentration does not affect total feed intake but increases total energy intake as long as the birds are responding positively to energy. However, meeting the energy requirement is the major limitation in broiler feeding. The reasonable energy levels in broiler diet range from 2800 to 3200 kcal ME per kg diet depending upon increased cost to meet energy requirement, ambient temperature, and type of meat required. At low level of dietary energy, the broilers are unable to meet requirement even by increasing feed intake to compensate energy intake resulting poor growth and feed conversion. High energy diet also leads to fat deposition in abdominal cavity, but the effect is more pronounced when energy to protein or limiting amino acids is wider. It means abdominal fat deposition is more in high energy and low protein diet. High density diet adequately balanced in energy and protein improves gain and feed conversion but may not increase abdominal fat pad.

Use of fats and oils in broiler diets: A starter diet with about 2850 kcal ME per kg and finisher diet with about 2950 kcal ME per kg can be formulated using maize-soybean meal without addition of fat. However, in order to increase the energy in diet beyond this limit it is necessary to add fat in diets. Moreover, to give a pleasant appearance in market broilers and to improve the meat quality, slight fat deposition is warranted. Replacement of one kg maize by fat or oil makes difference of about 50 kcal ME per kg diet. Addition of fat in diets reduces the heat increment, which is beneficial not only to reduce heat increment in extreme hot climate but also to compensate energy intake as ambient temperature is increased. However, the energy to limiting amino acids ratio should be adjusted to achieve good growth, feed conversion and welfare by reducing heat increment. The maximum effective level of fat in diet is 8% as upto this level it does not exert adverse effect on utilization of minerals and has extra-calorific effect. Generally, a total of 3 to 4 % fat comes from dietary origin and there is scope of adding 4 to 5% fat in broiler diets. However, the usefulness of fat is determined by the cost of production.

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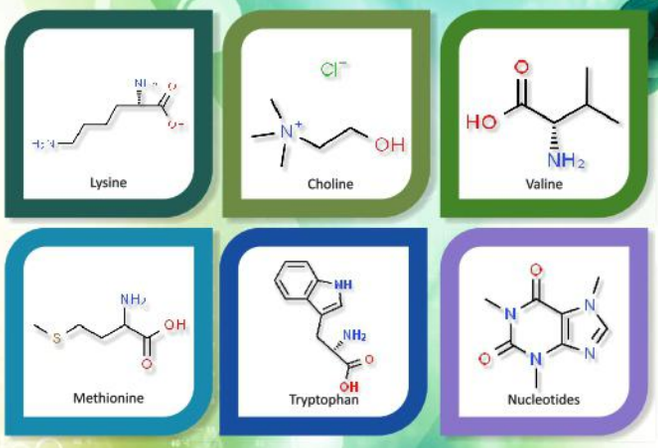

To achieve high efficiency poultry farming, a finely balanced feed formula with high bioavailability of feed nutritional fractions especially of critical ingredients including limiting amino acids, trace minerals etc., are required. To attain this balance, supplementation becomes extremely crucial to attain maximum bird performance and productivity.

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Protein and amino acids in broiler diets: The concentrations of essential amino acids are more important than protein as such. The dietary protein levels for broilers should be in between 21 to 23% during starting and 18-21% during finishing period at energy level of 3000 to 3200 kcal ME per kg in both the phases. Calorie-protein ratio must be maintained for effective utilization of protein as well as amino acids. Ambient temperature and age at marketing of broilers determine calorie-protein ratio. Faster growth is achieved when the protein level is increased i.e. at lower calorie to protein ratio. The specifications for energy to protein ratio for temperate climate is wider, while that for tropical climate it is narrower. The concentrations of amino acids especially of limiting amino acids are important. The first , second and third limiting amino acids in diets based on maize- soybean meal is methionine (or methionine plus cystine), lysine and threonine. While, these are in lysine, methionine, arginine and tryptophan in order of deficiency in groundnut meal-fish meal- maize based diets. The optimum lysine concentration varies from 1.10 to 1.30% in starting diets (0-3 weeks) and 1.00 to 1.20% in finisher diets (3-6 weeks). Thereafter (6-9 weeks) the requirement varies from 0.75 to 0.85% for optimum growth and feed conversion ratio.

The requirements of methionine and methionine plus cystine for the corresponding phases are 0.48 –0.50% and 0.75-0.90%, 0.38-0.45% and 0.78-0.88%, and 0.32-0.35% and 0.60-0.72%. The threonine requirements are 0.75-0.80%, 0.60-0.70% and 0.59-0.68% for 0-3, 3-6 and 6-9 weeks of age, respectively. The amino acid arginine is though not limiting, but its concentration affects utilization of lysine. Thus, arginine concentration needs to be considered. The requirements of arginine are 1.18-1.25%, 0.97-1.10% and 0.83-1.0% for the corresponding phases of broiler growth.

Vitamin and mineral requirements: As diets of broiler chickens are higher in energy and proteins, the requirements of vitamins and minerals are also higher to support rapid growth including mineral growth, and metabolism of nutrients. Vitamin A, riboflavin and vitamin D_3 are the most limiting vitamins in practical broiler diets. Other water soluble vitamins are also added as per requirements, however, their dietary supply may be reduced to half after 3 weeks of age when reared on litter (broilers are generally reared on litter). The requirements of calcium is 0.9 to 1.2%, while available phosphorus requirements are 0.45-0.50% during starting period, 0.40-0.45% during 21 to 42 days of age and 0.35% to 0.40% thereafter. Meeting the calcium and phosphorus requirement is critical as judicious use of calcium provides space to increase energy in diet, while phosphorus supplementation required costlier dicalcium phosphate. The cost of vitamins and minerals are about 5 to 8%.

Table.1 Nutrients requirements of broilers as percent or unit per kg of diet (90% DM basis) as suggested by NRC (1994) & modified at different energy levels (2900 & 3000 Kcal/kg):

		0-3 weeks			3-6 weeks		6-8 weeks	
Energy kcal	3200	3000	2900	3200	3000	2900	3200	3000
CP %	23.0	21.56	20.84	20.0	18.75	18.10	18.0	16.9
Arginine %	1.25	1.17	1.13	1.10	1.03	1.00	1.0	0.94
Lysine %	1.10	1.03	1.00	1.00	0.94	0.91	0.85	0.80
Methionine %	0.50	0.47	0.45	0.38	0.36	0.35	0.32	0.30
Meth + cyst %	0.90	0.85	0.82	0.72	0.68	0.66	0.60	0.56
Threonine %	0.80	0.75	0.725	0.74	0.70	0.68	0.68	0.64
Tryptophan %	0.20	0.19	0.18	0.18	0.17	0.16	0.16	0.15
Linoleic acid %	1.00	0.94	0.91	1.00	0.94	0.91	1.0	0.94
Calcium %	1.00	0.94	0.91	0.90	0.84	0.81	0.80	0.75
*NPP %	0.45	0.42	0.41	0.35	0.33	0.32	0.30	0.28
Sodium %	0.20	0.19	0.18	0.15	0.14	0.14	0.12	0.11
Chloride %	0.20	0.19	0.18	0.15	0.14	0.14	0.12	0.11
Copper mg	8.0	7.50	7.25	8.0	7.5	7.3	8.0	7.5
Iodine mg	0.35	0.33	0.32	0.35	0.33	0.32	0.35	0.33
Iron mg	80	75	72.5	80	75	73	80	75
Manganese mg	60	56	54	60	56	54	60	56
Selenium mg	0.15	0.14	0.13	0.15	0.14	0.14	0.15	0.14
Zinc mg	40	37.5	36.25	40	38	37	40	37.5
Vit A IU	1500	1400	1360	1500	1400	1350	1500	1410
VitD3 ICU	200	190	180	200	190	185	200	188
VitE IU	10	9.5	9.0	10	9.5	9.2	10	9.4
VitK mg	0.50	0.47	0.45	0.50	0.47	0.45	0.50	0.47
Thiamin mg	1.80	1.70	1.60	1.80	1.70	1.64	1.80	1.69
Riboflavin mg	3.60	3.37	3.26	3.6	3.38	3.27	3.0	2.8
Pyridoxine mg	3.50	3.28	3.17	3.5	3.3	3.19	3.0	2.8
Vit B12 mg	0.01	0.009	0.009	0.01	0.01	0.01	0.007	0.007
Biotin mg	0.15	0.15	0.14	0.15	0.14	0.14	0.12	0.11
Folic acid mg	0.55	0.52	0.50	0.55	0.52	0.50	0.50	0.47
Niacin mg	35	33	32	30	28	27	25	23.5
Pantothenic acid mg	10	9.5	9.0	10	9.4	9.1	10	9.4
Choline mg	1300	1200	1180	1000	940	910	750	700

NPP: non phytate phosphorus

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Feed additives: Certain feed additives or growth promoters viz. antibiotics, coccidiostats, enzymes, probiotics, antioxidants etc. can be added in diets as per recommended dose depending upon need. Under commercial environment, the birds are always exposed to infection. Antibiotic feed additives (zinc bacitracin, verginiamycin, aureomycin, etc. which are not used for therapeutic/treament purpose) not only prevent birds from subclinical infection, but also promotes growth and reduce stress. These additives are beneficial only when the broilers are kept under poor hygienic condition and with diets marginally deficient in micronutrients. The antibiotic feed additive must be withdrawn from diet one week prior to sacrifice of the birds. A coccidiostat (amprolium, bifuran, neftin, madhuramycin, monensin and many more anticoccidial feed additives are available in market) is must in diet especially when the litter is moist. If the litter is perfectly dry, it may be omitted from diet. The antioxidants (ethoxyquin, BHT, BHA, etc.) are required when high energy diet is compounded adding fats or oils. Enzymes may be added in high fibre diets but their effect is always not consistent and are yet to be standardized.

Feeding of broilers: Broiler chicks are fed *ad libitum* from day-old to the age of sacrifice. Light is provided to encourage feed intake. Frequent feeding (two to three times) of broilers is beneficial not only to encourage feed intake but also to prevent feed wastage. A whole mash feeding or pellet/crumble feeding is followed. The birds grew faster (by about 10%) and have better feed utilization efficiency (by about 5-8%) when pellet feed is used. However, the birds become more prone to ascites when pelleted feed is offered.

The basic purpose of phase feeding is to provide nutrients as per need depending upon the growth rate and type of growth.The dietary protein levels for broilers should be in between 21 to 23% during starting and 18-21% during finishing period at energy level of 3000 to 3200 kcal ME per kg in both the phases. Calorie-protein ratio must be maintained for effective utilization of protein as well as amino acids. Ambient temperature and age at marketing of broilers determine calorie-protein ratio. Faster growth is achieved when the protein level is increased i.e. at lower calorie to protein ratio. The broiler chickens requirements for energy and proteins are higher, likewise, the requirements of vitamins and minerals are also higher to support rapid growth, and metabolism of nutrients. Further, poultry farmers are looking for ways to improve the nutrient utilization of feed: i) Adding fat slows down the feed passage in the gut resulting in increased digestion by digestive enzymes. ii) Conditioning and pelleting improves the utilization of certain nutrients. iii) Inclusion of dietary enzymes helps break down the poorly digested dietary components.iv) Proper proportions of saturated and unsaturated fats enhance fatty acid absorption. v) Optimum particle size to increase surface area results in efficient enzyme action and enhanced nutrient availability.vi) Using synthetic essential amino acids to have a balanced low protein diet reduces nitrogen excretion- an energy costly affair. These practices improve feed utilization of the bird by making nutrients more available.Thus, by balancing the feed as per nutrient requirements and feeding broilers scientifically, one can definitely run a profitable poultry farm.

Table 2: Nutrient requirements of broilers under Indian conditions (DM basis)

Nutrients	BIS, 1992	Suggested for Indian conditions*			
	Starter	Finisher	0-3 wks	3-6 wks	6-9 wks
ME Kcal/kg	2800	2900	2950	3050	3100
CP%	23.00	20.00	22.00	19.50	18.70
CF, max %	6.0	6.0	6.0	6.0	6.0
AIA max %	3.0	3.0	3.0	3.0	3.0
Linoleic acid %	1.0	1.0	1.0	0.9	0.9
Lysine min	1.2	1.0	1.2	1.05	0.98
Methionine min %	0.50	0.35	0.48	0.42	0.39
Methionine+Cystine%	0.90	0.7	0.86	0.76	0.70
Threonine %	-	-	0.75	0.65	0.60
Tryptophan %	-	-	0.20	0.18	0.17
Arginine %	-	-	1.24	1.05	0.01
Isoleucine %	-	-	0.80	0.70	0.65
Calcium, min %	1.2	1.2	1.0	0.9	0.8
Available P, min %	0.5	0.5	0.45	0.40	0.35
NaCl, max %	0.6	0.6	0.3	0.3	0.3
Manganese, mg	90	90	50	50	50
Iodine, mg	1.0	1.0	1.0	1.0	1.0
Iron, mg	120	120	50	50	50
Zinc, mg	60	60	50	50	50
Copper, mg	12	12	10	10	10
Vitamin A, IU	6000	6000	5000	5000	5000
Vitamin D3, ICU	600	600	400	400	400
Vitamin E, IU	15	15	15	15	15
VitaminK, mg	1.0	1.0	1.0	1.0	1.0
Thiamin, mg	5.0	5.0	5.0	5.0	5.0
Ribiflavin, mg	6.0	6.0	6.0	6.0	6.0
Pyridoxine, mg	5.0	5.0	5.0	5.0	5.0
Pantothenic acid, mg	15	15	15	15	15
Nicotinic acid, mg	40	40	40	40	40
Biotin, mg	0.2	0.2	0.2	0.2	0.2
Vitamin B12, mg	0.015	0.015	0.015	0.015	0.015
Filic acid, mg	0.015	0.015	0.015	0.015	0.015
Choline, mg	1400	1000	1400	1000	800

**based on work conducted at CARI, Izatnagar and elsewhere in India*

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Noble VetScience Impresses
Global Poultry Industry at VIV Asia 2025

Noble VetScience made a striking impression at this year's VIV Asia, one of the most prominent international trade shows for animal health and production. With industry leaders, poultry marketers, and veterinary experts from across the globe in attendance, Noble VetScience's stall quickly became a hub of attention and curiosity.

As a company specializing in phytogenic products, Noble VetScience is committed to providing natural, plant-based solutions that are not only effective but also environmentally sustainable. Their innovative range of poultry and livestock health products received widespread appreciation for their quality, effectiveness, and science-backed formulations. From immune boosters and gut health enhancers to antibiotic alternatives and nutritional supplements, each product stood out for its performance and practicality in modern animal farming.

Noble VetScience's booth was a vibrant blend of information and interaction, where live product demonstrations, expert consultations, and engaging visuals allowed visitors to truly understand the value of the brand. The team, composed of skilled veterinarians and technical experts, was always on hand to address queries and share insights on how their phytogenic solutions are enhancing poultry and livestock health while promoting sustainability.

In addition to providing premium products, Noble VetScience is dedicated to offering expert technical and nutritional services to customers both in India and abroad. By providing personalized advice and tailored solutions, they ensure their clients maximize the benefits of their products, ultimately improving the overall health and productivity of their poultry and livestock operations.

What set Noble VetScience apart was not just the science behind the products, but the trust and results they deliver in the field. Many poultry marketers and livestock experts at the event acknowledged the positive feedback from their clients who had already adopted Noble's products in their operations. The interest and inquiries poured in, reinforcing the brand's growing reputation in the global market as a leader in phytogenic health solutions for all types of livestock and poultry.

The booth also attracted a strong international presence, with clients and distributors from the Philippines, Bangladesh, Sri Lanka, Nepal, Vietnam, Dubai, Malaysia, Taiwan, and Poland visiting to learn more about Noble's offerings. Their engagement underscored the global appeal and trust that Noble VetScience has built among industry professionals worldwide.

Beyond the business buzz, the Noble VetScience team made the most of their time at VIV Asia. The event provided an invaluable learning experience, exposing the team to the latest global trends, cutting-edge technologies, and emerging challenges in the poultry and livestock industries. Engaging in knowledge-sharing sessions and networking with fellow experts enriched their understanding and will surely fuel future innovation.

The trip wasn't all work, either. The team also took time to explore the vibrant culture and cuisine of Bangkok, building stronger bonds and returning home with cherished memories and fresh perspectives.

Noble VetScience's successful participation at VIV Asia 2025 is a clear indicator of the company's commitment to innovation, quality, and the health of poultry and livestock worldwide. With its continuous efforts in research and development—and a passionate team driving its mission—Noble is well on its way to becoming a trusted name in animal health across Asia and beyond.

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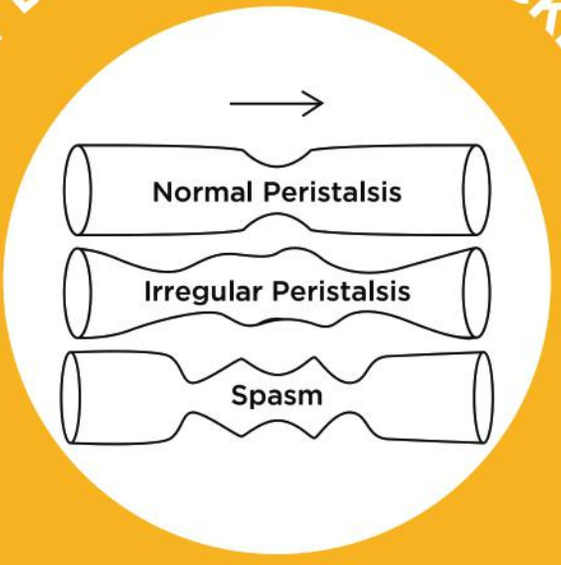

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Atomes India hosts Seminars to Advance Poultry Health Solutions

In line with its mission to support and elevate the poultry industry in India, Atomes India recently conducted a series of technical seminars across Chandigarh, Karnal, and Delhi. These sessions introduced Atomes' latest innovations in poultry health to a targeted audience of consultants, veterinarians, and industry experts.

The seminars served as a forum for in-depth discussions on key operational challenges, emerging needs, and opportunities for improvement in poultry production. Attendees engaged in constructive dialogue to enhance resilience and performance within poultry operations.

Leading the initiative, Dr. Sanjay Satbhai and the Atomes India team will be collaborating with participants to initiate field trials of Atomes' products in high-demand, real-world environments, validating performance where it matters most.

A highlight of the events was a keynote address by Dr. Johnny Nehme, Regional Director of Atomes Canada, who brought practical insight and global perspective to the conversation, drawing from his extensive experience in field implementation.

Atomes India remains confident that the awareness, insights, and professional connections generated through these seminars will contribute to the long-term advancement of poultry practices across India.

The success of our recent series of meetings wouldn't have been possible without the incredible reach and dedication of Mr. Manoj Kumar, North Head Atomes India Chemicals Private Limited. and Mr.Sanjeev Bhardwaj & Mr. Subodh Puri from FarmTech Solutions which is our exclusive distribution partner for North India.










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Avitech Nutrition Appoints

Dr Ashish Sachdeva

as Assistant General Manager – International Sales

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Avitech Nutrition has announced the appointment of Dr. Ashish Sachdeva as Assistant General Manager – International Sales. Dr. Sachdeva will be based at the company's corporate headquarters in Gurugram.

Holding a Master of Veterinary Science (MVSc) degree in Veterinary Bacteriology from the Indian Veterinary Research Institute, Bareilly, Uttar Pradesh, Dr. Sachdeva brings to this role extensive expertise in the animal nutrition industry.

Dr. Sachdeva possesses fifteen years of experience in international business development, sales, and product management within the animal nutrition industry. His professional career includes tenures with organizations such as Jubilant Ingrevia, EW Nutrition, and Ayurvet. Prior to joining Avitech Nutrition, Dr. Sachdeva was associated with Natural Remedies Pvt. Ltd.

In his capacity as Assistant General Manager – International Sales, Dr. Sachdeva will be driving Avitech Nutrition's international sales operations and contributing strategically to the company's market expansion initiatives.

Avitech Nutrition announces launch

of a new Trading Division for the Feed additive market

Avitech Nutrition, an established name in the animal feed and nutrition sector, has announced the establishment of its new Trading Division. This strategic expansion will focus on leveraging opportunities in trading of essential ingredients for the animal feed additive sector commencing with Vitamin blends and Straight Vitamins, which finds usage in animal feed formulations. Subsequently, several other products will be added to the Trading Division.

The Trading Division will cater to the needs of distributors and end-users by providing them with reliable access to high-quality inputs.

Spearheading this new venture is **Mr. Amal Kumar Datta**, who is leading the Trading Division. Mr. Datta brings with him extensive experience of over three decades in the Indian feed additive sector. His deep understanding of the market dynamics and established network will be invaluable in driving the growth and success of this new division.

The strategic move underscores Avitech Nutrition's commitment to strengthen its presence in the animal nutrition space. The establishment of the Trading Division will enable the company to further streamline the supply chain and offer enhanced value to its customer base.

For trade inquiries and further information,
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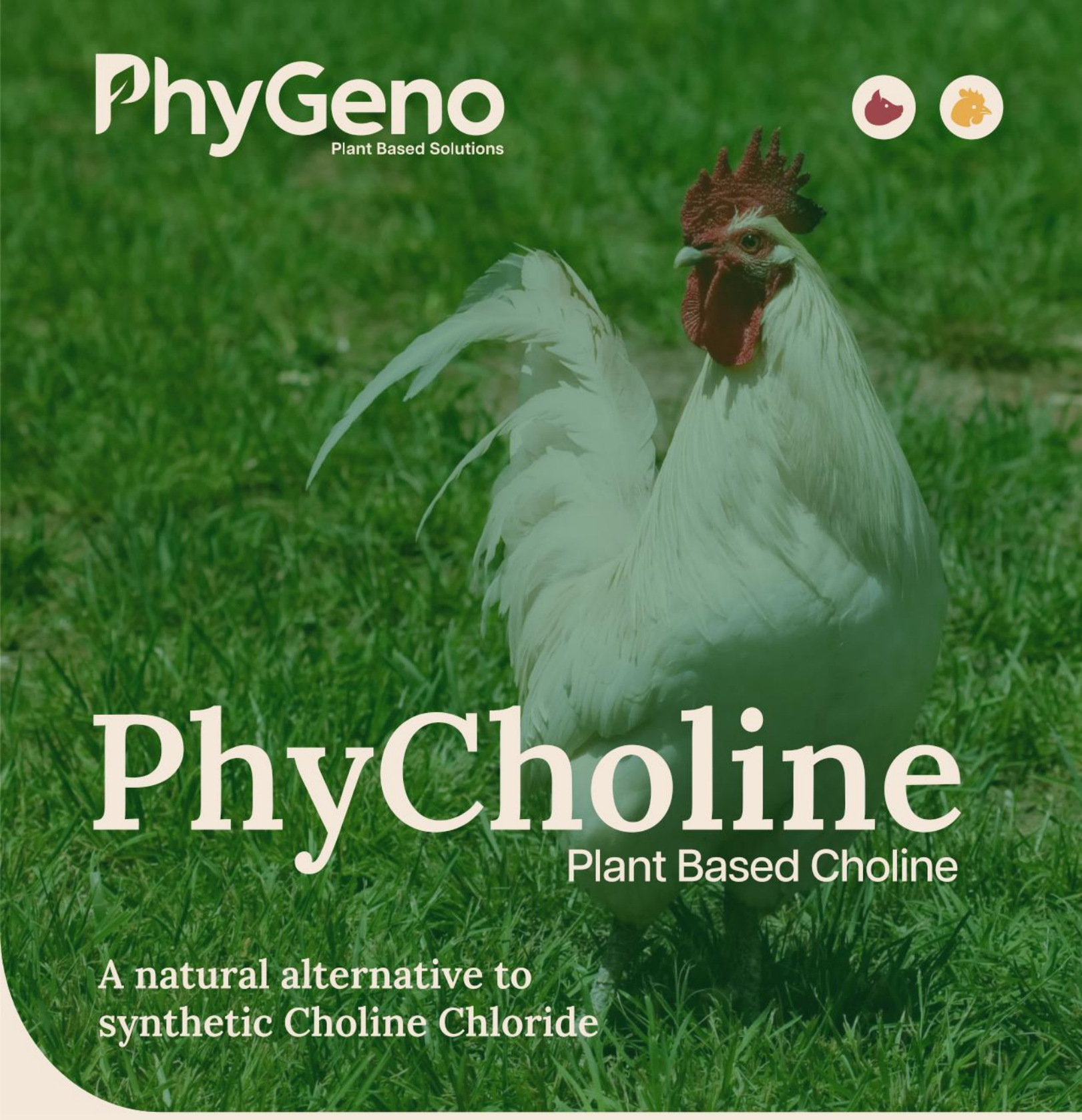

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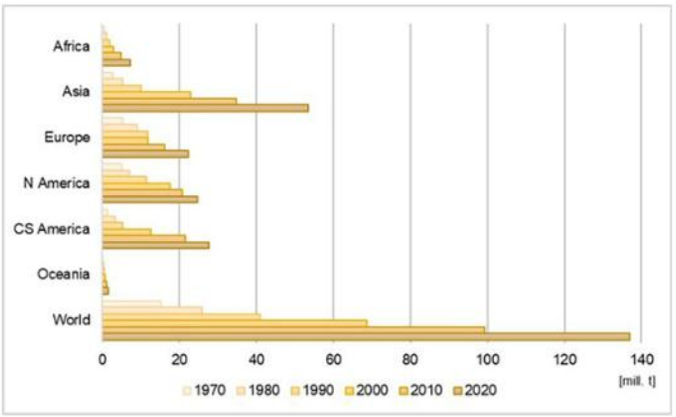
Remarkable Dynamics of the Global Poultry Industry

Poultry meat production has seen tremendous growth in the last 50 years. It's a wonder of agricultural development. Emeritus professor and statistical analyst Dr Hans-Wilhelm Windhorst witnessed it from the inside and reflects upon these remarkable dynamics.

Between 1970 and 2020, global poultry meat production increased from 15.1 million tonnes to 137 million tonnes, or by 807.8%. It was by far the fastest-growing animal product. Production volume grew much faster from 2000 than in the previous decades. Between 2000 and 2020 it increased by over 68 million tonnes.

A detailed analysis of the development at the continent level reveals the extraordinary role Asia played in the booming development (*Table 1*, *Figure 1*). To the absolute growth of 121.9 million tonnes in the decades under review, Asia contributed 41.6%, followed by Central and South America (16.8%), North America (16%), and Europe (14%). Africa and Oceania fell far behind. The highest relative growth is shown in Central and



South America and Asia. Even in Africa, it was higher than in Europe and North America.

Figure 1 – The development of poultry meat production at continent level between 1970 and 2020 (A. S. Kauer, based on FAO data)

Europe ahead before the nineties

Until 1990, Europe produced more poultry meat than Asia; then the extraordinary growth in several Asian countries began, as will be documented in a later part of this article. In 2000, the Americas surpassed Europe. The different dynamics at the continent level caused remarkable changes in the continents' share in the global production volume.

In the decades under review, Asia gained 21% while Central and South America 12%. In contrast, Europe lost almost 19% and North America more than 15%. These figures document a spatial shift of the regions with the highest dynamics from Europe and North America to Asia and Central and South America (*Figure 2*).

When breaking down the growth of poultry meat production by meat species, it is obvious that it was mainly a result of the extraordinary increase in chicken meat production (*Table 2*). To the absolute growth of the production volume, chicken meat contributed 108.3 million tonnes or 88.1%. The highest relative growth rate showed, however, goose and duck meat. One can see that chicken meat shared between 85.5% and 88.2% of global production volume (*Figure 3*). While duck and goose meat were able to expand their shares, that of turkey meat fluctuated considerably.

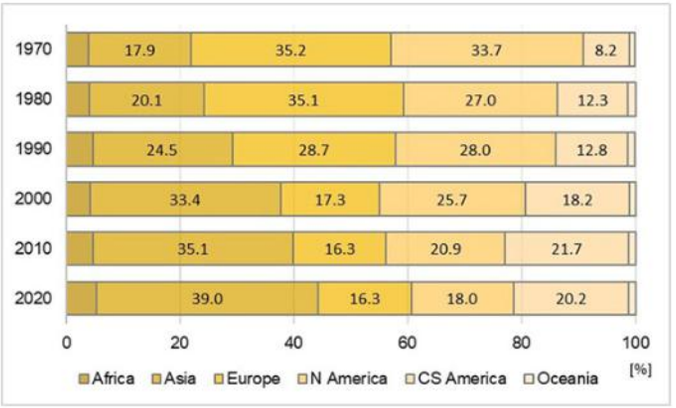


Figure 2 – The changing contribution of the continents to global poultry mat production between 1970 and 2020. Data in %. (A. S. Kauer, based on FAO data)

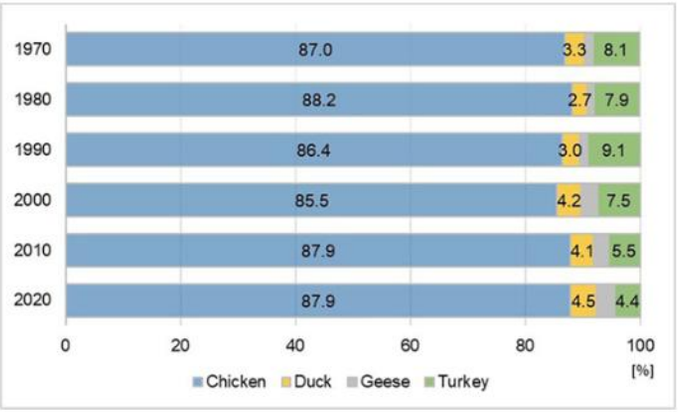


Figure 3 – The share of the poultry meat species in global poultry meat production between 1970 and 2020. Data in %. (A. S. Kauer, based on FAO data)

Differences per continent

In the next step, the development of chicken and turkey meat production at the continent level in the decades under review will be analyzed separately. *Figure 4* documents the dynamics in chicken meat production.

Figure 4 – The development of global chicken meat production at the continent level between 1970 and 2020. (A. S. Kauer, based on FAO data)

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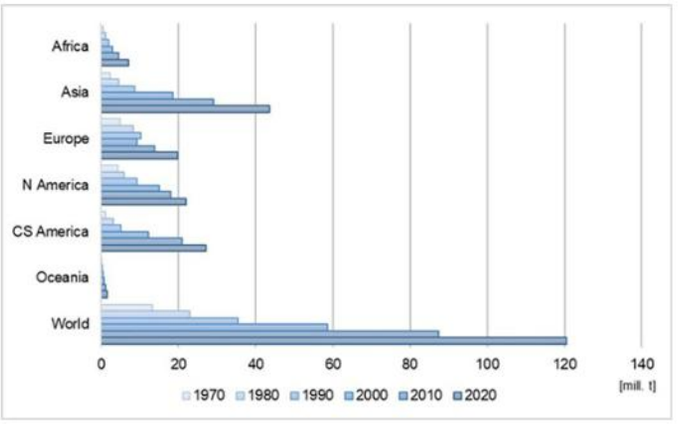

As expected, the dominance of this meat type resembles the dynamics of poultry meat. Because of the dominating role that Asian countries played in duck and goose meat production, the dominance of the continent was lower than in poultry meat in total. Until the 1990s, Europe and North America produced more chicken meat than Asia, and in 2020, Asia closed the gap in produced volume.

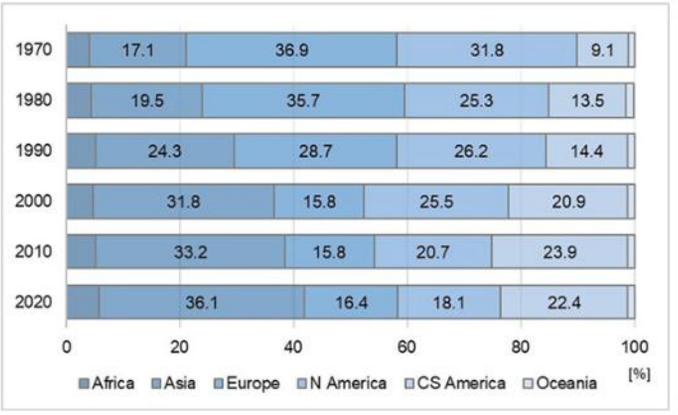

Figure 5 – The changing contribution of the continents to global chicken meat production between 1970 and 2020. Data in %. (A. S. Kauer, based on FAO data)

Figure 5 shows the changes in the contribution of the continents to global chicken meat production in the analyzed time period. A comparison with *Figure 2* reveals that the shares of North America and Europe were similar while that of Asia was lower and that of Central and South America higher. A later part of the paper will show which countries caused the differences.

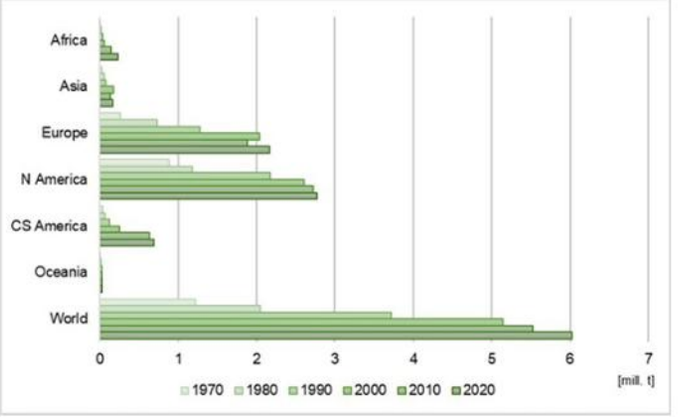

Figure 6 – The development of global turkey meat production at the continent level between 1970 and 2020. (A. S. Kauer, based on FAO data)

Chicken vs turkey

The dynamics in turkey meat production differed considerably from that in chicken meat production. *Figure 6* shows that North America and Europe dominated the production of this meat type over the analyzed decades. In all other continents, production volume was much lower and it was not before 2010 that Central and South America showed higher absolute growth rates.

When analyzing the development over time, one can see that the absolute and relative growth rates were highest until the 1990s. From then on, they decreased and seem to have reached a plateau in the past decade. While North America and Europe almost contributed the same amount to absolute growth, the relative growth rates were highest in Africa and Central and South America.

The different dynamics changed the continents' shares in global turkey meat production considerably (*Figure 7*). Between 1970 and 2020, Europe gained 14.4% and Central and South America 8.9%, in contrast, North America lost 26.8%. Due to the increase in the global production volume, Europe contributed 39.6% and North America 39.1%. The contribution of the other continents was much lower. This reflects the large differences in the per capita consumption of turkey meat. While this meat species is mainly consumed in Europe and North America, it has not reached a tradition as a meal in Asia and, except in Algeria and Morocco, not in Africa.

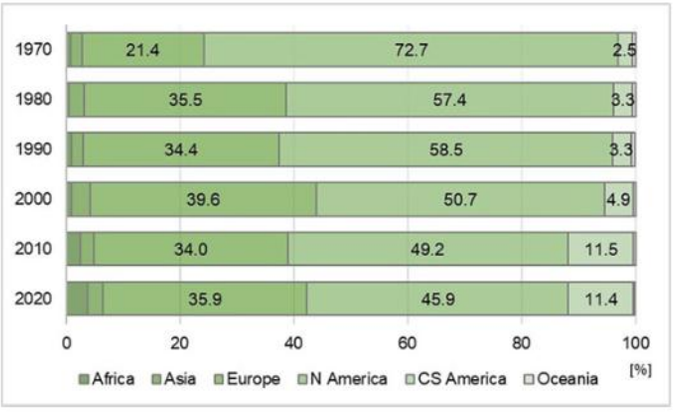

Figure 7 – The changing contribution of the continents to global turkey meat production between 1970 and 2020. Data in %. (A. S. Kauer, based on FAO data)

Remarkable changes at the country level

Over the past 50 years, the composition and ranking of the leading poultry meat-producing countries changed considerably (*Figure 8*). The US ranked in first place until 2019. In 2020, they were surpassed by China, which in that year produced 442,000 tonnes more than the US.

An extraordinary dynamic development showed Brazil. It climbed from 10th place in 1970 to third place in 2020. Until 1990, the USSR held 2nd place. After the political and economic collapse, the production volume decreased dramatically and it was not before the past decade that the Russian Federation showed up in the top group again.

The drastic decrease in pig meat production, which resulted from massive outbreaks of African Swine Fever, initiated a dynamic expansion of broiler growing. While in 1970, 5 European countries ranked in the top 10 group, here the USSR is included, in 2020, only 2, the Russian Federation and Poland, reached high ranks.

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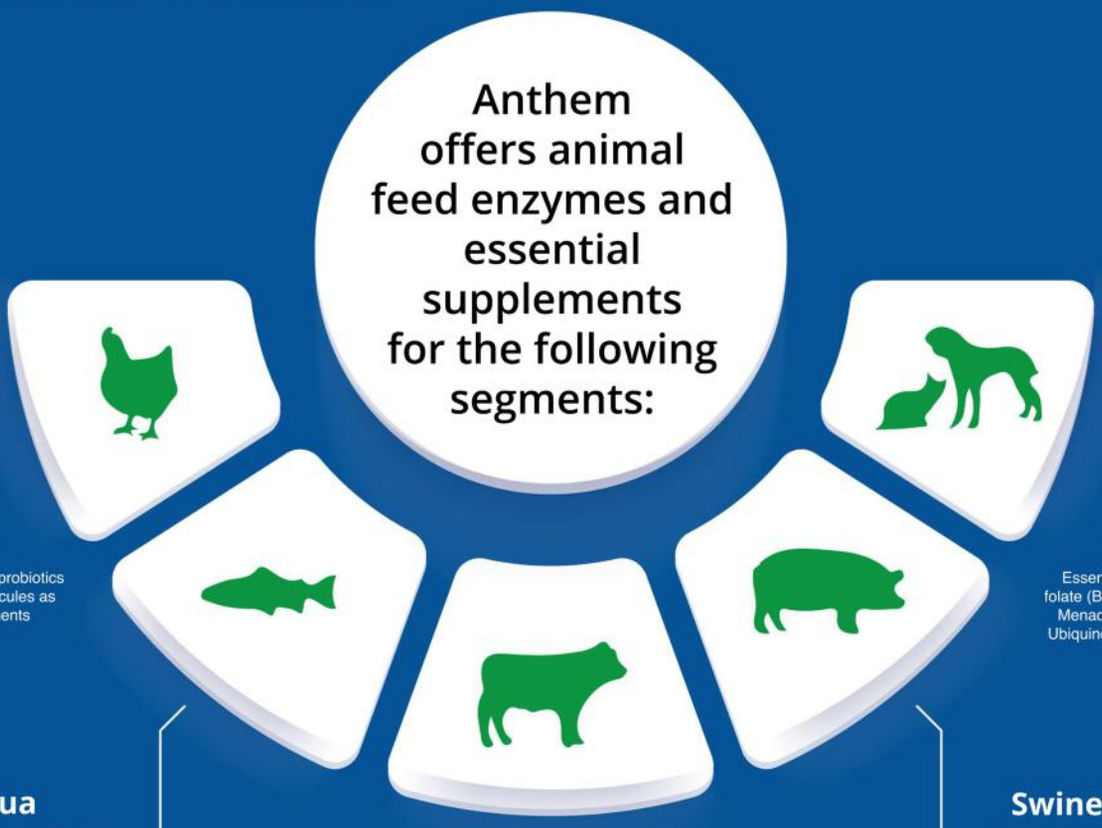

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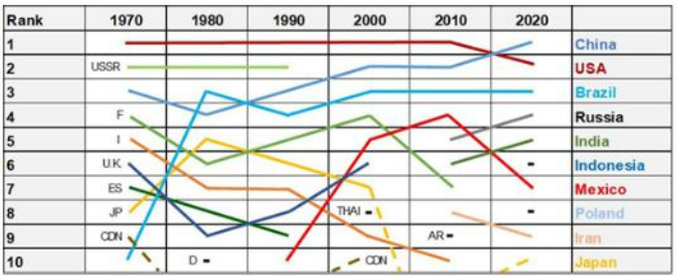

Figure 8 - The changing composition and ranking of the 10 leading poultry meat-producing countries between 1970 and 2020 (based on FAO data)

The composition of the 10 leading countries in 2020 reflects the already-mentioned spatial shift. Five of the countries were located in Asia, 3 in the Americas, and only 2 in Europe. Worth noting is the growing importance of India, Indonesia, and Iran.

The regional concentration in poultry meat production was highest in 1970 when the 10 leading countries contributed 67.8%. In the following decades, their share fluctuated between 62% and 65%. *Figure 9* documents the changes in the composition and ranking of the 10 leading countries. It reveals the declining importance of Europe and the growing importance of Asian and South American countries. With Poland, a European newcomer was, however, able to climb to 8th position in 2020.

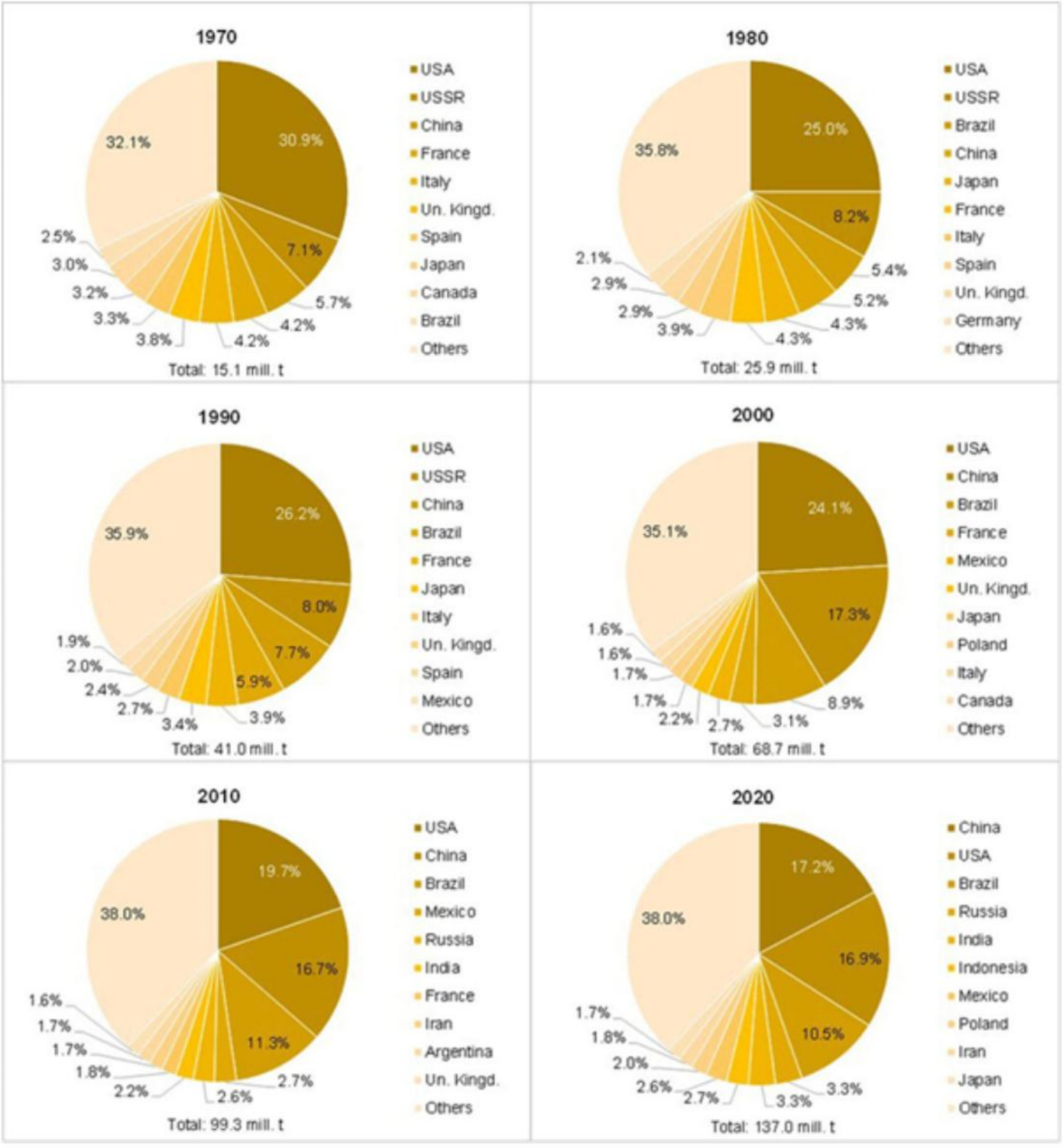

Figure 9 – The share of the 10 leading poultry meat-producing countries in global poultry meat production between 1970 and 2020. (A. S. Kauer, based on FAO data)

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With a few exceptions, the composition and ranking of the 10 leading countries in chicken meat production resemble that of poultry meat in total. In 2020, the US ranked before China in first place, producing about 6 million tonnes more than China. Argentina ranked in 10th place, substituting Poland.

Figure 10 shows the declining regional concentration in chicken meat production. While in 1970 the top 10 countries shared exactly 2-thirds of the global production volume, their contribution declined to 59.9% in 2020. This not only reflects the growing importance of Asian countries but also the general spatial spread of chicken meat production. The lack of religious barriers regarding consumption and the excellent feed conversion rate were the main steering factors behind these dynamics.

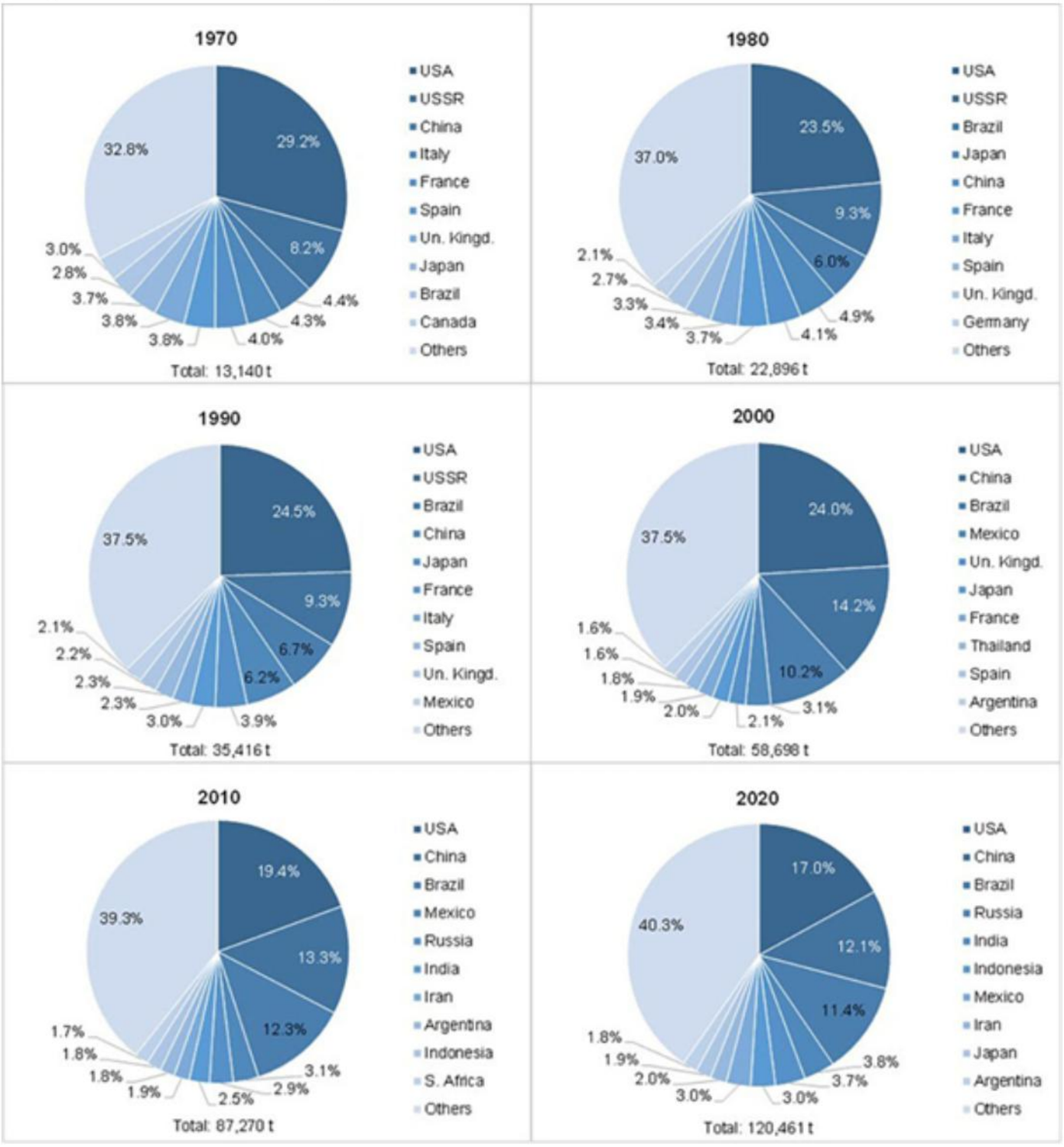

Figure 10 – The share of the 10 leading chicken meat-producing countries in global chicken meat production between 1970 and 2020. (A. S. Kauer, based on FAO data)

The composition and ranking of the leading turkey meat-producing countries differed considerably from that of chicken meat. *Figure 11* shows that European countries played a major role. In 1970 and 2020, 6 of the 10 leading countries were located in Europe. A detailed analysis of the dynamics in the ranking of the countries reveals some remarkable changes. The US ranked in first place during the decades under review. Brazil, which did not belong to the top countries in 1970, climbed from 10th to 2nd place in 2010 and could maintain that rank.

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Similar dynamics showed Germany, which ranked 3rd in 2020. In contrast, Italy and France lost several places since 1980 and Canada as well as the UK plummeted from upper rankings to near the bottom. Poland and Spain became major turkey meat producers only in the past decade. Israel ranked among the top-producing countries from 1970 until 2010 but was then replaced by Morocco. Several countries belonged to the top group only for a short period, such as Yugoslavia, Hungary, and Argentina.

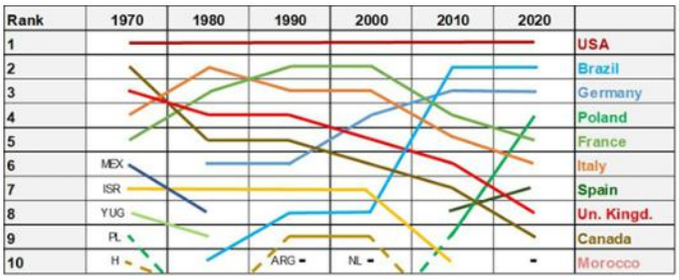


Figure 11 – The changing composition and ranking of the 10 leading turkey meat-producing countries between 1970 and 2020 (based on FAO data)

As can be seen from *Figure 12*, the regional concentration in turkey meat production was much higher than in chicken meat. The fluctuation was also much smaller; it differed only between 88% in 2010 and 93.7% in 1970. In 1970, the US held a dominating position with a share of 64.3% in the global production volume.

With the increasing production in Brazil and Germany, its contribution declined to 43.3% in 2020. The fact that the share of the 4 leading countries ranged between 83.7% in 1970 and 67.3% in 2020 documents the high regional concentration.

Despite the lack of religious barriers regarding the consumption of turkey meat, it never reached a double-digit percentage in the decades under review. The less favorable feed conversion and the frequent outbreaks of the avian influenza virus in turkey flocks in the US and Europe also limited the growth of this meat species. In addition, the fact that turkey meat was not able to find its way into systems gastronomy and that it did not reach a similar position as broiler meat in Asian countries, explains the low growth rates respectively stagnation during the past 2 decades.

Figure 12 – The share of the 10 leading turkey meat-producing countries in global turkey meat production between 1970 and 2020. (A. S. Kauer, based on FAO data)

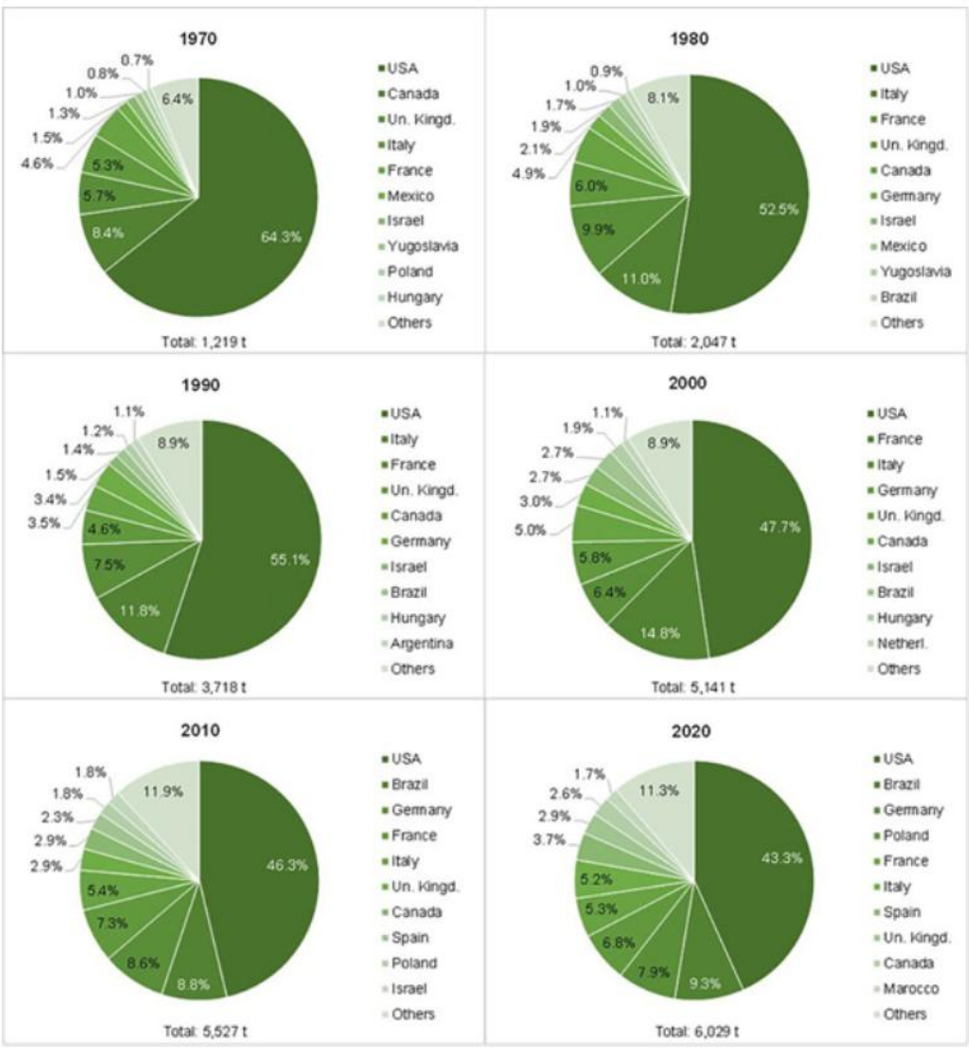
Summary and perspectives

The preceding analysis documented the extraordinary dynamics in poultry meat production over the past 50 years. In the decades under review, the production increased eightfold and reached a volume of nearly 122 million tonnes in 2020. Poultry meat was by far the fastest-growing animal product. This dynamic was mainly a result of the remarkable growth of chicken meat production, which shared between 85% and almost 88% of the overall production volume.

The application of the hybridization technology made the extraordinary success of chicken meat production possible. It reduced the days needed to grow a broiler to slaughter weight dramatically. In combination with a high-energy compound feed it reduced the production cost considerably and made broiler meat attractive for the consumers as the retail price was much lower than for beef or pork.

Worth noting is also that similar to the egg industry, production in most leading countries is organized in vertically integrated agribusiness companies. There is one difference, however. While in the egg industry, all steps of production are organized under one roof, in broiler and turkey production, contract growing became the standard form of operation, at least in market-oriented economies.

Turkey, duck, and goose meat fell far behind and reached only single-digit percentages.



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The dynamics in the continents and countries differed considerably, resulting in a drastic spatial shift. While the contribution of Asia grew from 23.8% in 1970 to 62.2% in 2020 and that of Central and South America from 8.2% to 20.2%, the shares of Europe and North America declined drastically. Europe lost nearly 30% and North America over 15% of their former shares.

The composition and ranking of the countries reflect the spatial dynamics. Even though the US was able to maintain its leading position in chicken meat, China and several other Asian countries (India, Indonesia, Iran) were the main winners besides Brazil in poultry meat production. European countries fell far behind. In 2020, only the Russian Federation and Poland ranked in the top group. The spatial patterns of turkey, duck, and goose meat production differed considerably from that of chicken meat. Turkey meat was mainly produced in North America and Europe, and duck and goose meat in Asia.

In the OECD/FAO Agricultural Outlook until 2030, an increase in poultry meat production to 153 million tonnes is projected. Asia and Central and South America will strengthen their positions while North America and Europe will lose shares despite a growing production volume. Chicken meat will show the highest absolute growth, while duck and goose meat production will grow further in Asia. In contrast, turkey meat will show only moderate growth, it may even decrease in North America and several European countries because of a falling per capita consumption.

In addition, the risk of massive avian influenza outbreaks in turkey flocks in North America and Europe may have incisive impacts. The current decade has shown that the avian influenza virus has become endemic in many countries of the northern hemisphere. A vaccination of turkeys and laying hens could reduce the risk of further epidemics, but strong opposition against compulsory vaccination can be observed in several of the leading poultry meat exporting countries because they fear negative impacts on their export opportunities.

Despite the success of plant-based meat alternatives and the beginning market approval of cultured meat, alternative meat products will only gain market shares in the single-digit percentage in the current decade. High production costs, problems in the scaling up of cultured meat production, and an obvious scepticism against consuming expensive and high-tech products will limit the fast diffusion of alternative meat.

BULLETIN

Carus Laboratories Honoured with the Sardar Patel Unity Award 2025 for Emerging Leader in Animal Healthcare

Carus Laboratories has proudly received the prestigious **Sardar Patel Unity Award 2025** under the category of Emerging Leader in Animal Healthcare, presented by the Topnotch Foundation.

The award ceremony was held in Goa in the esteemed presence of Padma Shri Hema Malini ji and Hon'ble Union Minister Mr. Shripad Yesso Naik. Representing Carus at the event were Mr. Jitender Pilani (Director) and Mr. Lalit Kapoor (Vice President), who accepted the honour on behalf of the entire Carus team.

This recognition affirms Carus Laboratories' steadfast commitment to research-led innovation, advanced manufacturing practices, and veterinarian-driven excellence. With a strong team of over 500 professionals and a FAMI-QS, ISO 22000:2018, and HACCP-certified manufacturing facility, Carus continues to raise the bar in the Indian animal health industry.

"This award is a tribute to the passion, dedication, and relentless pursuit of quality by our team. We extend our heartfelt thanks to the veterinary community, our partners, and the farmers who trust and support us," said Mr. Jitender Pilani, Director.

"It's a moment of pride for our field force and technical teams whose efforts at the grassroots make this recognition possible," added Mr. Lalit Kapoor, Vice President.

Carus remains focused on its mission—Building India's Animal Health Legacy through innovation, integrity, and inclusive growth.

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ARTICLE

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Role of Probiotics in Poultry Gut Health

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Probiotics are living microorganisms which when administered in adequate amount confer health benefits on the host. Probiotics are one of the more efficient methods of pathogen control and have not detrimental effects to the environment as antibiotics. The benefits include improved gut histomorphology, increase in beneficial microbiota, improved immunity, enhanced growth and laying performance.

Probiotics can be provided as a live microbial feed supplement for poultry, also known as direct fed microbials (DFMs), in the poultry diet or water or can be administered to the developing embryo using in-ovo feeding technology. The use of probiotics in poultry has increased steadily over the years due to the higher demand for antibiotic-free poultry. The probiotics market was reached 80 million USD in 2018 and is projected to reach 125 million USD by 2025 at a compound annual growth rate of 7.7% (Ahuja et all 2020).

Bacillus spp, Lactobacillus spp, Streptococcus spp, Bifidobacterium spp., Lactococcus spp and yeast Candida spp. are commonly used probiotics strains. Bacillus spp. are producing heat-resistance spores. This make it possible to make feed added with probiotics which is also made using a granulation process. Multi-strain probiotics act on different sites and provide different modes of action that create synergistic effects. The criteria for selecting probiotic strains include tolerance to gastrointestinal conditions, the ability to adhere to the gastrointestinal mucosa, and the competitive exclusion of pathogens. Probiotics should have survival ability in manufacturing, transportation, storage and application processes.

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NBPL

Properties of Good Probiotics:

- Probiotics must be a normal inhabitant of the gut and capable to adhere gastro-intestinal epithelium.
- Probiotic microorganisms must be able to survive in high temperature.
- Probiotic microorganisms must be able to survive in aerobic as well as anaerobic environment.
- Probiotic microorganisms must has tolerance to low pH and presence of bile acids.
- Probiotic microorganisms must be non-pathogenic and non-toxic to the host.
- Probiotics must exert its beneficial effects like enhanced nutrition and increased immune response.
- Probiotics must be sustainable under normal storage conditions.

Mechanism of action:

A. Probiotics helps in maintaining normal gut health and intestinal microflora by:

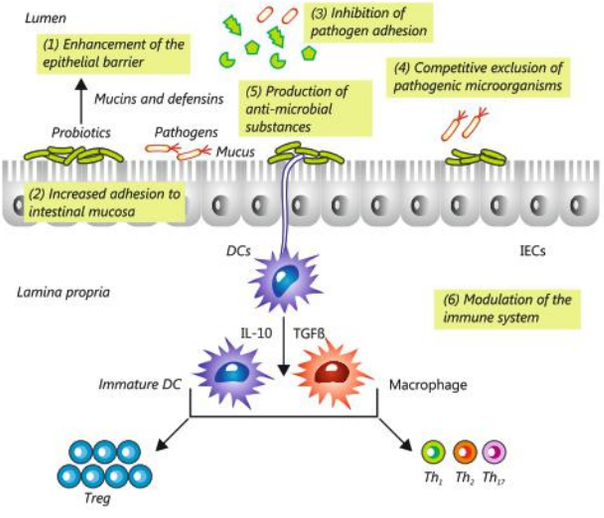
- Enhancement of the epithelial barrier with releasing of gut protective metabolites like arginine, glutamine, short-chain fatty acids, conjugated linoleic acids etc.
- Competitive exclusion by increasing adhesion to intestinal mucosa and by inhibiting pathogen adhesion to it.
- Production of antimicrobial substances like bacteriocins which helps to reduce pathogenic bacteria.
- Alteration in gene expression of pathogenic micro-organisms.

B. Probiotics supplementation alters digestion, absorption and metabolism of nutrients by:

- Increasing digestive enzyme activity.
- Decreasing bacterial enzyme activity.

C. Probiotics supplementation develops Immunomodulation by:

- Enhancing serum and intestinal antibodies production against foreign antigens.
- Enhancing secretion of cytokines, lymphokines and anti-inflammatory mediators, resulting modulation of immunity.

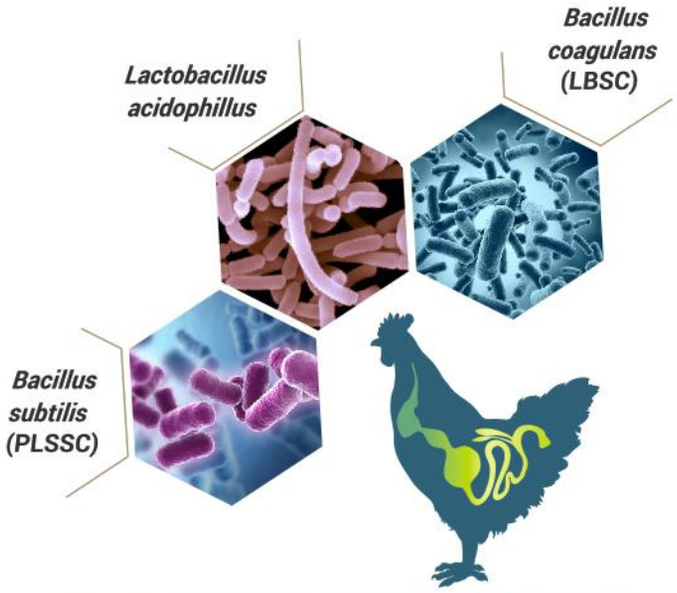


Benefits of Probiotics:

- Promotes optimal development of gut microbiota especially post-hatch.
- Re-establishes balanced gut microflora during post-antibiotic application.
- Reduces incidence of wet litter and pasty vent.
- Improves weight gain and feed conversion in broilers.
- Helps to maintain consistent egg production in layers and breeders.
- Effectively reduces early chick morbidity and mortality.
- Effectively replaces AGPs.
- Zero withdrawal period and it can be administered throughout the life cycle.

About CosBac™:

CosBac™ is a uniquely blended, poultry-specific, multi-species synbiotic product that promotes development of beneficial gut microflora, increase in beneficial microbiota, improved immunity, which further leads to healthy & economics production parameters through the combined action of carefully selected probiotic microorganisms and prebiotics. It comprises Bacillus subtilis (PLSSC) $5x10^9$ CFU/g, Bacillus coagulans (LBSC) $3x10^9$ CFU/g and Lactobacillus acidophilus $2x10^9$ CFU/g with guaranteed total potency of ≥ $10x10^9$ CFU/g along with Prebiotics.



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Safeguarding Poultry Health

Diagnostic Strategies for Effective Mycotoxin Management

Bentoli

Poultry producers frequently encounter non-specific symptoms such as reduced feed intake, poor growth, and unexplained mortality, often without clear pathological signs. Mycotoxins in feed are a common culprit behind these issues. As feed contamination may occur at any stage—from raw material procurement to on-farm storage—a robust diagnostic approach is essential for early detection and management.

Dr. Hanumanth Rao, Dr. Sushant Mhatre, Dr. Jayanta Bhattacharyya

a. Critical Control Points in Mycotoxin Detection

Effective mycotoxin management requires monitoring at key critical control points (CCPs):

1. Receiving Raw Materials: Screen incoming grains using rapid lateral flow assays to detect contamination early. Ensure suppliers provide certified toxin-free raw materials.
2. Storage of Ingredients: Monitor moisture levels and environmental conditions to prevent fungal growth. Collect samples from various bin sections to capture variability.
3. Feed Processing: Use ELISA or chromatographic methods to test compound feed batches before dispatch.
4. Farm-Level Feed Inspection: Perform random checks of delivered feed and inspect bins for mold, caking, or discoloration—early indicators of spoilage.

b. Sampling Recommendations

The number of samples to be tested depends on the critical control points. For example:

- Storage Bins: Collect samples from the top, middle, and bottom of each bin to account for variability in contamination.
- Incoming Raw Materials: Draw composite samples by mixing multiple grab samples from different bags or truckloads.

c. Stage-by-Stage Analysis

Implementing a stage-by-stage analysis approach, using sufficient numbers of samples at each point, will significantly reduce the risk of mycotoxin contamination in feed at the feeder level. Regular monitoring combined with appropriate diagnostic tools helps safeguard bird health and optimize production outcomes.

d. Diagnostic tools of Mycotoxins Analysis

Diagnostic methods fall under two broad categories:

- Chromatographic Techniques (e.g., HPLC, LC-MS): Gold standards offering high accuracy and multi-toxin detection but require skilled personnel and infrastructure.
- Immunological Methods (e.g., ELISA, LFIA): Rapid, field-friendly tools suitable for on-site screening with reasonable sensitivity and cost-effectiveness.

Emerging tools such as microchip-based sensors and FTIR spectroscopy show promise for high-throughput, lab-independent screening but need further development for field readiness.

Table 1: Tools and Methods for Mycotoxin Analysis

Category	Method	Description	Advantages	Disadvantages
Chromatographic Methods	HPLC with IACs	High-performance liquid chromatography using immuno-affinity columns for sample cleanup	High specificity and sensitivity	Expensive; requires skilled personnel
	LC-MS	Liquid chromatography-mass spectrometry for multi-mycotoxin analysis	Simultaneous multi-mycotoxin analysis	Sophisticated infrastructure needed
	TLC	Thin-layer chromatography for qualitative/ semi-quantitative analysis	Simultaneous testing of multiple samples	Lower sensitivity compared to HPLC
	HPTLC	High-performance TLC for quantitative analysis	Improved accuracy compared to traditional TLC	Requires more precision and expertise
Immunological Methods	ELISA	Enzyme-linked immunosorbent assay for quantitative analysis	Rapid and efficient	Moderate sensitivity
	LFIA	Lateral flow immunoassay for qualitative/quantitative analysis	Portable and user-friendly	Limited precision
	Immuno-fluorometric methods	Fluorescent-based detection methods	Higher sensitivity	Requires specialized equipment
Official Analytical Tools	HPLC validated by AOAC/CEN	High-performance liquid chromatography with official standards	Reliable and widely accepted	Expensive and resource-intensive
Rapid Screening Tools	Qualitative Tests	Simple tests for contamination detection above/below control levels	Quick decisions possible in the field	Lacks precision and specificity
Spectral Analysis (FTIR, NIR, FT-Raman)		Provides structural information for in situ analysis	Qualitative/quantitative capabilities	Expensive, complex data interpretation, spectral overlaps
Microchip/Thin Film Sensors		High sensitivity and specificity, multi-mycotoxin analysis, cost-effective	Rapid detection, lab-independent	Still in development, may face standardization challenges

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Fig 1 - HPLC

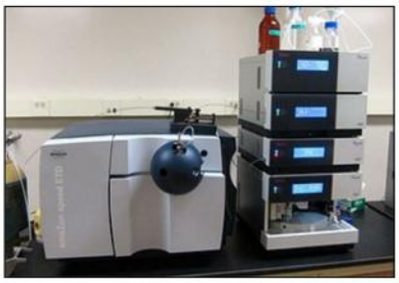

Fig 2 - LC-MS

Fig 3 - ELISA Reader

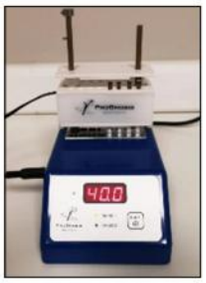

Fig. 4 - LFIA

e. Challenges in Multi-Stage, Multiple-Sample Mycotoxin Analysis

Mycotoxin analysis in poultry feed through multi-stage, multiple-sample testing, poses significant scientific, technical, and logistical complexities.

1. Sampling Variability

- Heterogeneous Distribution: Mycotoxins are unevenly distributed in feed batches, making it difficult to obtain representative samples.
- Multiple Sampling Points: Requires multiple sub-samples from various points (e.g., top, middle, bottom of a silo or bag), increasing complexity and risk of inconsistency.
- Sample Size and Frequency: Deciding optimal number and frequency of samples across stages (raw material, in-process, finished feed) can be challenging.

2. Analytical Method Limitations

- Sensitivity and Specificity: Some methods (e.g., ELISA) may lack the sensitivity for low-level contamination or fail to detect masked mycotoxins.
- Matrix Effects: Complex poultry feed matrices can interfere with detection and quantification, especially in LC-MS/MS analysis.
- Cross-reactivity: In immunoassays, structurally similar compounds can give false positives or underestimate toxin levels.

3. Data Integration and Interpretation

- Stage-to-Stage Comparison: Correlating results from raw materials, in-process, and final feed stages requires careful normalization and tracking.
- Regulatory Thresholds: Different countries have varied mycotoxin limits, complicating risk assessments when feeds are exported or sourced globally.
- Risk Assessment: Integrating results with toxicological data for poultry performance and safety can be challenging.

4. Cost and Resource Constraints

- High Analytical Costs: Especially with advanced techniques like LC-MS/MS for multi-toxin detection.
- Labor and Expertise: Requires skilled personnel for sampling, preparation, and result interpretation.
- Turnaround Time: Multi-stage testing slows down feed production timelines.

f. On-Site Rapid Testing Solutions

To overcome cost and logistical challenges, portable diagnostic tools such as ELISA kits and lateral flow devices can be effectively utilized.

Key Advantages:

- Portability: These devices can be easily used at the feed mill or farm.
- User-Friendly: Minimal technical expertise is required for operation.
- Cost-Effective: Compared to laboratory-based methods, these tests provide faster results with lower operational costs (De Boevre et al., 2019).

Key activity:

- Schedule routine rapid testing to monitor critical control points such as storage bins and feed delivery points.
- Develop simple protocols for farm staff to conduct routine mycotoxin testing.

g. Optimal Mycotoxin Management Program

The most effective mycotoxin management strategy combines on-site rapid testing with periodic laboratory-based analyses.

h. Practical Testing Framework:

1. Routine On-Site Testing:

- Use rapid tests to screen for common toxins like aflatoxins, DON, and zearalenone.
- Implement a weekly or monthly testing schedule based on feed storage and usage patterns.

2. Periodic Laboratory-Based Testing:

- Conduct lab testing for complex or less common mycotoxins to gain a comprehensive view of contamination levels.
- Opt for lab testing after major weather changes or during storage seasons prone to fungal growth (Pleadin et al., 2014).

3. Data Tracking:

- Maintain a digital record of test results to identify trends and high-risk periods.
- Use software solutions to track and predict contamination risks.

By strategically integrating cost-effective rapid tests with detailed laboratory analyses, feed millers and poultry farmers can efficiently manage mycotoxins while minimizing operational expenses.

Future Mycotoxin Analysis Tools and Techniques

Emerging technologies in mycotoxin detection are increasingly adopting antibody- and aptamer-based sensors due to their exceptional sensitivity, specificity, and portability (Smith et al., 2019). These advanced tools are available in various formats, including thin films, microfluidic devices, microarrays, and lateral flow devices (LFDs) (Zhang & Lee, 2021). Among these, LFDs stand out for their simplicity and seamless integration with measurement systems, making them particularly promising for on-site analysis (Miller & Gupta, 2020). The two primary categories of these sensors are optical and electrochemical sensors, each offering distinct advantages in analytical precision and application (Patel et al., 2022). Despite being in the developmental phase, these technologies have considerable potential to revolutionize mycotoxin analysis and detection processes (Jones et al., 2023).

Dr. Hanumanth Rao Technical Executive - Livestock Nutrition
Dr. Sushant Mhatre AGM - Techno Commercial
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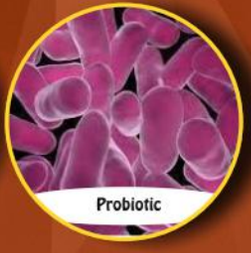

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- **Protectotype goes over serotypes:** The concept of Protectotype, which from apractical point of view is more relevant than serotypes, shows that in vivoprotection is much broader than the result of in vitro testing Koopman, Rik. Global technicalDirector MSD Animal Health
- **Cross-protection and managing variant viruses:** A lot of research has beenconducted on the protective ability of different IBV vaccines or combinations ofIBV vaccine types. In general, using more than one type of IBV vaccine in avaccine program will provide broader protection than the use of just one typeof IBV vaccine. Mark W. Jackwood, PhD. Poultry Health Today – 2016
- **Practical IB Control:** In many countries, you have three, four, five variants. We'rerealizing that it may be futile to vaccinate against one specific IB virus strain. Youhave to try and make smart vaccine combinations, so your protection is broader.Sjaak De Wit. PHD. The Poultry Site – 2012

Protectotype Advantages

- Unique Immunogenicity
- Predictable Behavior & Genetic Stability:
- Unparallel Performance: Protection against Major IBV strains present in the fieldconditions
- Breakthrough MDA+: can breakthrough high Maternally Derived Antibodies Level, yet SAFE in Low MDAs level.
- Safety at Hatchery Administration
- Safety on Field Administration (No Reversal to virulence)

Protectotype Performance

Safety:

- Hatchery:
  - Safe in baby chicks with low or high level of MDAs.
- Field Administration:
  - No Significant Post Vaccinial Reaction.
  - During lay, does not produce any adverse systemic orreproductive vaccination reactions.

Efficacy:

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  - Proven ciliostasis protection
- Kidney protection
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  - Shows dominance for up to 8 weeks in kidneys without any lesions,reflecting on strong kidney protection.

Unique features:

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25-27 NOVEMBER 2025 – VIV MEA
Venue: Adnec Center Abu Dhabi
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Abu Dhabi, U.A.E.
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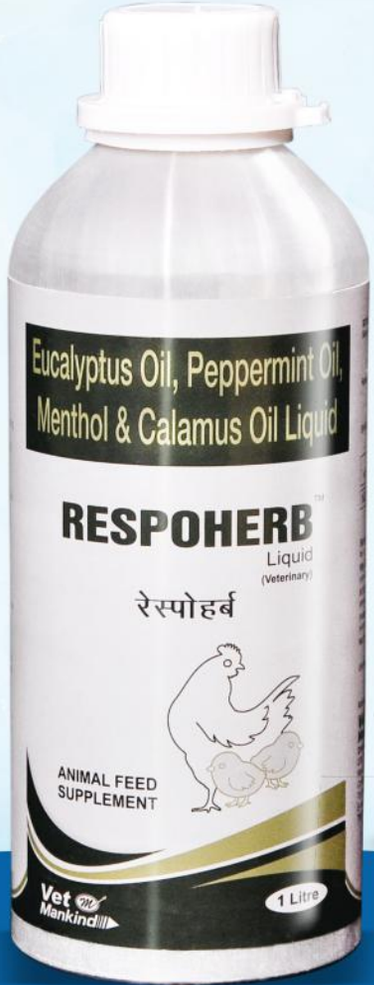

with advantage of

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E-Senses: Catalysing a Paradigm Shift in Meat Quality Assessment

Meat, the quintessential source of vital nutrients encompassing protein, fats, iron, zinc, niacin, and vitamins B6 and B12, has long held a coveted position in our diets. Yet, its journey from the farm to the dining table is fraught with challenges. The slightest mishandling or inadequate preservation can result in not only health hazards for consumers but also substantial economic losses for producers.

Traditionally, ensuring the quality and safety of meat involved labour-intensive physicochemical measurements and sensory analyses, often conducted by highly trained personnel in specialized laboratory environments. However, the dawn of the 4th Industrial Revolution has ushered in a wave of innovation, offering expedited solutions for these processes. E-Nose, E-Eye, and E-Tongue, inspired by the intricacies of our own senses, have emerged as transformative tools to objectively evaluate the flavour, aroma, and appearance of various foods, with a particular focus on meat quality.

Pramod Kumar[1], Suman Bishnoi[1*], Monika Rani[1] and Gauri Jairath[2]

E-Nose: Unveiling Aroma with Electronic Precision

Imagine having at your disposal a device capable of replicating the human sense of smell with pinpoint accuracy. This is precisely the magic of the Electronic Nose or E-Nose. Essentially, it is an odour analysis instrument meticulously engineered to mimic the complexity of our olfactory system. At its core, the E-Nose comprises an array of electrochemical sensors, fine-tuned to excel in recognizing both simple and intricate odours. These specialized sensors engage with volatile compounds, initiating a process that results in the generation of a unique signal pattern. This pattern is then processed and classified using digital signatures. Companies like Airsense and Sensigent have stepped to the forefront in producing E-Nose equipment.

In practical applications, the E-Nose proves invaluable in the early detection of pathogenic microorganisms within meat and meat products. This capability is a crucial safety measure, proactively preventing foodborne disease outbreaks by identifying potential contaminants before they pose a risk to consumers. Furthermore, the E-Nose lends its talents to identifying adulteration in fresh meat. Adulteration is a pressing concern for the meat industry, and the E-Nose, with its capabilities, offers a robust defence against fraudulent practices.

Recent experiments leveraging E-Nose technology showcased its remarkable accuracy in differentiating between the aroma profiles of fresh and frozen-thawed chicken meat. Such precise discrimination ensures consumers receive authentic and unadulterated meat products. Moreover, the E-Nose plays a pivotal role in monitoring the quality decay of meat during its shelf life. Through its sensitive detection of changes in the volatile compound profile, it offers a real-time assessment of meat freshness. This is particularly valuable in reducing food waste by allowing consumers and producers to make informed decisions about meat consumption and distribution.

It is important to acknowledge that while E-Nose technology offers tremendous advantages, it is not without its challenges. Metal oxide semiconductor sensors, commonly used in E-Noses, operate at high temperatures, often up to 400°C, requiring stringent control of experimental conditions, including humidity, pressure, and gas velocity. Additionally, the relatively low number of sensors compared to the human nose necessitates meticulous calibration and preparation of the equipment, consuming both time and energy. Furthermore, oxide semiconductor sensors are susceptible to sensor drift, a temporal fluctuation in sensor response attributed to factors such as aging and contamination. These challenges notwithstanding, the E-Nose stands as a formidable tool in the quest for meat quality assurance.

E-Eye: Seeing Beyond the Surface

The role of colour in the perception of food quality is paramount. Meat, as one of the foods in our diets, is no exception. This is where the Electronic Eye, or E-Eye, enters the picture. E-Eye is a detection technology rooted in recognizing and analysing visual information, offering essential insights into food quality. It boasts cost-effectiveness, portability, and scalability, making it a compelling choice for large-scale applications. E-Eye operates through various methodologies, including colorimetry, spectrophotometry, and computer vision. Companies such as Loccus Biotecnologia and Alpha M.O.S are pioneers in the field of visual sensors. They have introduced innovative solutions, such as the Doc L-Pix image benchtop system and the IRIS Smart Vision, equipped with high-resolution cameras for capturing detailed images of food products.

The E-Eye lends itself to a multitude of quality evaluations in fresh meat and various meat products. It plays a pivotal role in assessing meat colour, a critical determinant of freshness. When the expected colour of meat is compromised, consumers may hesitate to purchase, leading to potential food waste. In this regard, the E-Eye offers a powerful tool to ensure that meat products align with consumers' expectations. Marbling, the distribution and quantity of intramuscular fat in meat, is another critical factor influencing consumer choice. E-Eye technology has been applied to grade marbling in fresh meat, offering producers a means to ensure their products meet consumers' expectations. Beyond basic colour evaluation, E-Eye technology has expanded its horizons, delving into the prediction of physicochemical characteristics and sensory attributes of meat products. By leveraging the information gleaned from high-resolution images, it can provide comprehensive insights into meat quality. Moreover, E-Eye technology excels in detecting defects that may compromise meat quality. Its non-destructive nature allows for thorough evaluations without altering the integrity of the samples.

E-Eye offers ease of operation, non-invasiveness, minimal sample preparation requirements, and the acquisition and permanent storage of high-resolution images. However, it is worth noting that E-Eye technology demands a controlled environment with consistent lighting conditions to prevent external light interference. It can evaluate only one side of samples at a time, necessitating careful attention to background separation for accurate data acquisition. Additionally, consistent calibration remains essential for reliable results.

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E-Tongue: Unravelling Taste with Precision

Taste is the essence of our sensory experience when it comes to food. Enter the Electronic Tongue, or E-Tongue, designed to enhance our understanding of this complex facet of food quality. Unlike the human tongue, the E-Tongue boasts heightened sensitivity, selectivity, and multiplexing capabilities, thanks to modern biosensors. It is a technology built around a set of sensors submerged in chemical solutions, enabling the reliable and swift prediction of sample quality. The core components of an E-Tongue include an electrochemical cell, a measurement module, and advanced pattern recognition software. This ensemble of sensors excels in analysing foods, providing information on freshness, maturity levels, and more.

E-Tongue technology has been harnessed to address a wide array of quality-related questions in the meat industry. One particularly noteworthy application is the identification of meat by species differentiation. E-Tongue systems have demonstrated an exceptional ability to discern between cattle and buffalo meat, offering producers a tool to ensure product authenticity. Additionally, E-Tongue technology has been tested for its effectiveness in detecting irradiation treatments in meat samples, a critical aspect of food safety and quality assurance. In another notable application, E-Tongue technology equipped with sensors sensitive to ammonia and putrescine exhibited its capacity to monitor the quality decay in refrigerated meat.

The E-Tongue stands out for its simplicity, long-term stability, and customization capabilities. Impedance-based sensors, for instance, offer straightforward operation, while optical mass-based sensors boast extended sensor lifetimes. Furthermore, E-Tongues can be tailored to specific compounds, such as potentiometric sensors ideal for evaluating foods containing toxic compounds like mycotoxins. Nevertheless, some challenges remain. For solid foods, especially meat and meat products, sample pre-treatment is often required. Additionally, sensor components may have a limited lifespan due to the absorption of food constituents, particularly for potentiometric sensors.

A Bright Future for Meat Quality

As we steer into the future of meat quality evaluation, electronic systems inspired by our own senses are poised to play pivotal roles. The revolution in smell, sight, and taste assessment is well underway, and their applications are expanding to redefine the standards for meat and meat products. This promising landscape underscores the need for further research and exploration of these three technologies within the realm of meat and meat products.

In the industrial sector, the 4th Industrial Revolution is marked by automation and real-time monitoring, reshaping the landscape of food production. E-Nose, E-Eye, and E-Tongue are critical players in this evolution, providing reliable, rapid, cost-effective, and portable solutions to elevate production processes and enhance competitiveness in the global food market. However, it is crucial to acknowledge that there is still ground to cover. These technologies, while immensely promising, require ongoing development and refinement to unlock their full potential. The journey continues, and with it, the promise of a brighter future for meat quality and safety.

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BULLETIN

Brazil Confirms First Case of Avian Influenza at Commercial Poultry Farm

Brazil Confirms First Avian Influenza Case in Commercial Poultry Farm

Brazil has confirmed its first-ever case of highly pathogenic avian influenza (HPAI) in a commercial poultry production facility. The outbreak was identified at a breeder farm in Montenegro, located in the Metropolitan Region of Porto Alegre, Rio Grande do Sul, as announced by the Ministry of Agriculture and Livestock (Mapa) on Friday, May 16.This marks a significant shift in Brazil's animal health status. Until now, the country had only recorded isolated cases of avian influenza in wild or backyard birds. The detection of HPAI in a commercial system signals a new phase for surveillance and containment efforts. Since 2006, HPAI has circulated across Asia, Africa, and Europe, but Brazil had managed to keep its commercial farms free of the disease until now.

In response, Mapa declared a 60-day state of animal health emergency under Ordinance No. 795. The measure includes the establishment of a 10-kilometre control zone around the affected farm, quarantine protocols, restrictions on the movement of birds and poultry products, increased inspections, and culling where necessary. The ordinance also permits the expansion of the emergency area depending on the outcome of ongoing epidemiological investigations.

China responded by suspending poultry imports from the affected region for 60 days, a significant move given Brazil's role as the world's largest poultry meat exporter. In 2024, Brazil reached record export levels, shipping 5.294 million tonnes of chicken meat—a 3% increase over 2023—and earning US$9.928 billion in revenue, also a historic high.

Containment measures under Brazil's National Contingency Plan for Avian Influenza are already in place. Federal and state teams, alongside industry stakeholders, are conducting surveillance, collecting samples, and performing clinical inspections across farms in the region, which is a key hub for poultry production.

The Ministry has officially notified the World Organisation for Animal Health (WOAH), trade partners, and relevant national agencies. In a public statement, Mapa reassured consumers that avian influenza is not transmitted through properly inspected chicken meat or eggs, affirming the continued safety of poultry products. The risk of human infection remains low and is primarily linked to direct contact with infected birds.

Brazil's Veterinary Service has been preparing for such outbreaks for nearly two decades, with robust training, surveillance, and sanitary protocols. Despite this recent development, health authorities and the poultry industry remain vigilant, ready to take further action if necessary to contain the spread and maintain the integrity of the country's poultry sector.

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- Odorous, toxic to skin and mucous membranes

POTASSIUM PERMANGANTATE

- High cost
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- Essentially an oxidising agent
- Use with Formalin only to liberate gas from it
- Leaves coloured ash residue

FIRST TIME IN INDIA
FIRST TIME IN INDIA

ENCIFUM-UD	Volume	Area
100 ml Tin Container	175 M^3	650 Sq. Ft
250 ml Tin Container	350 M^3	1225 Sq. Ft
500 ml Tin Container	625 M^3	2500 Sq. Ft
1000 ml Tin Container	1250 M^3	5000 Sq. Ft

Please Scan for Video
ENCIFUM-UD

Disinfect the poultry farm with ENCIFUM-UD 1 day before bird leading in farm.

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Friend's Egg Unit:
A Poultry Success Story from the Heart of Kalahandi

Dr Parag Acharya

The Western Undulating Zone of Odisha, covering the districts of Kalahandi and Nuapada, is marked by a hot, moist and sub-humid climate, with an average annual rainfall of 1352 mm. Temperatures range from a scorching 37.8°C in summer to 11.9°C in winter. The region is mainly composed of Red, Mixed Red and Black, and Black soils. Despite their agricultural potential, the area remains prone to droughts, famines and persistent socio-economic challenges.

Amidst these challenging conditions, in the remote yet vibrant village of Pastipada, under Bhawanipatna block of Kalahandi district, stands a remarkable example of agricultural resilience and entrepreneurship — ***Friend's Egg Unit.*** This commercial poultry farm, owned and managed by the visionary farmer Mohammed Gouse, has emerged as a beacon of self-reliance, innovation and sustainable rural livelihood. Through dedication, strategic planning and effective utilization of government support under the Mukhyamantri Krushi Udyog Yojana (MKUY), Gouse transformed a modest beginning into a thriving enterprise — showcasing how determination can turn adversity into opportunity.

Established on February 12, 2020, under the Mukhyamantri Krushi Udyog Yojana (MKUY) — a flagship initiative of the Government of Odisha to promote agri-enterprises — *Friend's Egg Unit* is a testament to what well-channeled government support, combined with personal grit and dedication, can accomplish.

The Beginning: From Vision to Venture

Mohammed Gouse, a youth with a passion for farming and a head for business, envisioned creating a commercial layer poultry unit that could cater to the nutritional needs of the region while generating local employment. With a clear vision and support from MKUY, he initially started with a smaller flock, gradually expanding it to a thriving commercial layer farm with a capacity of 60,000 birds. By June 2020, within four months of establishment, egg production had begun in full swing. From the outset, the unit focused on professionalism, breed management and adherence to biosecurity protocols — ensuring a stable base for long-term success.

Scaling Up: Breed Management and Productivity

The farm rears two globally renowned commercial layer breeds — **Bovans** and **BV 300** — known for their high egg-laying performance and feed efficiency. The Bovans brand includes a variety of layer breeds, with **Bovans Brown** being one of the most widely preferred for brown egg production. These birds are valued for their **early and sustained laying performance,** maintaining excellent consistency in egg size and shell quality. In addition, **BV 300** is a high-performing white-egg laying strain developed by the **VH Group**. It is well-regarded for its **adaptability to diverse climatic conditions,** making it suitable for varied farming environments. This strain is appreciated by poultry farmers for its **steady productivity, feed efficiency and uniform egg size.** On average, a BV 300 hen is capable of laying around **330 eggs**, each weighing approximately **60 grams**, offering a balanced combination of quantity and quality — essential for maximizing returns in commercial poultry ventures. With meticulous planning and scientific rearing practices, the unit consistently achieves a daily production of 45,000 eggs, making it one of the significant egg producers in the region.

Revenue Generation: The Power of Eggs

Eggs produced at the unit are sold at an average rate of **₹4.50 per egg**, tapping into both local markets and supply chains extending to neighbouring districts. The steady demand for eggs ensures a consistent cash flow, enabling the unit to manage operations, reinvest in infrastructure, and support allied activities.

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Improvement in cFCR

Upto 70 g

Improvement in BWT in open shed

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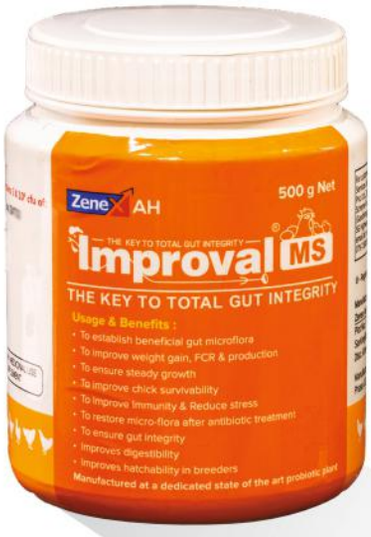
Improvement in BWT in EC shed

Upto 30%

Improvement in livability vis-à-vis antibiotic control



#1 FCR point represent third/last decimal point of 1000

*Majority of field trials were conducted at same farm with multiple sheds in integrations across various geographical locations and at different time of the year. Some of the integrators were generous in sharing complete production indices while others communicated the summary of the trial results. In the field trials, Improval MS was compared with antibiotic/probiotic/antibiotic + probiotic/probiotic + prebiotic control. Detailed reports availble on request.

Today, *Friend's Egg Unit* produces around **45,000 eggs daily**, generating a stable income by selling them at ₹4.50 per egg. With consistent production and efficient management, the farm earns an **approximate profit of ₹3 lakh per month,** translating to nearly **₹36 lakh annually.**

Beyond Profit: The Impact on Rural Livelihood

The success of *Friend's Egg Unit* goes far beyond its balance sheet. The unit has become a local employment generator, directly employing 15–20 workers from nearby villages. From daily operations, feed distribution, egg collection and packaging, the enterprise offers a livelihood to both skilled and semi-skilled labourers. Additionally, Gouse has actively mentored local youth interested in poultry and agribusiness, becoming a role model for self-employment. The ripple effect of his venture has encouraged several new poultry start-ups under MKUY and similar state schemes.

Sustainability and Best Practices

One of the core strengths of the farm is its adherence to sustainable and hygienic practices:

- **Regular vaccination schedules** to prevent disease outbreaks
- **Scientific litter management** to maintain cleanliness and reduce ammonia levels
- **Efficient feed-to-egg conversion ratio** for profitability
- **Proper housing and ventilation**, especially during peak summer and monsoon

The farm is also exploring solar-powered lighting and water systems to reduce its carbon footprint and ensure uninterrupted operations during power cuts.

Recognition and Future Goals

The consistent performance and efficient management have brought recognition to *Friend's Egg Unit* at both local and district levels. Officials from the Agriculture and Animal Husbandry departments often cite the unit as a "model poultry enterprise" during training and awareness programs.

Looking ahead, Mohammed Gouse plans to:

- Expand the unit to 1 lakh birds
- Set up an egg grading and cold storage facility
- Launch a branded egg line focusing on quality and nutrition
- Explore value-added products

Conclusion: A Story That Inspires

Friend's Egg Unit is more than a poultry farm — it is a story of entrepreneurship nurtured by opportunity and driven by passion. In a district often associated with challenges in agriculture and livelihoods, Mohammed Gouse's venture stands as a shining example of how innovation, planning and the right support can create sustainable change. As thousands of eggs leave the farm daily, they carry not just nutrition to the tables of consumers, but also the powerful message of rural prosperity, resilience and hope.

Dr Parag Acharya
Scientist (LPM), R.R.T.T.S.,
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BULLETIN

Demand for poultry meat drives feed production

Increasing global demand for poultry helped boost world animal feed production last year, which grew by 1.2% to 1.396 billion metric tonnes.

Despite the ongoing issues posed by high pathogenic avian influenza, economic uncertainties and climate fluctuations, figures released by Alltech in its Agri-Food Outlook showed animal feed production rising from 1.380 billion mt in 2023.

The annual survey, based on data from 142 countries and 28,235 feed mills, found that the top 4 countries (China, United States, Brazil and India) produced more than half of the world's feed (52%).

Taking into account the next 6 largest feed producers (Mexico, Russia, Spain, Vietnam, Turkey and Japan), the top 10 nations produced nearly two thirds of all animal feed (65.6%).

Poultry: growth areas

Consumer desire for protein-rich cheap poultry continues to drive up production and in turn broiler feed. Broiler feed rose by 1.8% to 385.4 million mt, accounting for 27.6% of the total feed tonnage in the world.

With red meat prices surging, affordability drove demand in both Asia-Pacific and Latin America, but rising incomes in parts of Africa also boosted growth. Alltech believes that although HPAI will continue to be persistent, feed volumes are likely to rise moderately due to the meat's affordability and export opportunities.

The layer sector also saw growth, but perhaps lower than envisaged at 1.4% to 173 m mt in 2024. This was partly due to disease, which led to flock reductions in North America but also oversupply in some regions.

There were volumes gains however in Asia-Pacific as consumer favoured eggs as a cheaper protein option, while healthy demand continued last year in Africa and Latin America.

The future is less certain and for some regions may depend on the development and uptake of vaccines against HPAI and improved biosecurity measures to mitigate bird losses.

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* Fouad et al., 2012

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Breeders - 2 kg per tonne of feed

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(In feed): 200 gm per tonne of feed. **Pack:** 200 gm & 1 kg

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