

# Livestock & Feed Trends



VOLUME - 22 • NUMBER - 3 • OCTOBER- DECEMBER 2024



**"CLFMA Chairman Mr.Divya Kumar Gulati and Office Bearers Key Visits to Krishi Bhavan and CLFMA Managing Committee at Poultry India"**

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**Improvement in livability vis-à-vis antibiotic control**



<sup>#</sup>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 available on request.



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# From the Chairman's Desk.....

Dear Friends,

Warm greetings to you all!

As we step into the New Year 2024, I wish each one of you a year filled with happiness, robust health, and abundant prosperity.

The third quarter has been a remarkable one for CLFMA OF INDIA, as we made significant strides in strengthening our presence and impact within the industry. Through meaningful initiatives, strategic meetings, and active participation in key events, we continue to forge ahead in our mission to contribute to the growth of the livestock sector.

I'm delighted to share some notable highlights from the last quarter, which are elaborated upon in the "CLFMA Activity Updates" section of this magazine. Key highlights from this period include the followings:

In October 2024, CLFMA joined hands with AIDA and TANUVAS to organize two impactful seminars that brought together stakeholders from across the sector. A significant meeting at Krishi Bhavan in October introduced the newly elected office bearers of CLFMA and addressed critical industry concerns. On 11<sup>th</sup> October 2024, CLFMA celebrated World Egg Day, emphasizing the importance of eggs in global nutrition. We had the privilege of meeting Ms. Daniela Schmitt, Minister of Economic Affairs, Transport, Agriculture, and Viniculture of Rhineland-Palatinate, Germany, along with Mr. Achim Fabig, Consul General of the German Consulate General in Mumbai, during their visit to India. This collaboration highlighted opportunities for mutual growth.

As Chairman, I had the honor of representing CLFMA as a Guest of Honour at the Feed Tech Expo 2024, Pune. Mr. Nissar F. Mohammed, Hon. Secretary of CLFMA OF INDIA, actively participated in the Government of India's Pre-Budget (2025-26) Consultation Meeting, lending valuable insights. CLFMA showcased its unwavering support and active participation at the Poultry India Expo 2024, held from 27<sup>th</sup> to 29<sup>th</sup> November, 2024.

CLFMA South Zone President Mr. C. Sarvanan, accompanied by CLFMA Members Mr. Sarath Sriram R.,



Director of Annam Feeds Pvt. Ltd. (Sun India Hatcheries), and Mr. Prajeeth Murughu A., Director of MBS Hatcheries, visited Vietnam on 10<sup>th</sup> and 11<sup>th</sup> December 2024. This impactful delegation was made possible with the steadfast support of Mr. Reece Cannady, Director, U.S. Grains Council, and Mr. Jaison John, Team Lead – India, USSEC, who played key roles in organizing and facilitating the visit. Mr. Nissar F. Mohammed, Hon. Secretary of CLFMA OF INDIA attended 2<sup>nd</sup> Meeting of the Standardization Cell chaired by Shri. Sagar Mehra, JS (Inland Fisheries), GOI on 20<sup>th</sup> Dec'2024. I had the opportunity to engage with key officials at Krishi Bhavan to address industry challenges. CLFMA submitted 5<sup>th</sup> additional feed additive list to GOI on 31<sup>st</sup> December, 2024, etc.

Your consistent support and feedback have been instrumental in driving our initiatives forward. As we embark on this new chapter, I wholeheartedly invite your valuable suggestions to help us grow stronger and better serve the livestock industry. Together, let us create a sustainable and thriving future for the sector.

With warm regards,

For **CLFMA OF INDIA**,



**Divya Kumar Gulati**  
**Chairman**



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### EDITORIAL BOARD

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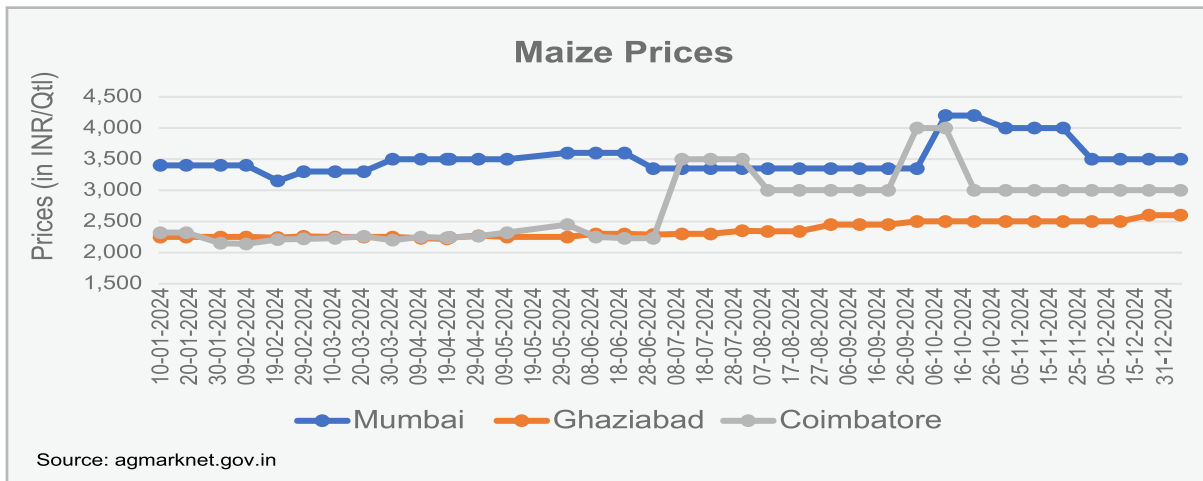




## Commodity Updates

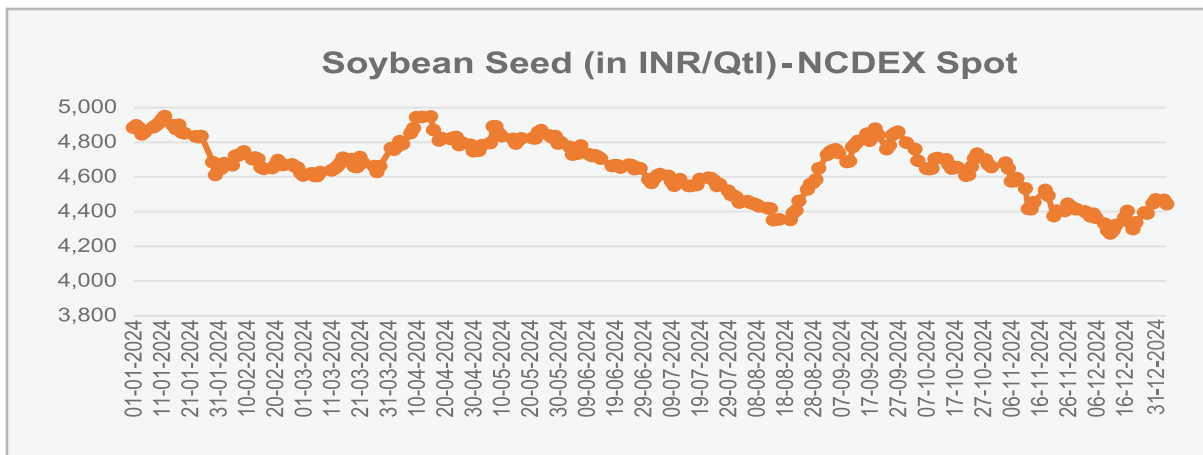
### 1. Domestic Prices

#### I. Maize



Maize Prices (INR/Quintal)		
City	31/12/2024	30/11/2024
Mumbai	3,500	3,500
Ghaziabad	2,600	2,500
Coimbatore	3,000	3,000

#### II. Soybean

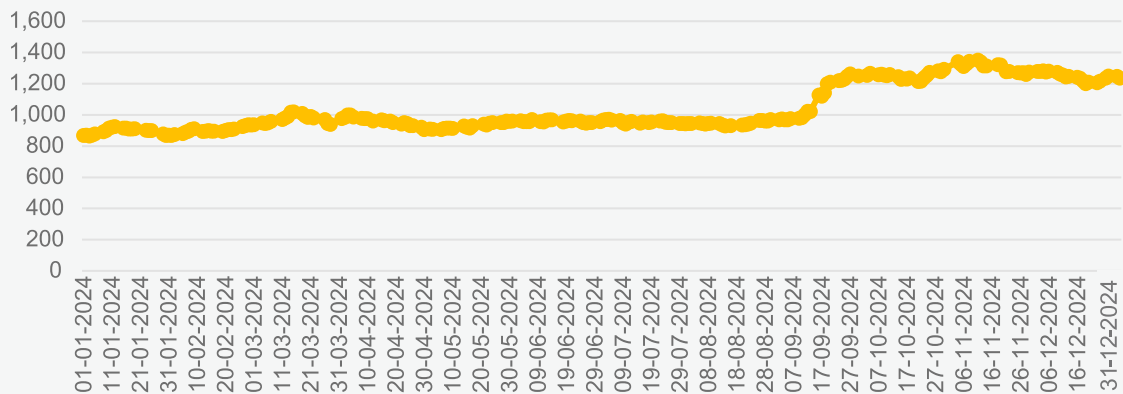


## Soybean Complex Prices - NCDEX Spot

Commodity (Unit)	31/12/2024	30/11/2024
Soybean Seed (in INR/Qtl)	4,443	4,413
Ref. Soya Oil (in INR/10kg)	1,234	1,275
Soymeal (in INR/MT)	33,300	32,000

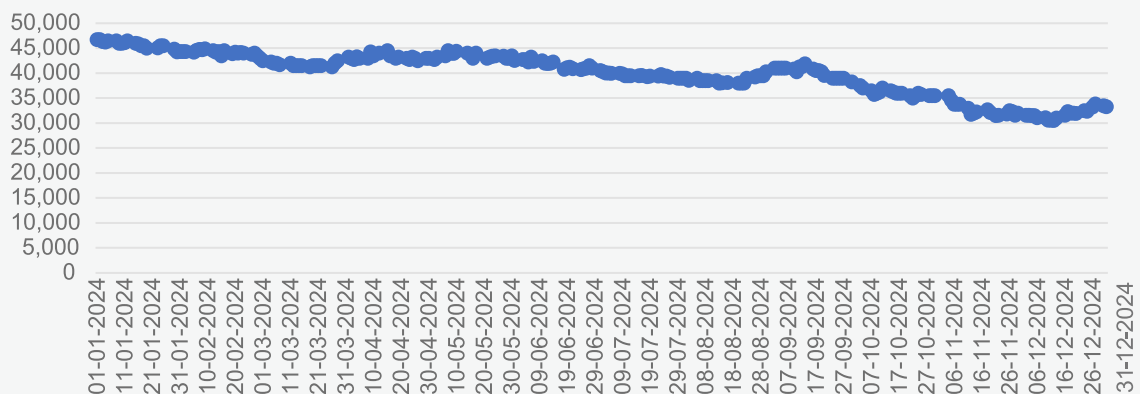
## Ref Soya Oil

### Ref. Soya Oil (in INR/10kg) - NCDEX Spot



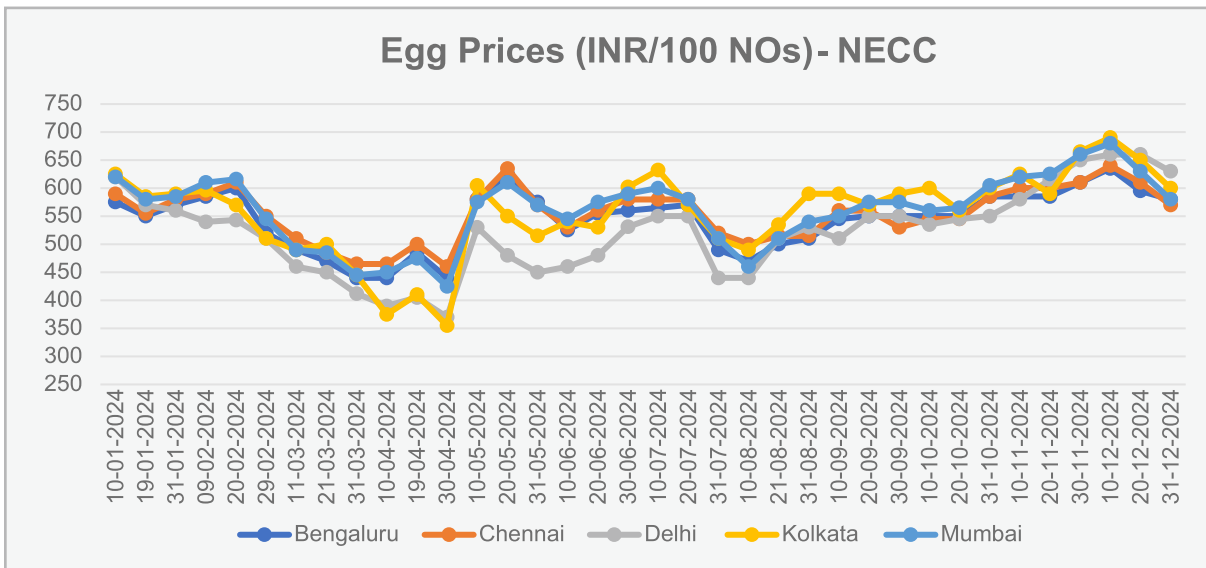
## Soymeal

### Soymeal (in INR/MT) - NCDEX Spot





### III. Egg Rates



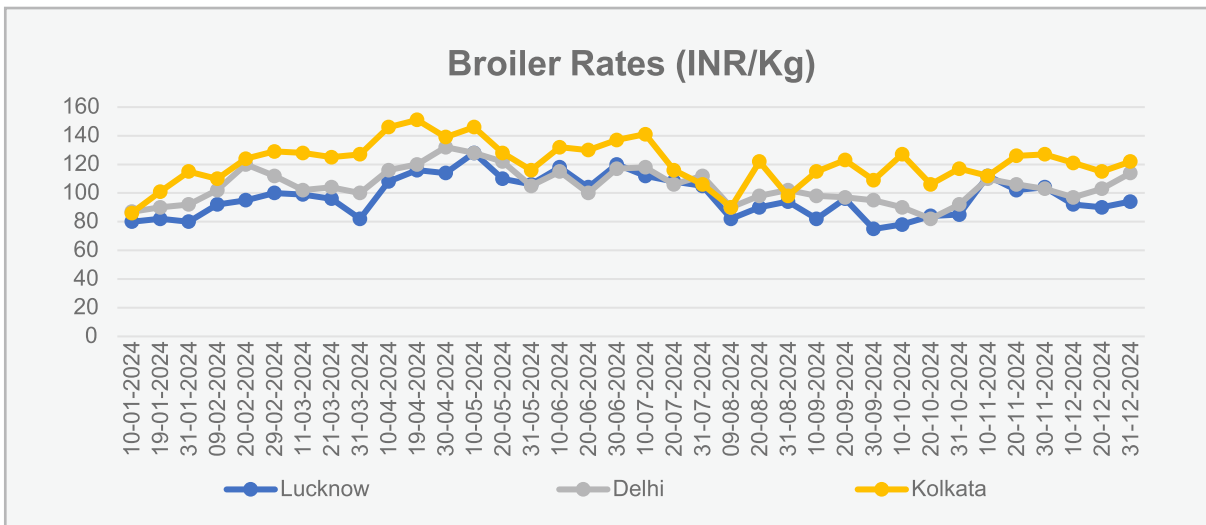
EGG PRICES (INR/100 NOs)		
Name of Zone	31/12/2024	30/11/2024
<b>NECC Prices</b>		
Ahmedabad	590	635
Ajmer	580	624
Barwala	572	619
Bengaluru (CC)	580	610
Brahmapur (OD)	550	610
Chennai (CC)	570	610
Chittoor	563	603
Delhi (CC)	630	650
E.Godavari	535	595
Hospet	530	560
Hyderabad	510	600
Jabalpur	565	614
Kolkata (WB)	600	665
Ludhiana	570	615
Mumbai (CC)	580	660
Mysuru	580	612
Namakkal	530	565
Pune	575	655
Raipur	550	605
Surat	590	650
Vijayawada	540	605
Vizag	600	585
W.Godavari	535	595
Warangal	512	602

### III. Egg Rates

EGG PRICES (INR/100 NOs)		
Name of Zone	31/12/2024	30/11/2024
<b>Prevailing Prices</b>		
Allahabad (CC)	619	662
Bhopal	570	630
Indore (CC)	550	620
Kanpur (CC)	614	662
Lucknow (CC)	650	677
Muzaffarpur (CC)	635	680
Nagpur	560	635
Patna	635	680
Ranchi (CC)	638	671
Varanasi (CC)	617	667

Source: NECC

### IV. Broiler Rates



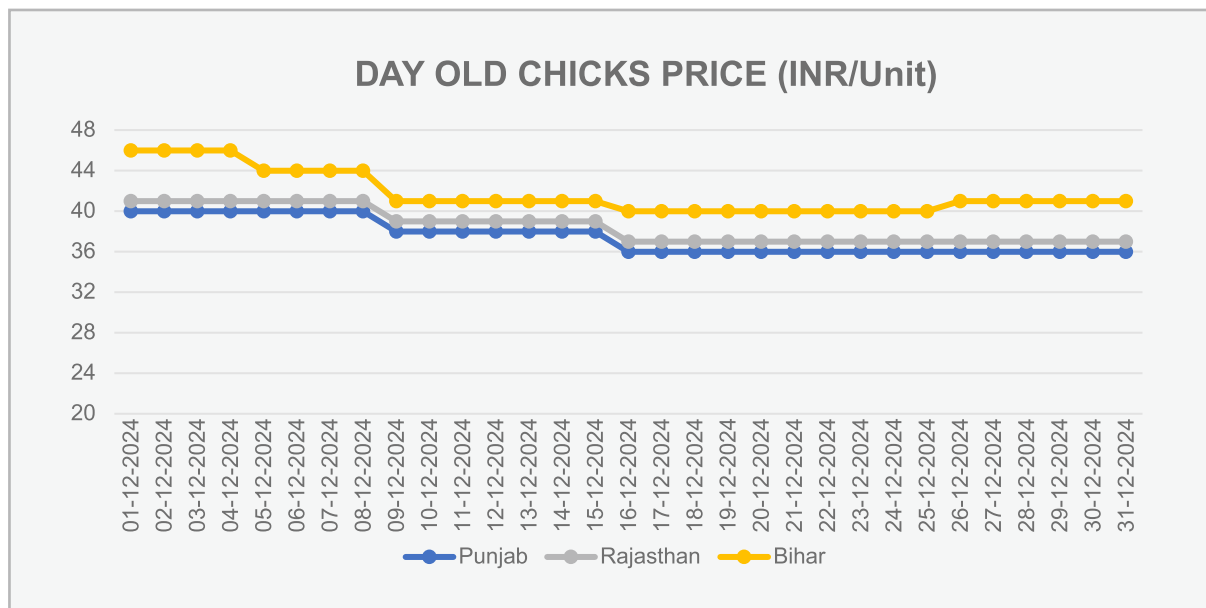
BROILER RATES (INR/Kg)		
Location	31/12/2024	30/11/2024
Delhi	114	103
Punjab	107	96
Raipur	97	90
Pune	99	90
Bengaluru	92	94
Hyderabad	95	105
Guwahati	100	91
Kolkata	122	127
Bihar	100	98
Madhya Pradesh	96	91
Lucknow	94	104

Source: SRP (Wholesale Rates)

## V. Day old Chicks Price

DAY OLD CHICKS PRICE (INR/Unit)		
State	31/12/2024	30/11/2024
Punjab	36	40
Dehradun	37	41
Haryana	36	40
Himachal Pradesh	37	41
Rajasthan	37	41
Jammu	38	42
Andhra Pradesh	47	49
Uttar Pradesh	39	44
Madhya Pradesh	44	46
Telangana	47	49
Bihar	41	46
Jharkhand	41	46
Gujarat	44	46

Source: Poultry India TV/ SRP





## VI. Fish Prices

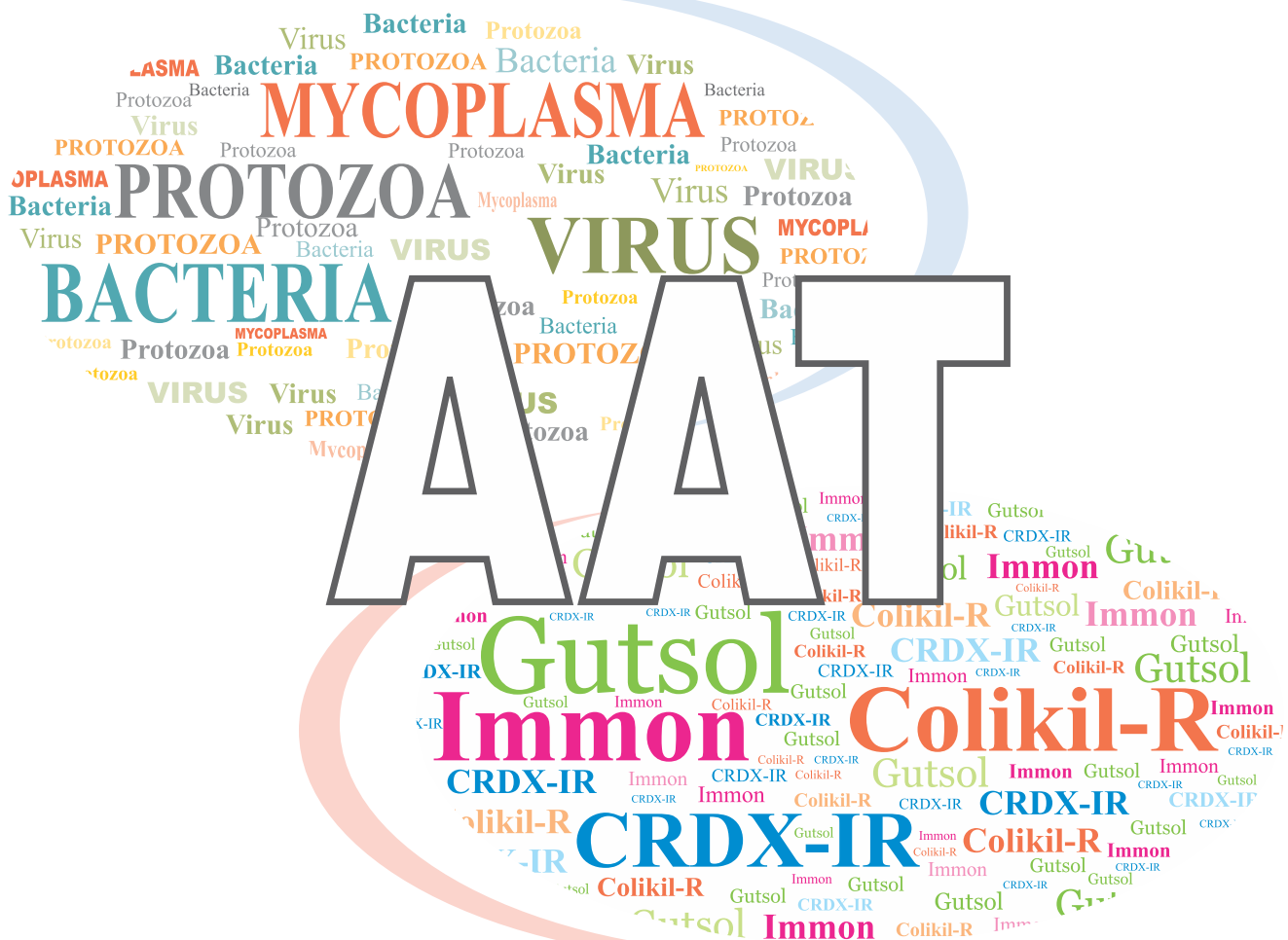
Fish Prices Average Price (INR/Quintal)		
Fish Type	31/12/2024	30/11/2024
Bata Putti	8,500	8,500
Black Dom	12,000	12,000
Blue Dom	13,500	13,500
Chilwa	9,000	9,000
Halwa	30,000	30,000
Hilsa	60,000	60,000
Katla (Small)	30,000	30,000
Malli (Big)	20,000	20,000
Malli (Small)	16,000	16,000
Pangass	13,000	14,000
Katla (Big)	35,000	35,000
Singhra (Big)	25,000	25,000
Singhra (Small)	15,000	15,000
Surmali (Small)	32,500	32,500
Surmai (Big)	47,500	47,500
Sol	55,000	48,000
Soli	15,000	15,000
White Dom	13,000	13,000
Rahu (Andhra)	19,000	12,500
Zinga (Zambo-A)	52,500	52,500
Zinga (Zambo-B)	45,000	45,000
Zinga (Zambo-C)	35,000	35,000

Source: agmarknet.gov.in and Primary Research  
The Prices are of Delhi (Gazipur Mandi)



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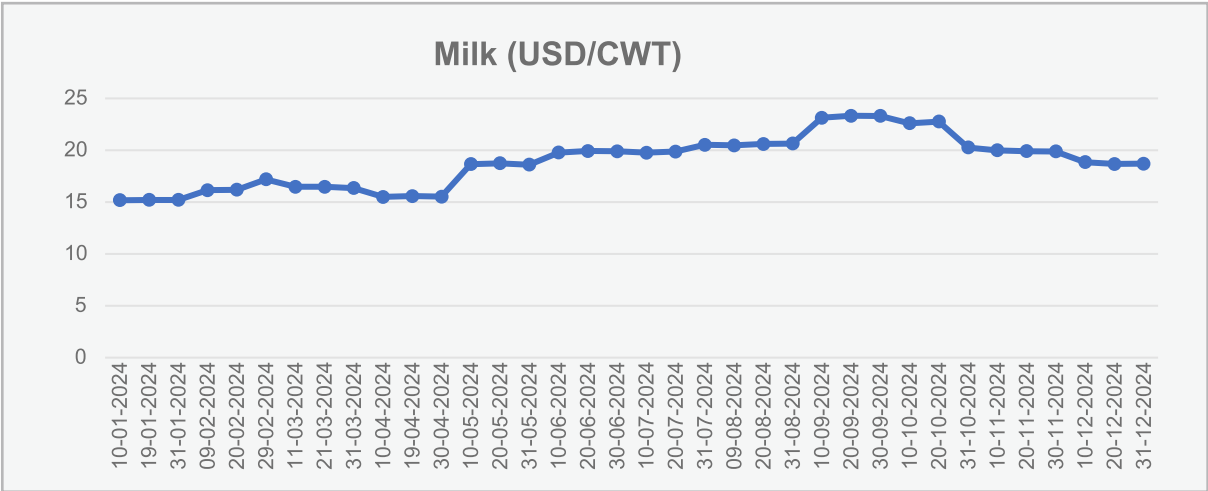




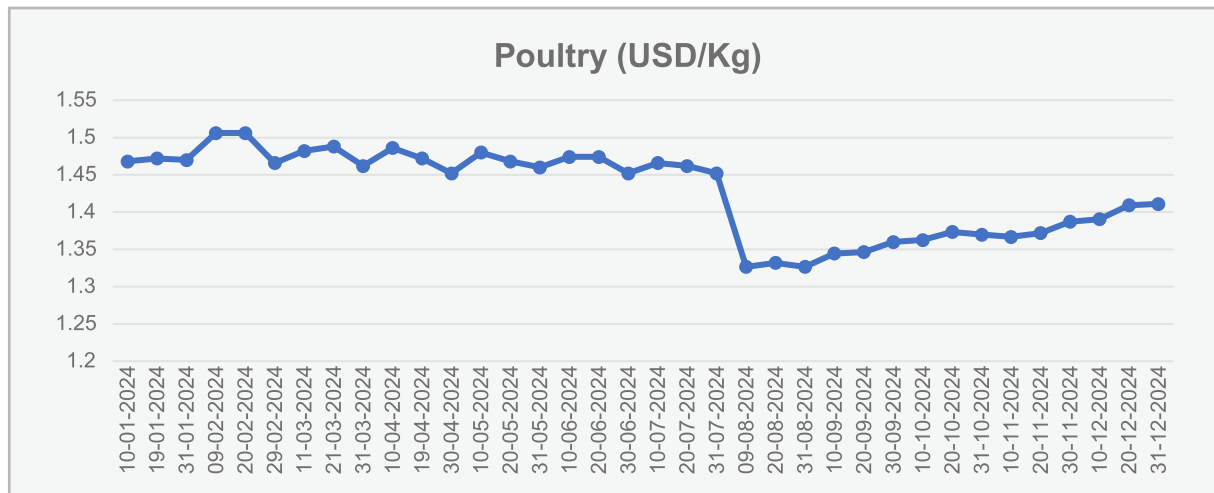
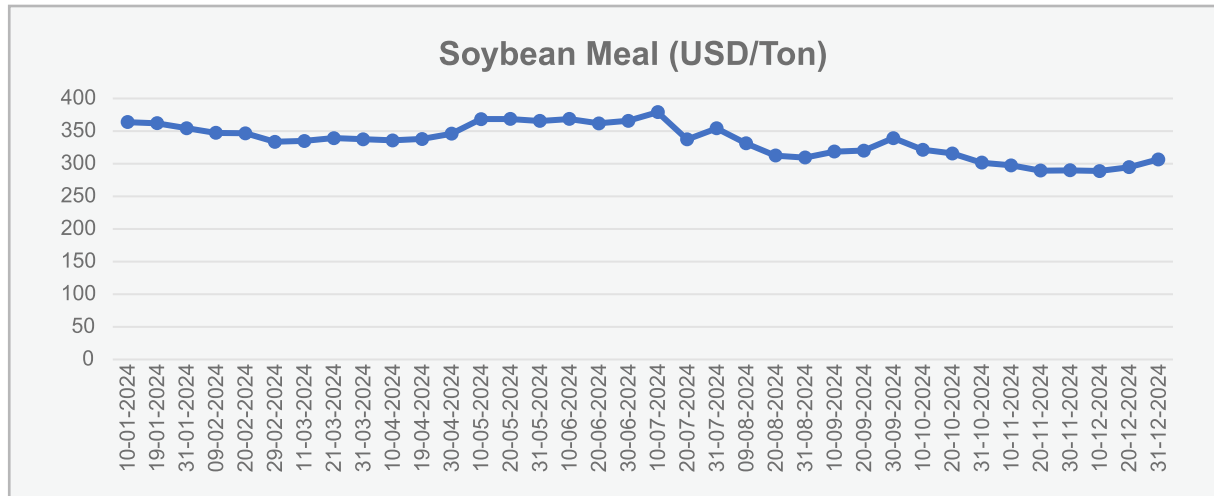
2. Global Commodity Prices

Commodity (Unit)	PRICE (31/12/2024)
Milk (USD/CWT)	18.70
Rapeseed (Euro/Ton)	505.09
Soybean Meal (USD/Ton)	306.50
Soybean Oil (USD/lb)	0.40
Live Cattle (USD/Lbs)	1.94
Poultry (USD/Kgs)*	1.41
Eggs US (USD/Dozen)	5.81

**Source:**tradingeconomics; markets.businessinsider  
USD: United States Dollar  
CWT: Short Hundredweight  
Lbs: Pounds  
1 BRL (Brazilian Real) = 0.17 USD  
\*-Poultry price refers to the cost of the chicken in the wholesale market of São Paulo, Brazil. The price is converted from BRL to USD using above conversion rate.

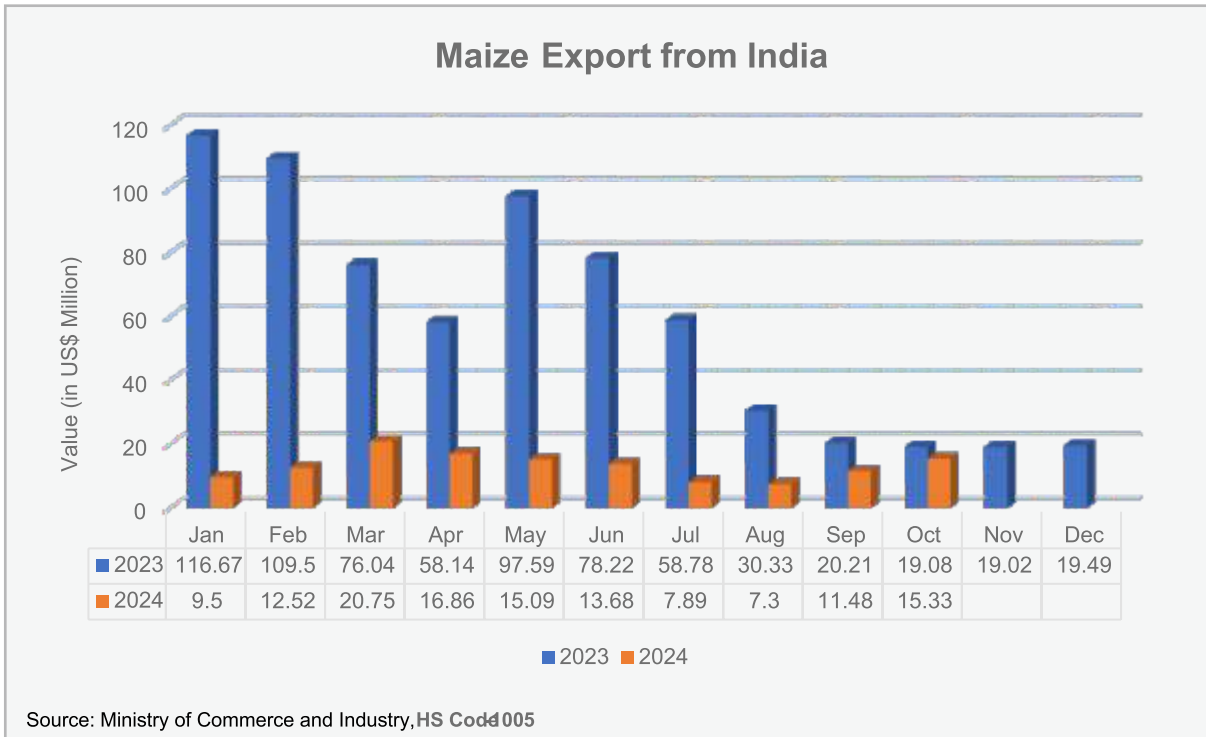


## 2. Global Commodity Prices

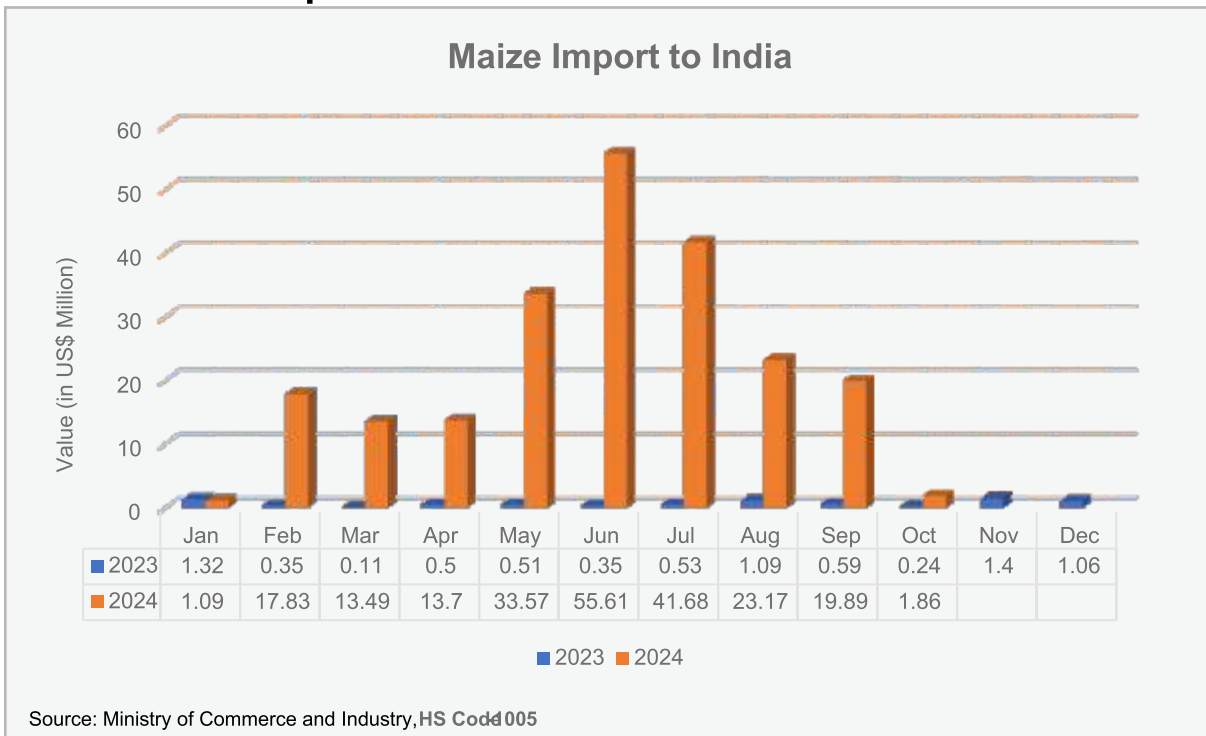


### 3. Trade Details

#### India: Maize Export



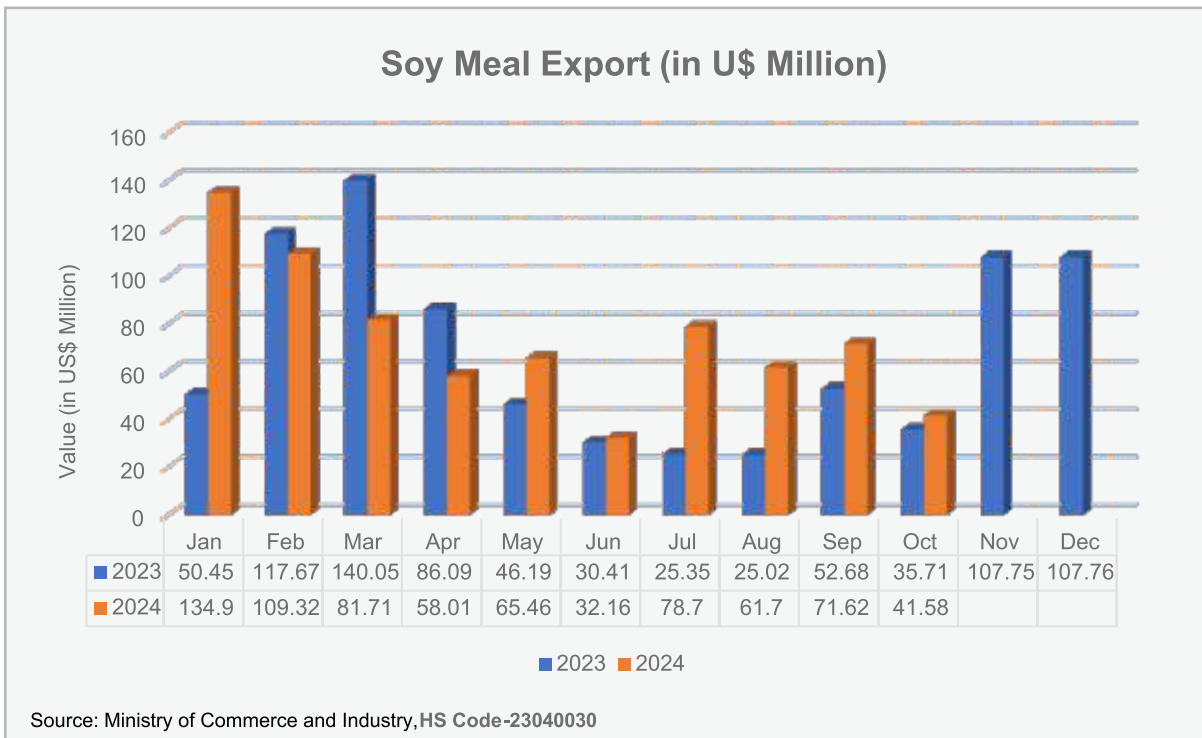
#### India: Maize Import



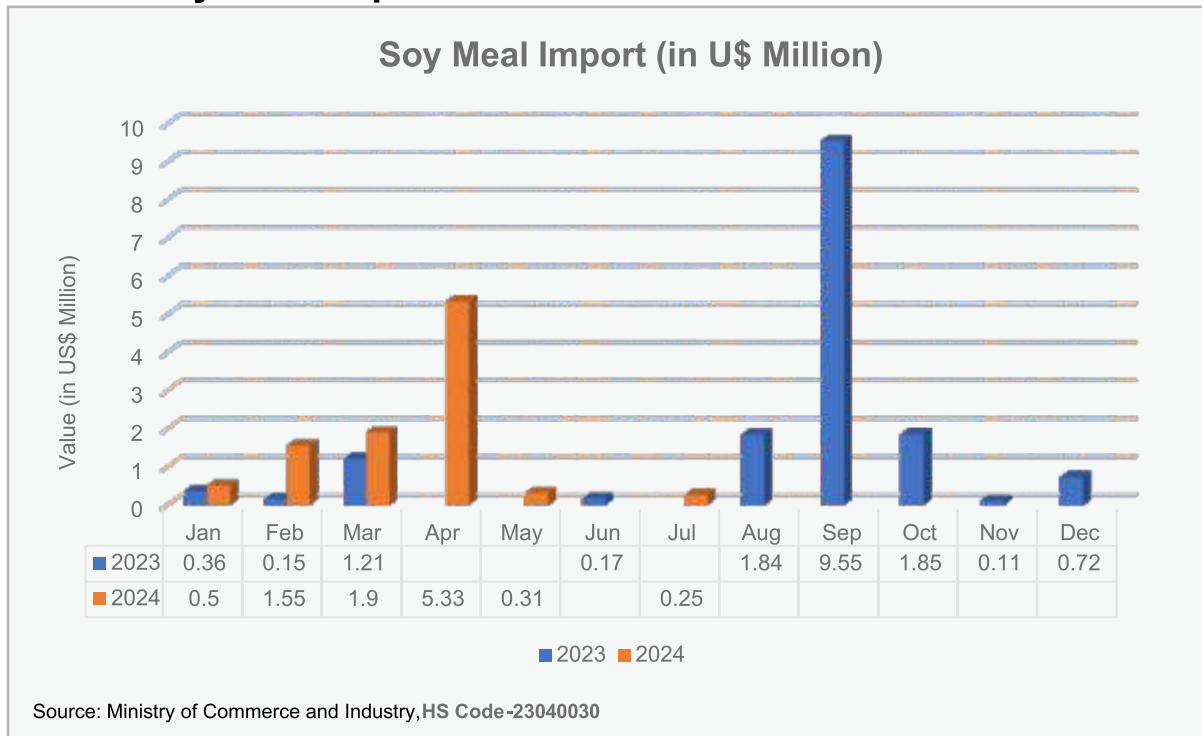
Note: This Data is sourced from the Ministry of Commerce and Industry, which was last updated in October.



## India: Soy Meal Export



## India: Soy Meal Import



Note: This Data is sourced from the Ministry of Commerce and Industry, which was last updated in October.

## 5. Market Drivers

### Maize

Market Drivers	Monthly Outlook
Growing Demand for Poultry and Livestock Feed	Bullish
Rising demand for Ethanol in Auto-fuels	Bullish
Increasing Demand as a Wheat Substitute due to Wheat Export Ban	Bullish
Increasing Food Inflation	Bearish
Commercialization of Genetic Modified Maize Crop	Bullish
Increasing demand for Coarse Cereals	Bullish

### Poultry

Market Drivers	Monthly Outlook
Rapid Growth in Consumer Demand for Livestock Products	Bullish
Rising Demand for White Feather Broilers	Bullish
Increasing Broiler Chicken Price Increases Due to Higher Feed Cost	Bearish
Increasing Food and Feed Inflation	Bearish
Enhancement of Backyard Poultry Farming	Bullish
Increasing the Demand of Organic Poultry Farming	Bullish

Regards,  
**CLFMA OF INDIA**  
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## CLFMA ACTIVITY UPDATES

### **CLFMA OF INDIA and AIDA in collaboration with TANUVAS organized Seminar on 4<sup>th</sup> October, 2024, Namakkal:**

CLFMA OF INDIA and All India Distillers Association in collaboration with TANUVAS viz. Veterinary College of Research Institute, Namakkal organized seminar in Association with Dairy Connect, GEMA, Animal Nutrition Society of India and Novonesis on the theme “Feed of the Future. For India. By India.” On 4<sup>th</sup> October, 2024 10:00 am – 02:00 pm at VCRI Namakkal Alumni Auditorium, Veterinary College, Namakkal. Chief Guest of the Seminar was Dr. M. Selvaraju, Dean, I/C, VCRI, Namakkal, From CLFMA OF INDIA Dr. Dinesh Bhosale attended the Seminar.

### **Meeting at Krishi Bhavan on 8<sup>th</sup> October 2024:**

A productive meeting was held between CLFMA OF INDIA and various stakeholders from the Department of Animal Husbandry and Dairying and Fisheries, Government of India in New Delhi on 8<sup>th</sup> October 2024 to introduce the new Office Bearers and present the Report on the CLFMA OF INDIA Symposium held on 21<sup>st</sup> September 2024.

Additionally, discussions on the availability of maize and soybean meal at the right price, attracting skilled labour into the livestock sector through collaborations with veterinary universities / institutions, ways to create public awareness about the importance of adequate protein consumption for better nutrition, health & well-being, increasing the outreach of CLFMA OF INDIA and other key challenges and future growth strategies for the livestock industry were held.

This collaborative effort aims to identify solutions that will not only address current issues but also propel the industry towards sustainable development and innovation. Mr. Divya Kumar Gulati was joined by fellow Office Bearers Mr. Abhay Shah, Mr. Nissar F. Mohammed and Mr. Abhay Parnerkar and we would like to thank Ms. Alka Upadhyaya (Secretary, Department of Animal Husbandry & Dairying (GOI)), Mr. Sagar Mehra (Joint Secretary, Department of Fisheries

(GOI)), Dr. Abhijit Mitra (Animal Husbandry Commissioner (GOI)), Dr. H.R. Khanna (Joint Commissioner NLM (GOI)), Dr. Gagan Garg (Dy. Commissioner Trade (GOI)) and Dr. Lipi Sairiwal (Deputy Commissioner AHIDF (GOI)) for taking out time from their schedules and engaging in productive dialogue with the team.

CLFMA OF INDIA is committed to strengthening the Livestock Sector, ensuring food security, and supporting the livelihoods of millions involved in this crucial industry.



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### **CLFMA OF INDIA Seminar with AIDA in Association with GEMA and Novonesis on 23<sup>rd</sup> October, 2024, Vadodara :**

CLFMA OF INDIA and All India Distillers Association organized one more seminar in Association with GEMA and Novonesis on the theme "Feed of the Future. For India. By India." On 23<sup>rd</sup> October, 2024 09:30 am – 01:30 pm at 10<sup>th</sup> Floor, Hotel Farefield by Marriott, RC Dutta Road, Alkapuri, Vadodara. On behalf of CLFMA Mr. Abhay Shah, Dy. Chairman of CLFMA OF INDIA also participated and represented CLFMA OF INDIA.

### **World Egg Day Celebration – 11<sup>th</sup> October 2024**

CLFMA OF INDIA celebrated World Egg Day 2024 on 11<sup>th</sup> October, 2024. at Mumbai Veterinary College, Goregaon, Mumbai by distributing eggs to the college students, promoting the nutritional value of eggs as part of a balanced diet.



### **Strengthening Global Ties in Livestock and Agriculture:**

Mr. Divya Kumar Gulati, Chairman of CLFMA OF INDIA and Mr. Suresh Deora, Immediate Past Chairman met with Ms. Daniela Schmitt, the Minister of Economic Affairs, Transport, Agriculture, and Viniculture of Rhineland-Palatinate, Germany, in the presence of Mr. Achim Fabig, Consul General- German Consulate General Mumbai, during the visit of a delegation from the German Federal State of Rhineland-Palatinate, in cooperation with the German Consulate General Mumbai.

The meeting focused on fostering cooperation between India and Germany, exploring opportunities in agriculture and livestock sectors, and exchanging ideas for mutual growth and sustainability. This engagement is a step forward in

strengthening economic and agricultural ties between the two regions.

Together, CLFMA OF INDIA look forward to enhancing industry innovation, sustainability, and global collaboration.



**CLFMA Chairman Mr. Divya Kumar Gulati honored to Join as Guest of Honor at the Inauguration of Dairy Industry Expo & Feed Tech Expo 2024 on 24-26 October, 2024:**

It was a privilege to be invited as the Guest of Honor for the inaugural event of the Dairy Industry Expo & FeedTech Expo 2024, alongside Shri Arun Ganpatrao Dongale, Chairman of Gokul Dairy, Shri Yogesh Gopal Godbole, Managing Director of Gokul Dairy, Mr. Prasad Wagh MD of Japfa Comfeed India Pvt. Ltd., Mr. C. Vasantkumar, Former President, Poultry Farmers and Breeders Association, Maharashtra.

CLFMA Chairman Mr. Divya Kumar Gulati shared his thoughts about the increasing production of milk and poultry but still having scarcity of land and the same productivity of crops required by the feed industry. Industry together should address the GOI and look for solutions together.

He extends his sincere gratitude to Dr. Milind Meshram, Associate Dean of Krantisinh Nana Patil College of Veterinary

Science, Shirwal, for the warm welcome, and to Ms. Prachi Arora from Benison Media for her efforts in organizing this impactful event.

The expo stands as a significant platform for innovation, collaboration, and knowledge-sharing within the dairy, poultry and feed technology industries, and he is truly appreciative of the opportunity to connect with industry leaders and visionaries.







**CLFMA OF INDIA Seminar with AIDA in Association with GEMA and Novonesis on 25<sup>th</sup> October, 2024, at Palampur:**

CLFMA OF INDIA and the All India Distillers Association organized a seminar in association with GEMA and Novonesis, themed “Feed of the Future. For India. By India,” on 25<sup>th</sup> October 2024 at Palampur. The event was graced by Chief Guest Dr. Naveen Kumar, Hon'ble Vice Chancellor of CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur; Guest of Honour Dr. Ravinder Kumar, Dean of DGCN, COVAS, CSKHPKV, Palampur; and Dr. APS Sethi, President of the Animal Nutrition Society of India. Dr. Dinesh Bhosale, Past Chairman of CLFMA OF INDIA, attended as a special guest.

The seminar focused on “Recent Trends in the Use of Distillers' Dried Grains with Solubles (DDGS) in Animal Feeding” and took place at Dr. GCN College of Veterinary and Animal Sciences. In his inaugural address, Vice Chancellor Prof. Naveen Kumar discussed the deficit in fodder and feed availability in hilly states. He noted that while around 36% of the state's land is designated for pastures and grazing, it provides sufficient feed for only a few months, mainly during the rainy season. Prof. Kumar stressed the need for alternative feeds to address this gap. He explained how the government's policy promoting ethanol as a biofuel has led to increased grain-based production, previously limited to the sugarcane industry. The residual product, DDGS, is rich in vitamins and minerals, providing a viable solution to meet the nutritional needs of domestic cattle. He emphasized that sustainable and productive animal husbandry can be achieved through customized feed solutions.

Dr. Ravinder Kumar, Dean of the College, highlighted the importance of DDGS in animal feed, while Dr. Shivani Katoch, Head of the Department of Animal Nutrition, welcomed the dignitaries and farmers attending the seminar.

One more CLFMA OF INDIA Seminar with AIDA in Association with GEMA and Novonesis is scheduled on 2<sup>nd</sup> December, 2024 at Vijayawada.

These seminars showcase CLFMA OF INDIA's ongoing commitment to advancing industry knowledge, addressing critical livestock feed issues, and strengthening its network across the sector.

**CLFMA's Participation in CII Krishi Bharat at Lucknow, Uttar Pradesh on 15<sup>th</sup> November 2024:**

Dr. Saikat Saha, CLFMA West Zone President, represented CLFMA OF INDIA as a Special Invitee at the CII Krishi Bharat 2024 held in Lucknow, Uttar Pradesh, on Friday, 15<sup>th</sup> November 2024. The event was inaugurated by Hon'ble Chief Minister Shri. Yogi Adityanath, who emphasized the importance of agricultural innovation and highlighted collaborations with the Netherlands aimed at boosting farmers' incomes. Dr. Saikat Saha's participation reinforced CLFMA's commitment to fostering sustainable growth in agriculture and livestock sectors through industry partnerships and knowledge sharing. The four-day agriculture and technology event, being organised at the Vrindavan Yojana ground, emphasizes the need to blend agriculture with entrepreneurship and adopt modern technology to boost farmers' incomes.

**Pre-Budget (2025-26) Consultation Meeting (virtual) organized by GO on 18<sup>th</sup> November 2024:**

Mr. Nissar F. Mohammed, Hon. Secretary of CLFMA OF INDIA, participated in the Pre-Budget Consultation Meeting (2025-26) for the Fisheries Sector, organized by the Government of India. The meeting, chaired by Dr. Abhilaksh Likhi, Secretary, Department of Fisheries, was held virtually on 18<sup>th</sup> November 2024 at 3:00 PM. This forum brought together industry associations and stakeholders to discuss priorities for the upcoming Union Budget, set to be presented in February 2025.

Mr. Nissar F. Mohammed actively contributed to the discussions, offering valuable insights and recommendations on behalf of CLFMA, underscoring the organization's commitment to advancing the fisheries sector through collaborative policymaking.

**CLFMA OF INDIA supported 16<sup>th</sup> Edition of Poultry India Expo 2024, South Asia's Largest Poultry Event on 27<sup>th</sup> to 29<sup>th</sup> November 2024:**

The 16<sup>th</sup> Poultry India Expo, South Asia's largest poultry exhibition, concluded on November 29, 2024, at the HITEX

Exhibition Complex, Hyderabad. Held from November 27 to 29, the event attracted over 40,000 attendees, including poultry farmers, industry professionals, and policymakers from across the globe.

Inaugurated by Dr. O.P. Chaudhary, Joint Secretary, DAH&D, the Expo emphasized the pivotal role of the poultry sector in food security and rural employment. Mr. Uday Singh Bayas, President of IPEMA, highlighted the need for policy support to tackle rising input costs and sustain growth in the sector.

With over 400 exhibitors from 15+ countries, the event showcased cutting-edge innovations in poultry science, animal health, equipment, and sustainable practices. Preceding the Expo, the Knowledge Day seminar on November 26, 2024, focused on “Shaping the Future of the Indian Poultry Sector,” drawing over 1,500 delegates.

CLFMA OF INDIA participated with a stall at Hall 5, Stall Y39. Representing CLFMA were Executive Director Commander S. Jaikumar, Admin Manager Ms. Shilpa Utekar, Accounts Manager Ms. Poonam Mestry, and Office Assistant Mr. Dinesh Ambavkar.

The Expo fostered networking, knowledge exchange, and innovation, solidifying its role as a critical platform for advancing the poultry industry and promoting sustainable practices.





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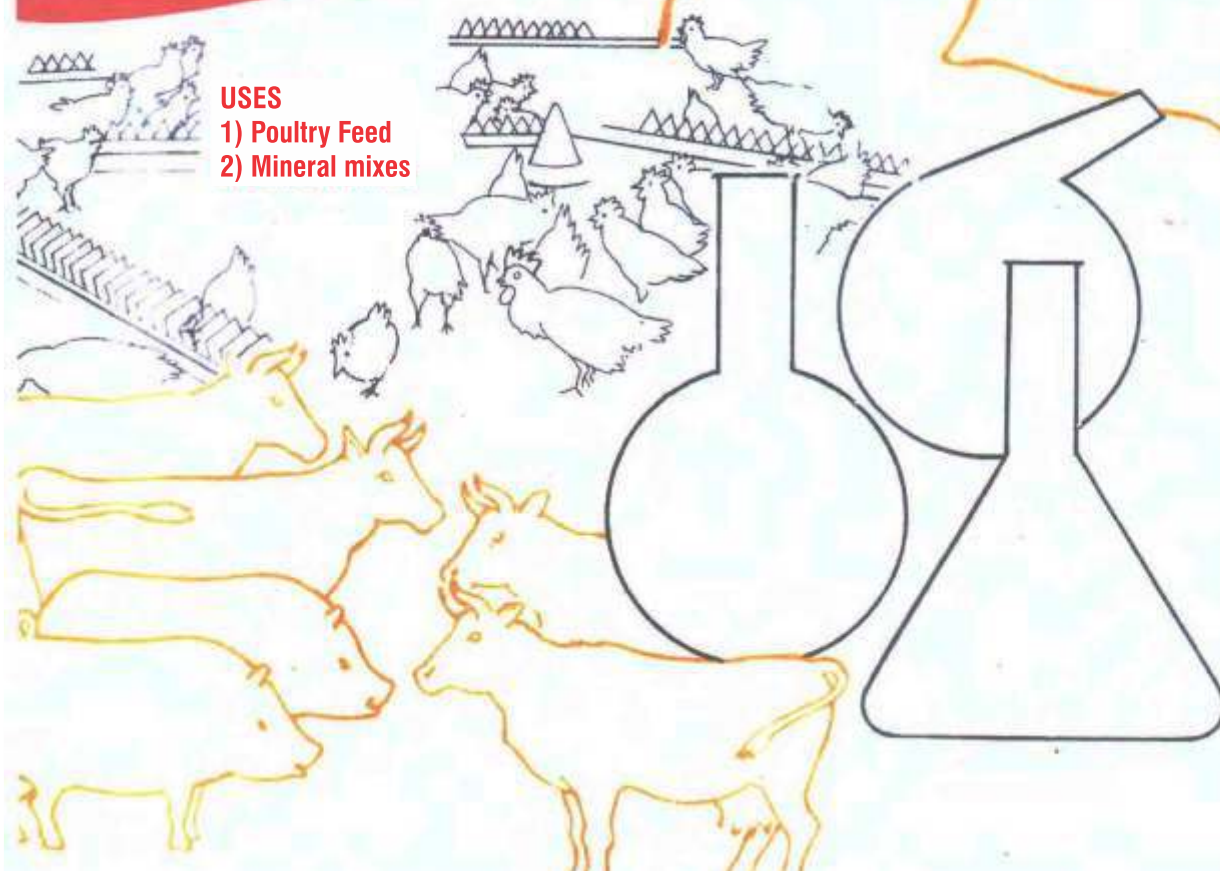
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**CLFMA OF INDIA extends its heartfelt gratitude to US Grains Council Mr. Reece Cannady, Director, U.S. Grains Council & Mr. Jaison John, Team Lead – India, USSEC, CLFMA Managing Committee Member & its esteemed members for their unwavering support in organizing a highly successful delegation to Vietnam on 10<sup>th</sup> and 11<sup>th</sup> Dec' 2024.**

The visit, held on 10<sup>th</sup> and 11<sup>th</sup> December 2024, was led by CLFMA South Zone President, Mr. C. Sarvanan, accompanied by esteemed members Mr. Sarath Sriram R., Director of Annam Feeds Pvt. Ltd. (Sun India Hatcheries), and Mr. Prajeeth Murughu A., Director of MBS Hatcheries.

This delegation provided an invaluable opportunity to explore Vietnam's poultry and feed industries, gaining insights into their efficient approach to importing raw materials while maintaining global competitiveness. The delegation also facilitated meaningful engagements with key industry players and officials in Vietnam, offering significant takeaways on innovative practices and strategies that can benefit the Indian livestock sector.

The meticulous planning and coordination by the association ensured a seamless experience, resulting in productive industry visits and insightful discussions. The learnings from this initiative have paved the way for exploring innovative approaches to enhance the growth and sustainability of India's livestock sector.

We extend our sincere thanks to all members and stakeholders for their commitment and vision in making this delegation a grand success.



### **Krishi Bhavan Visit of CLFMA OF INDIA Chairman Mr. Divya Kumar Gulati and Commander S. Jaikumar, Retd. Indian Navy on 11<sup>th</sup> December, 2024:**

CLFMA OF INDIA Chairman Mr. Divya Kumar Gulati and Commander S. Jaikumar, Retd. Indian Navy visited Krishi Bhavan and met Ms. Alka Upadhyaya, IAS, Secretary AHD, Department of Animal Husbandry and Dairying, Shri. Rama Shankar Sinha, Joint Secretary (LH), Department of Animal Husbandry and Dairying, Dr. Sujit K. Dutta, Joint Commissioner (AH), Dr. Gagan Garg, Dy. Commissioner, Department of Animal Husbandry and Dairying, Dr. Lipi Sairiwal, Deputy Commissioner (AHIDF), Department of Animal Husbandry and Dairying, GOI, Shri. Sagar Mehra, Joint Secretary (Inland Fisheries), Department of Fisheries, GOI to discuss industry related issues.



### **2<sup>nd</sup> Meeting of the Standardization Cell hosted by Department of Fisheries on 20.12.2024**

2<sup>nd</sup> Meeting of the Standardization Cell Chaired by Shri. Sagar Mehra, Joint Secretary (Inland Fisheries), Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India on 20<sup>th</sup> December, 2024 at 4:00pm through video conferencing, On behalf of CLFMA OF INDIA the meeting was attended by Mr. Nissar F. Mohammed, Hon. Secretary of CLFMA. The agenda for the meeting was traceability SOPs/Frameworks for fish and fisheries products in India, Gradation of Hatcheries (Shrimp/Carp/Freshwater Prawn/ Pangasius/ Tilapia/ Trout Ornamental Fish, etc.), Guidelines / SOPs for

Aquaculture waste disposal other than Coastal Aquaculture. Standards for feather meal aquafeed, Standards for insect meal in aquafeeds. Overall, the meeting was very interactive.

Mr. Nissar F. Mohammed, Hon. Secretary of CLFMA OF INDIA emphasised the need for proper Waste Management and that disposal of Fish offals, Tails & Head after processing is a major challenge & it is nearing 30-70% of the Fish, depending on the species which aggravates the cost of production adding to operational expenses which is a major hazard for air pollution.

### **Millet Maize DDGS Ethanol Summit 2024, at hotel Leela Ambience Gurgaon, Haryana:**

CLFMA OF INDIA invited in to Millet Maize DDGS Ethanol Summit 2024, at Hotel Leela Ambience Gurgaon, Haryana on 21<sup>st</sup> December 2024. This esteemed event had an International Agri-Food Conference, Exhibition and Awards, hosted at the renowned Hotel Leela Ambience Gurgaon Haryana. The focus of this gathering was the ever-evolving landscape of the Millet Maize DDGS Trade Industry, a domain of paramount significance. The summit was attended by CLFMA Executive Director Commander S. Jaikumar, Retd. Indian Navy and CLFMA Past Chairman Dr. Dinesh Bhosale.

MMDE International Millet Maize DDGS Ethanol conference had Business Session, Panel discussion on Maize Outlook, Panel discussion on Millet Outlook, Panel discussion on Ethanol Market Overview.

### **Ms. Zoya Afroz with CLFMA Team**



CLFMA OF INDIA Participated in Virtual Preparatory Meeting on 23<sup>rd</sup> December, 2024 at 3:00 pm. The preparatory meeting was for "Entrepreneurship Development Conclave" scheduled on 13<sup>th</sup> January, 2025 in Pune, Maharashtra:

The Department of Animal Husbandry and Dairying (DAHD) is organizing the Entrepreneurship Development Conclave on 13<sup>th</sup> January 2025 in Pune, Maharashtra. The event will highlight two key entrepreneurship development schemes: the Animal Husbandry Infrastructure Development Fund

(AHIDF), launched under the Prime Minister's Atma Nirbhar Bharat Stimulus package with an outlay of ₹ 29,110.25 crore, and the National Livestock Mission – Entrepreneurship Development Programme (NLM-EDP) with an outlay of ₹ 2,300 crore.

The conclave aims to acknowledge stakeholders' contributions, create awareness about these flagship schemes, and generate innovative ideas to strengthen them. The Hon'ble Minister of Fisheries, Animal Husbandry, and Dairying, Shri. Rajiv Ranjan Singh (Alias Shri Lallan Singh), will grace the event as Chief Guest.

As a crucial stakeholder in these initiatives, CLFMA OF INDIA has been invited to participate. Ahead of the conclave,

Dr. Vijay Makhija, CLFMA Managing Committee Member, represented the organization at a virtual preparatory meeting held on 23<sup>rd</sup> December 2024. The meeting focused on discussing the agenda and defining the roles of key stakeholders to ensure the success of the upcoming conclave.

CLFMA OF INDIA will continue its active engagement at the conclave in January, contributing to the collective vision of sustainable development in the livestock sector.

CLFMA submitted 5th additional feed additive list to GOI on 31<sup>st</sup> December, 2024



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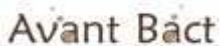
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## Telangana fish production reaches 4.56 lakh tons in 2024; Rs 7,059 crores contribution to State

Telangana's Fisheries Department has emerged as a leader in the country by housing 5,901 fisheries cooperative societies with a total membership of 4,13,120. With 5.73 lakh sqkm of water, including reservoirs, Telangana has the third-largest inland water spread in the nation, marking a true 'Blue Revolution' for the State. It has the fifth place in the country for inland fish output. This year, the state achieved fish production of 4.56 lakh tons, generating a revenue of Rs 7,059.04 crores, significantly contributing to the State's economy. Telangana's Fisheries Department has set new benchmarks in the sector, solidifying its position as a front runner in inland fisheries development in the country. Since December 2023, as many as 225 new societies have been established, enrolling 8,069 new members, further strengthening the cooperative network. Under the Group Accidental Insurance Scheme, a premium of Rs 139.77 lakhs was paid to insure the lives of 4.16 lakh fishers, setting a notable example. Additionally, the construction of new fish ponds was sanctioned, covering an area of 195.94 hectares with a project cost of Rs 2,145.44 lakhs. To conserve and promote striped murrel fish, a centre of excellence is being set up at the Yellampalli Reservoir in the Mancherial district in collaboration with the ICAR-Central Institute of Freshwater Aquaculture (CIFA). Furthermore, an export-oriented state-of-the-art fish market is being developed at Koheda in Ranga Reddy district at a cost of Rs 47.03 crores. As part of the Indira Mahila Shakti program, 32 mobile fish retail outlets were distributed to women's self-help groups with a 60 percent subsidy. Apart from that, Telangana has won the National Award for Best Inland Fisheries for the year 2024.

## Indian Fisheries Sector Contributes 8% of World's Production; Fish Production in India Nearly Doubled Since 2014: Union Minister Rajeev Ranjan

Union Minister of Fisheries, Animal Husbandry, and Dairying Rajiv Ranjan Singh on November 21 said that India has become the world's second-largest fish producer and is one of the largest producers in capture fisheries. While addressing an event by the Department of Fisheries under the Ministry of Fisheries, Animal Husbandry, and Dairying (MoFAH&D) on the occasion of World Fisheries Day 2024, he said that various initiatives like the Blue Revolution and

Pradhan Mantri Matsya Sampada Yojana (PMMSY) and Pradhan Mantri Matsya Kisan Samridhi Sah- Yojana (PMMKSY), have supported boosting fish production in the country; as a result, fish production nearly doubled since 2014 to 17.5 million tons, with inland fishing now surpassing marine fishing, contributing 13.2 million tons. "India is the world's second-largest fish producer, contributing 8 per cent to global output, ranks second in aquaculture production, leads in shrimp production and export, and is one of the largest producers in capture fisheries," Singh said. "Since 2015, the Government of India has committed investment of Rs. 38,572 crore through key initiatives such as the Blue Revolution Scheme, Fisheries and Aquaculture Infrastructure Development Fund (FIDF), Pradhan Mantri Matsya Sampada Yojana (PMMSY), and its sub-scheme, Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PMMKSSY), to drive sustainable growth and development in the sector," Singh added. The event was organised at the Sushma Swaraj Bhawan in the national capital to celebrate the contribution and achievements of fishers, fish farmers, and other stakeholders and reinforce commitment towards sustainable and equitable development of the fisheries sector, with the theme of 'India's Blue Transformation: Strengthening Small-Scale and Sustainable Fisheries. Singh, alias Lalan Singh, highlighted the achievements and challenges of the fisheries sector and congratulated the fishermen and fish farmers for their role in making India the second-largest fish producer globally, with around 30 million people involved in fish production across the value chain.

## Revenue of Poultry Industry Expected to Increase by 10% in FY 2025: CareEdge Report

The revenue of the Indian poultry industry could increase by 8-10% in the current financial year. According to a report by rating agency CARE Edge Ratings, the operating profit margin of the domestic poultry industry may rise by 180-220 basis points in the 2024-25 fiscal year. The agency anticipates that the coming year will also be favorable for the poultry industry. The report states that by 2024, India has made significant progress in egg and broiler meat production, producing over 140 billion eggs and approximately 4.5 million tons of chicken meat annually. The demand for eggs and chicken has surged due to urbanisation and rising incomes, which has fueled the industry's rapid growth. The industry is also benefiting from stable input costs, improved feed management, and government support. Additionally, the demand for meat and eggs increases during festivals and winter, which further boosts the industry. The report further mentions that egg and meat production in India has consistently grown over the past decade, playing a key role in meeting the country's protein needs. In the food sector, meat,



fish, and seafood fulfill about 31-34% of the total protein demand. In the coming years, egg production is expected to grow by 7-8% and meat production by 5-6%. During the COVID-19 pandemic in 2020, the poultry industry suffered significant losses, reducing income and revenue. In 2022, however, earnings for major poultry companies improved, although rising maize and soybean prices increased production costs in 2023 and 2024. Maize and soybean are primary components of poultry feed, and their prices surged due to supply issues. Nevertheless, with a good harvest and government support, prices have now stabilized. Key Challenges are:

**Fluctuating Input Costs:** The poultry industry relies heavily on maize and soybean, which make up approximately 65-70% of the total feed cost. In the 2024 year, the stabilization of feed prices has improved industry profits. Large companies are addressing this challenge by focusing on better breeds and FCR.

**Impact of Diseases:** Diseases like avian influenza negatively impact industry profits by reducing sales and increasing costs for preventive measures. Major companies in the industry are working to develop vaccines and disease-resistant breeds.

**Feed Conversion Ratio (FCR):** FCR is crucial for profitability in the poultry industry. Enhancing FCR through improved breeds and feed quality can increase profitability.

## 'At 21%, Bengal Achieves Highest Egg Production in the Country'

The growth rate in egg production in Bengal, which is presently 21 per cent, is the highest in the country, state Animal Resources Development (ARD) minister Swapan Debnath said during the question answer session at the state Assembly on 03 December 2024. The minister said that the state took significant strides towards becoming self-reliant in egg production and cutting down imports from other states. "The state presently needs 1,528 crore eggs annually which is increasing on a daily basis. In the financial year 2022-23, the state imported 64.6 crore eggs from other states. However, in the year 2023-24, the state achieved self-sufficiency with a total production of 1,581.77 crore eggs," Debnath said in response to a question from TMC MLA Samir Jana. As per data of the state ARD department, in the 2023-24 fiscal, the total egg production in the domestic/ unorganised sector is 798.29 crore; production through private players is 736.38 crore. The West Bengal Livestock Development Corporation produces 47 crore taking the total production to 1581.77 crore which is more than the present consumption demand of the state. The state ARD department came up with five state-of-the-art, environmentally controlled mega Commercial Layer Farms, each having a capacity of 3 lakh birds at Mekhligunj (Cooch Behar), English Bazar (Malda), Purulia, Salboni (West Midnapore) and Haringhata (Nadia). These five government poultry farms are expected have started egg production. This has contributed to stopping import from

other states. According to recommendations by the Indian Council of Medical Research (ICMR), a person needs to consume 180 eggs and 10.5 kg meat annually.

## Indian Dairy Industry to see 13-14% Revenue Growth in FY25

India's dairy industry is expected to see healthy revenue growth of 13-14 per cent this financial year 2024-25, asserted Crisil Ratings, as strong consumer demand continues along with an improved supply of raw milk. While the rating agency believes the demand will be supported by rising consumption of value-added products, the ample milk supply will be driven by good monsoon prospects. A rise in raw milk supply will also lead to higher working capital requirements for dairy players. That, along with continued capital expenditure (capex) by organized dairies over the next two fiscals will result in debt levels inching up. Nevertheless, credit profiles will be stable supported by strong balance sheets, a CRISIL Ratings analysis of 38 dairies accounting for 60 per cent of the organised segment revenue indicates so. Mohit Makhija, Senior Director, CRISIL Ratings, says, "Amidst modest growth of 2-4 per cent in realization (rates), the dairy industry's revenues are seen rising on healthy 9-11 per cent growth in volumes." The value-added products segment – a 40 per cent contributor to the industry revenues – is expected to be the primary driver, fueled by rising income levels and consumer transition towards branded products. "Rising sales of value-added products and liquid milk in the hotels, restaurants and cafes (HORECA) segment will also support the revenue growth," added Makhija. The strong consumer demand will be complemented by improved raw milk supply which is expected to increase 5 per cent this fiscal, due to better cattle fodder availability, given the favourable monsoon outlook this fiscal. Milk availability will be further supported by the normalisation of artificial insemination and vaccination processes after facing disruption in the past. Additionally, various measures such as genetic improvement in indigenous breeds and an increase in the fertility rate of higher yield breeds will help enhance milk supply. Steady milk procurement prices augur well for the profitability of dairies, and their operating profitability is expected to improve 40 basis points (100 basis points is equal to 1 percentage point) to 6 per cent this fiscal. Rucha Narkar, Associate Director, CRISIL Ratings, says, "While the revenue and profitability of dairies will improve this fiscal, debt levels are also expected to increase, mainly for two reasons.

## UP Allocates Rs. 10.5 Cr to set up Modern Dairy Units Across State

The state govt has launched the 'Mini Nandini Krishak Samridhi Scheme', under which modern dairy units will be

set up across the state to enhance both the quality and quantity of milk production. The govt has allocated Rs 10.5 crore for the implementation of this scheme. A govt spokesperson said that the scheme seeks to raise the state's milk production per animal to match the national average. Even though UP is a leading milk production state in India, its per animal yield is only 3.78 litres. Despite being one of India's leading milk-producing states, Uttar Pradesh currently lags behind in terms of per-animal milk output, with an average of 3.78 litres per cow, below the national average. "To address this issue, the govt will be establishing hi-tech dairy units with 10 cows each, focusing on high-quality indigenous breeds such as Gir, Tharparkar, and Sahiwal, which are known for their superior milk yield," the official said. He added that each dairy unit, expected to cost around Rs 23.60 lakh, will be funded through contributions from both the govt and beneficiaries. The selected breeds will undergo rigorous evaluation based on their milk production capacity and quality to ensure that the initiative significantly increases milk output across the state. As part of the scheme, cattle sheds and other modern infrastructure will be set up. Those who keep the cows will receive advanced training in animal care and management, using the latest technical methods. To ensure the benefits reach every beneficiary, eligible farmers with at least three years of experience in cattle rearing will be selected, with a particular focus on small and marginal farmers. The scheme will introduce farmers to scientific practices, enabling higher production at a lower cost. "Beyond increasing milk production, it will bring positive changes to rural communities by providing new opportunities for cattle keepers to become economically empowered and self-reliant," he said.

## Oilmeals Export Down 7% in First Eight Months of 2024-25

The overall export of oilmeals decreased to 27.51 lakh tonnes (lt) during April-November of 2024-25 against 29.64 lt in the corresponding period of 2023-24, registering a 7.15 per cent decline. BV Mehta, Executive Director of the Solvent Extractors' Association of India (SEA), attributed this decline to reduction in export of rapeseed meal and castorseed meal. During April-November 2024-25, India exported 13.21 lt of rapeseed meal (16.07 lt in April-November 2023-24), and 1.97 lt of castorseed meal (2.54 lt). Total oilmeals exports during November 2024 stood at 3.63 lt (3.97 lt in November 2023), registering a decline of 8.63 percent. Mehta said the export of soyabean meal increased to 12.06 lt during the first eight months of the financial year 2024-25 against 9.37 lt in the corresponding period of 2023-24 due to higher imports by the UAE, Iran and France. However, Indian soyabean meal is facing severe competition in the recent months due to the increased supply of soyabean meal in world market, he said, adding, export is likely to slow down in coming months. Bangladesh, which is the major market for rapeseed meal, is faced with uncertainties. Volume of export to Bangladesh has come down in the recent months. SEA is making efforts to

persuade the Centre to lift the ban on the export of de-oiled rice bran. He hoped that the government will take some positive steps to allow the export of de-oiled ricebran. During April-November 2024-25, South Korea imported 5.05 lt of oilmeals (5.55 lt) from India. This included 3.50 lt of rapeseed meal, 1.15 lt of castorseed meal, and 39,036 tonnes of soyabean meal. India exported 1.78 lt of oilmeals (3.35 lt) to Vietnam during the first eight months of 2024-25. This included 1.49 lt of rapeseed meal, 15,571 tonnes of soyabean meal, 10,970 tonnes de-oiled ricebran extraction, and 2,871 tonnes of groundnut meal. Thailand imported 3.02 lt of oilmeals (4.62 lt) from India during April-November 2024-25. This included 2.92 lt of rapeseed meal, 7,427 tonnes of soyabean meal, and 2,511 tonnes of groundnut meal. India exported 4.70 lt of oilmeals (5.95 lt) of oilmeals to Bangladesh during April-November 2024-25. This included 4.13 lt of rapeseed meal and 57,554 tonnes of soyabean meal. Iran imported 1.54 lt of soyabean meal from India during the first eight months of 2024-25.

## Soyabean Production in Country may Reach 126 Lakh Tonne

Kharif 2024: Soyabean production in the country in kharif 2024 is projected to reach approximately 126 lakh tonne, up six percent from the previous year, according to an estimate released by Soybean Processors Association of India (SOPA), a traders' body. The estimate was based on a survey conducted in the three major soyabean growing states of Maharashtra, Madhya Pradesh, and Rajasthan, and was unveiled on Oct 15 at the concluding day of International Soya Conclave 2024, in Indore. The survey showed that India's soyabean production in 2024 is projected to jump to 126 lakh tonne as against 119 lakh tonne in the previous season. The average yield in soyabean in 2024 has surged to 1,063 kg per hectare, compared to 1,002 kg per hectare recorded a year ago. SOPA executive director D N Pathak attributed this positive trend in overall soyabean crop production to favourable weather conditions and enhanced agricultural practices. SOPA's estimation of the area under soyabean cultivation in the country stands at around 118 lakh hectare, while the government's estimated acreage is slightly higher at 127 lakh hectare. The survey, conducted between Oct 2 and Oct 10, 2024, involved two teams from SOPA covering 51 of the highest soyabean growing districts in India, including 25 in Madhya Pradesh, 20 in Maharashtra, and six districts in Rajasthan. Madhya Pradesh, a leading soyabean cultivating state, is expected to witness a soyabean output of 55 lakh tonne in 2024, up from 52 lakh tonne in 2023, as per the survey's findings. In the International Soya Conclave, industry experts deliberated on significant issues, new technologies, challenges, and opportunities related to the soy industry. The event featured sessions on technology, price outlook, and market outlook, providing valuable insights to the participants. Addressing the gathering, water resources department minister Tulsiram Silawat emphasized the interconnectedness of the soy industry with both industrialists and farmers.

# Feeding Goats: Some On-Farm Practical Guidelines

Saumya Tiwari<sup>1\*</sup>, Nunsavath Ravalika<sup>1\*</sup>, Ashokkumar Valupadasu<sup>2</sup>, M.S. Mahesh<sup>3\*\*</sup>

## Introduction

The goat is popularly known as “poor man’s cow” and contributes to the livelihood security of rural India. Currently, India ranks first in goat population with about 148.8 million, supporting 3.30% of total milk production in India and goat meat (chevon) represents 14.47% of total meat production of the country. Goats—just like sheep—are accepted across all population in India as food animals without any social taboo. In order to realise optimum production and profitability, “balanced nutrition and feeding” become imperative in goat husbandry as feed alone is factored at 0.65 of recurring expenses in goatery. India has some of the excellent breeds of goats adapted to local conditions like Jamunapari, Beetal, Sirohi, Barbari, Jakhrana, Black Bengal, Osmanabadi etc. that are raised in extensive (zero input), semi-intensive (minimum input) and intensive (stall-fed) systems. Goats are adaptable to climatic stress and relatively have low water requirements than other ruminants. In this article, the practical guidelines and tips to feed goats in different physiological/life stages under stall feeding are briefly discussed.

## Digestive physiology and special features of goats

Although both sheep and goats are small ruminants, goats prefer a variety of feedstuffs in their diet as they are more selective than sheep. Due to their mobile upper lip and prehensile tongue, goats can consume a wide range of tree foliages, bushes, twigs etc. including woody species and thorny botanical fractions that no other farm ruminants could relish. Besides, top feeds (foliages) help satisfy the “browsing” habit of goats through their characteristic bipedal stance. Indeed, goats utilise tanniferous foliages better than any other species of ruminants due to their more tolerance to the adverse effects of tannic acid by the presence of *Streptococcus caprinus* in the rumen. This apart, digestive physiology of goats is characterised by more taste sensation, salivary secretion, greater urea recycling through saliva leading to a relatively higher rumen ammonia concentration than sheep. Furthermore, a greater retention time of digesta enables goats to have a better digestive efficiency with coarse roughages. Notably, goats are naturally evolved to economise water usage by excreting less water through faeces and urine

besides having a lower ratio of water-to-dry matter intake (DMI).

## Balanced feeding

The principle behind “balanced feeding” is fulfilling all the necessary dietary nutrients for a particular physiological function over a period of 24 hours. In other words, the feeding programs are to be formulated in such a way that whatsoever the goat is consuming (i.e., offered ration comprising of forages and concentrate mixture) in a day should fulfil its requirements and adequately support the target production performance such as growth, pregnancy, lactation etc. In any balanced diet for goats, carbohydrates, protein, fat, minerals and vitamins are the essential dietary nutrients.

The forage component of goat ration could comprise of the following:

- **Legumes:** Berseem (*Trifolium alexandrinum*), lucerne (*Medicago sativa*), cowpea (*Vigna sp.*), *Stylosanthes* etc. These contain 15-20% protein and 1-2% calcium on a dry basis.
- **Grasses:** Anjan/buffel (*Cenchrus ciliaris*), para grass (*Brachiaria mutica*), guinea grass (*Panicum maximum*), hybrid napier, etc.
- **Cereal fodders:** Maize (*Zea mays*), sorghum (*Sorghum vulgare*), pearl millet (*Pennisetum typhoides*), oats (*Avena sativa*) etc.
- **Top feeds/tree foliages/browse:** Drumstick (*Moringa oleifera*), neem (*Azadirachta indica*), peepal (*Ficus religiosa*), ber (*Ziziphus mauritiana*), babul (*Acacia nilotica*), subabul (*Leucaena leucocephala*), bakain/Malabar neem (*Melia dubia*), siris (*Albizia lebbek*), khejri (*Prosopis sp.*), gulmohar (*Delonix regia*), gular (*Ficus racemosa*), hedge lucerne (*Desmanthus sp.*), Gliricidia, Sesbania etc. These can be planted around goat shed and fodder field to act as “protein bank” in the period of feed scarcity.
- **Dry feeds:**
  - Dry pods: Babul, khejri, rain tree, subabul, shisham etc.
  - Dry roughages: Legume straw (groundnut haulms,





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soybean straw, gram straw and husk as well as cereal straw like wheat straw and rice/paddy straw.

### Different life stages of goats



#### I. Feeding of young kids (0-3 months of age)

Kids are fed colostrum, milk, kid starter and forages according to their age, as follows (Table 1):

Table 1. Feeding schedule of kids from birth to weaning

Age	Body weight (kg)	No. of feedings/day	Milk feeding	Kid starter <sup>a</sup>	Green forage/day <sup>b</sup>
Birth to 5 days	1-3	3-4	Colostrum (15% of BW)	-	-
5-30 days	3-5	2-3	300-500 mL (15% of BW)	50 g	Free-choice
31-60 days	5-7	2	400-500 mL (12.5% of BW)	100-150 g	Free-choice
61-90 days <sup>c</sup>	7-10	2	350-500 mL (5-10% of BW)	150-200 g	Free-choice

<sup>a</sup>Composition: Maize: 50%, groundnut cake/soybean meal: 30%, wheat bran: 12%, molasses: 5%, mineral-vitamin mixture: 2% and common salt: 1% (Nutritive value: CP: 22%; TDN: 82%). With age, reduce quantity of milk and proportionally increase starter feed.

<sup>b</sup>A good quality legume hay can also be fed on a free-choice basis.

<sup>c</sup>At the time of weaning (90 days), body weight (BW) should ideally be 5-times the birth weight and milk feeding is completely stopped.

#### II. Feeding of growing-finishing kids (3-12 months of age)

The diet chart of growing goats include free-choice green (cereal or legumes: 1-2 kg) + dry forages (legume hay: 200-300 g) + concentrate mixture (Table 2). Out of total DMI of 3-4% of body weight (BW) in growth phase, concentrate is generally fed at 2-2.5% of BW. The target growth rate of 75-100 g/d is satisfactory to obtain 20-25 kg of final BW by one year. Leguminous foliages (moringa, subabul etc.) support an excellent growth rate when fed along with a cereal fodder-

based diets. Goats may be fed either forages and concentrates separately in a "component-fed system" or can also be maintained on a "dry total mixed ration" and/or silage-based diets upon adaptation. Care should be exercised not to allow kids to become too fat by adjusting the amount of concentrate feed based on body condition.

Table 2. Ingredient composition of a concentrate mixture for growing goats

Ingredient	Proportion (kg, as-mixed)
Maize	25
Barley	15
Groundnut cake	10
Soybean meal	5
Mustard cake	6
Bengal gram	15
Wheat bran	20
Mineral-vitamin mixture	2.5
Sodium bicarbonate	0.5
Common salt	1
Total	100
<b>Nutritive value (on dry basis):</b> crude protein: 20% and total digestible nutrients: 78%	

#### III. Feeding of dry goats

Non-lactating dry adult goats are generally kept on a maintenance ration comprising of free-choice green (1-2 kg) + 200 g dry forage + 100 g concentrate mixture.

#### IV. Feeding during breeding

Physiological processes like ovulation, conception, gestation and parturition are all important events associated with reproductive success in goats. "Flushing" is the practice of increasing overall nutrient intake about 2-3 weeks prior to and during breeding. The primary objective of flushing is to increase ovulation rate, conception and kidding rate. Does and breeding bucks are daily fed with ~400-500 g or more (up to 1 kg for large breed bucks) of concentrate mixture in addition to ad lib. green and dry fodder during breeding. Excessive legume hay with rumen degradable protein should be avoided in the diet of bucks. A good feeding regimen is known to increase reproductive efficiency in Jamunapari and Barbari does by increasing twinning percentage and reducing inter-kidding interval. Ideally, three kiddings in two years with a mean inter-kidding period of eight months shall be the yardstick to measure reproductive efficiency in goats.

#### V. Feeding of pregnant goats

Along with free-choice green (2-3 kg) and dry forage (200-300 g), a higher allocation of concentrate mixture (300-600 g/day) after 100 days of gestation is necessary to support the

rapid development of foetus in this period. This allows to gain additional body reserves, leading to a better body condition score at parturition. While the low-plane of nutrition in this period leads to the birth of kids with a low BW, over-conditioning of the gravid doe, on the other hand, should also be avoided. The amount of concentrate must be reduced to 200-300 g during the last week of pregnancy.

#### VI. Feeding of lactating goats

The nutrient requirements are highest during lactation phase, which is about double the maintenance requirement. Lactating does should be fed to fulfil the DMI at 4-6% of live weight by offering free-choice green (3-5 kg of legume, grass or grass-legume mixture) + 200-300 g dry forage + 400-800 g concentrate mixture. The thumb rule to enhance milk yield especially in high milk producer like Jamunapari, Beetal, Jakhrana is, for every kg of milk produced, offering 400 g of additional concentrate mixture is suggested. Further, does nursing twin kids or triplets (for instance, Black Bengal) need extra concentrate allocation. In general, high-merit dairy does need a ration with about 17% crude protein. Among trace minerals, compared to sheep, goats require higher dietary copper. Feeding program should be such that it avoids metabolic/production diseases like hypocalcemia (calcium deficiency around kidding), ketosis (energy deficiency post kidding) and lactic acidosis (sudden intake of a large quantity

grain/concentrate feeds). In addition, always ensure the availability of clean drinking water ad lib. in the shed on a 24-hour basis. A free-choice salt/mineral licks should be kept in goat shed for optimum performance and health.

#### Conclusions

As a small ruminant livestock, goat is one of the preferred animal by the consumers both for milk as well as meat. A good diet that is scientifically formulated and balanced in all the essential nutrients matching with the nutrient requirements is the key to unlock optimum production as well as bottom-line profitability in goat enterprises.

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# Importance of the Quality Evaluation of Soybean Meal as a Feed Ingredient for Poultry

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## Introduction

Soybean meal is the inevitable vegetable protein source for poultry, and it is the most common, widely used feed ingredient. It has also become world-wide standard against which other protein sources are compared. Protein content varies from 44 to 48% which depends on seed variety, oil extraction processing and harvesting time. Its amino acid profile is excellent and highly digestible, when combined with cereals helps in cost efficient feed formulation for animal or birds. In addition, it is also rich source of potassium and isoflavones. Isoflavones have been implicated in enhancing immunity and improving growth performance and carcass traits.

Table1. Nutritional composition of Indian Soya doc (NIRS data)

	Average	SD
CRUDE PROTEIN	48.47	0.95
AME(n)(kcal/kg)	2308.25	38.8
TOTAL PHOSPHOURS %	0.49	0.03
PHYTATE P%	0.29	0.02
NON-PHYTATE P%	0.20	0.01
LYSINE%	2.87	0.05
METHIONINE%	0.61	0.01
CYSTEINE%	0.66	0.02
ARGININE	3.54	0.08
THREONINE	1.84	0.04
TRYPTOPHAN%	0.64	0.01
METHIONINE+CYSTEINE%	1.27	0.03
LEUCINE	3.63	0.08
ISOLEUCINE%	2.18	0.04
VALINE%	2.25	0.04
GLYCINE%	2.04	0.03
SERINE%	2.43	0.05
GLUTAMIC ACID%	8.66	0.19
Oil%	1.71	0.31
CRUDE FIBRE%	5.72	0.52
TOTAL ASH%	7.22	0.28
LYSINE/CP RATIO	0.059	0.0007
*K%	1.70	.085
*Ca%	0.36	.026

Average N= 1289 ; \*Analysed using ICP-OES, Average N= 17

**Note:** This table is applicable for 47% protein soya doc. Protein and oil % is higher on NIRS compared to the wet chemistry. This is because, for NIRS, protein content is calibrated by using Dumas method instead of Kjeldahl method which is most common. In the Kjeldahl method nitrate and nitrite N can not be quantified. Also, for NIRS calibration, ether extract sample is acid hydrolysed before extraction, which is not done in regular analysis leading to incomplete fat/oil extraction.

## Soybean processing

Soybean meal is a byproduct of soya oil industry; after cracking the seed, oil is extracted at 70°C using hexane. This hexane is removed completely by evaporative cooling; otherwise, the residual hexane may cause liver problems in birds.

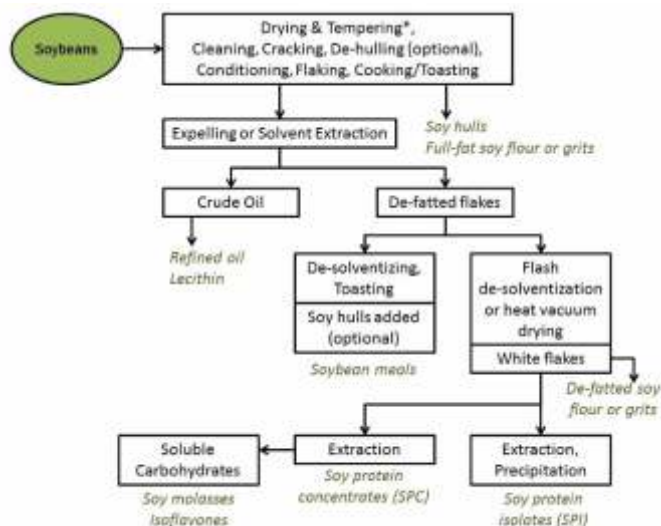


Fig.1 Soyabean processing

Reference: Manual of quality analysis for soyabean products in the feed industry (2<sup>nd</sup> Ed.)

This highly valued feed ingredient contains many anti nutritional factors (ANF) which is one of the most important restrictions in the use of soybeans and their products in monogastric animal diets. The presence of these factors is also the main reason why different technological treatments are applied to soybeans or their products.



### Anti-nutritional factors

Following are different ANFs which are easily destroyed with proper heat treatment (except mycotoxins). First five are intrinsic, while mycotoxins are formed because of high moisture content and improper storage of the soya seed or soya doc.

1. **Trypsin inhibitors (TI):** The residual trypsin inhibitor in soyabean products combines with the trypsin in the small intestine and forms an inactive complex thus reducing the availability of proteins by reducing the digestibility of specific amino acids. It induces pancreatic hypertrophy causing increased secretion of trypsin (loss of endogenous nitrogen). Independent of this, trypsin inhibitors have been correlated with the occurrence of "rapid feed passage" syndrome in broilers. The combined effect on the bird is a reduction in nitrogen retention, growth and feed conversion.
2. **Antigenic compounds:** Glycinin and B conglycinin are the allergens present in soya beans, which may induce inflammatory response in intestines.
3. **Agglutinin:** Its non-fibre carbohydrate related glycoprotein. The structure is similar to lectins found in other leguminous plants but is more stable. It causes negative effects on animal intestinal health by influencing the intestinal structure, barrier function, mucosal immune system, and the balance of the intestinal flora.
4. **Anti-vitamin factors** against vitamin A, B2 and D3.
5. **NSP and OS:** Soyabean meal contains approximately 30% carbohydrates (DM basis), of which only a small part is in the form of starch. A significant proportion (7-10%) comprises indigestible OS (e.g. raffinose, stachyose, verbascose). Up to 20% of dry matter is in the form of NSP such as arabinogalactans and galactomannans.

OS increase osmotic pressure and therefore fluid flux into the gut. This increases digesta passage rates and reduces the efficiency of digestion and absorption of nutrients. On reaching the hind gut, OS are subject to microbial fermentation, which causes bloat and concomitant reductions in feed intake and production efficiency. As a result, these are commonly referred to as "flatulence factors".

Insoluble NSP directly prevent access to nutrients due to the well-documented "cage effect". In addition, soluble NSP cause increased viscosity of the gut digesta, leading to rapid through-put and reduced availability of

nutrients for digestion and absorption.

Importantly, both OS and soluble-NSP are implicated in wet litter and its associated effects on health and carcass quality.

6. **Mycotoxins:** Soya doc generally do not contain significant levels of mycotoxins, however, ochratoxin (produced by the molds *Aspergillus ochraceus* or *Penicillium verrucosum* under poor storage conditions) and zearalenone (produced by the fungus *Fusarium graminearum*) are commonly found.

Under-toasting retains the intrinsic ANFs of soybean and over toasting may denature proteins. Over toasting also makes protein unavailable by a chemical reaction between protein and carbohydrate in the soybean, called as Maillard reaction, in which lysine is involved. Reactive lysine content (NIRS calibrations are available) should be more than 90% of total lysine (Reactive + heat damaged lysine).

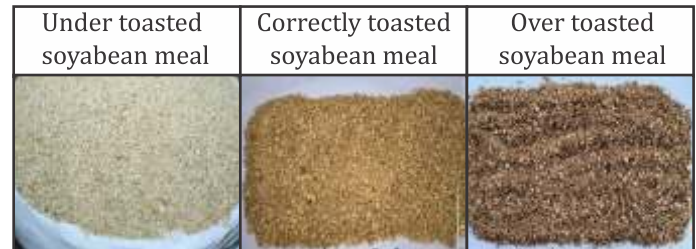


Fig2. Soya doc color

### Quality tests to assess soybean meal processing efficacy

There are few tests available to check whether soybean is properly processed or not. They are 1) Urease activity test 2) Soluble protein and 3) Protein Dispersibility Index (PDI).

- 1) **Urease Activity:** It is an indirect method to detect whether trypsin inhibitors are destroyed to the maximum extent by measuring the presence of urease enzyme, which normally is present in soybean but destroyed by heat treatment along with trypsin inhibitor. Urease is measured in terms of change in pH during assay. The change in pH that is normally accepted in the industry is between 0.05 and 0.2. As pH test is time consuming, commonly phenol red indicator method is used, here number of red spots are correlated with the change in pH units. Higher values mean there is still residual urease (and trypsin inhibitor) indicating undercooked meal. One drawback of this test is that absence of any pH change just indicates the absence of urease activity in the soybean meal, which could be indicating either optimum cooking (up to the exact level of destruction of urease and thereby the trypsin inhibitor) or over cooking or over-processing of soybean meal.

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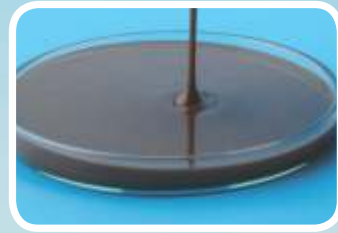
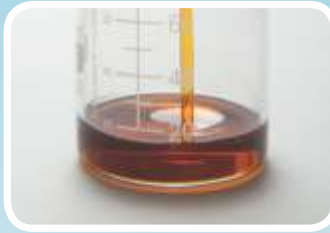
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2) **KOH protein solubility:** Since there is no indication of over-cooking by urease activity method, Araba and Dale from Canada developed an alternative method. In this method, solubility of protein in soybean meal is measured using a weak alkali solution of potassium hydroxide (0.2%). After confirming good correlation between the amount of protein from soybean meal soluble in weak KOH solution and chick growth, the method is followed in many countries as a tool for assessing the quality of soybean meal. Heating tends to make the protein less soluble in weak alkali solution. Correctly heat-processed soybean meals should have a protein solubility around 78-85%. Raw soyabean meal is 100% soluble.

3) **Protein Dispersibility Index (PDI):** Among the available tests for determining protein quality in soybean products, the PDI is the simplest, most consistent, and most sensible method. This test measures the solubility of soybean proteins in water and is probably the best adapted to all soy products. The PDI method measures the amount of soy protein dispersed in water after blending a sample with water in a high-speed blender. PDI value between 15-30% is considered as good.

Table 2. Commonly used tests for heat processing

	Urease activity	KOH solubility test	Protein Dispersibility Index
Under processing	Very appropriate	Low use	Appropriate
Over processing	Not appropriate	Appropriate	Low use
Target values	The change in pH is between 0.05 and 0.2	KOH protein solubility around 78-85%.	PDI value between 15-30%
From left to right Fig3- Urease by Phenol red Fig4-KOH solubility Fig5-High performance blender for PDI			

### Adulterants in soybean meal

Adulteration is addition of inferior/cheaper quality materials to superior quality materials. High quality feed ingredient such as soybean meal is usually prone to adulteration intentionally or unintentionally. Adulteration not only changes the chemical composition but also reduces the original nutritive value.

The following are the common adulterants with soybean meal:

1. NPN compounds
2. Soil/Sand silica
3. Hulls (fibre)
4. Other cheaper meals
5. DDGS
6. Over/under cooked soya

**NPN compounds:** Non protein nitrogenous compounds like urea, melamine may be adulterated in soya DOC to increase the crude protein (CP) content. It boosts the N content in soya DOC which is reflected in CP. It can lead to formulation mistakes leading to short supply of the amino acids to poultry. It also creates burden on liver and kidney for excretion of unutilized N. Ultimately poultry performance will be poor.

**Urea** contains 46% N (287% CP equivalent). Urea toxicity can cause respiratory dyspnea, staggering gait and watery diarrhea in birds.

For urea spot test phenol red indicator is used whereas for NPN (other than urea) spot test Nessler's reagent is used.

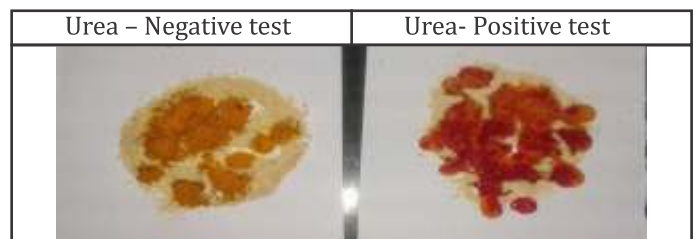


Fig6 Urea spot test

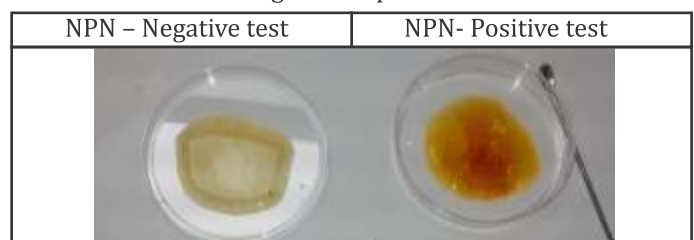


Fig7 NPN (other than urea) spot test

**Melamine** is an organic nitrogenous compound used in the production of plastics, dyes, fertilizers and fabrics. It contains 67% N (418% CP equivalent). Feed level of 5000-10000 ppm is toxic to birds, also it has human health significance because its residue are observed in liver and kidney of birds. In humans it causes nephrotoxicity.

**Sample**  
 ↓  
**Add 1-2 drops of 50% sulphuric acid for 1 minute**  
 ↓  
**Add 3 drops of Nessler's reagent**  
 ↓  
**Orange color indicates the presence of melamine.**

Fig8 Melamine spot test



**Soil/ sand silica/LSP:** It is added to soya doc to increase weight. It reduces nutrient value of the soya doc and may contain mineral/heavy metal contaminants. Addition of limestone powder (LSP) can increase digesta pH, increases feed calcium levels and reduce the nutrient digestibility.

QC test: Analysis of the Acid Insoluble Ash (AIA)%.



Fig9 Acid insoluble ash

**Hulls:** Soya hulls may be added which dilutes the nutrient levels (energy, amino acids) and increases the fibre content. Non starch polysaccharide content of hulls may cause increased digesta viscosity ultimately reducing the digestibility of different nutrients.

QC tests: Analysis of the crude fibre, neutral detergent fibre and acid detergent fibre %.



Fig10 Crude fibre

**Other cheaper raw materials:** Raw materials like guar meal, mustard seed doc, DORB and DDGS can be used as adulterants in soya DOC. Guar meal has similar protein content as that of soya DOC, it is high in NSP (mannans, gums). In case of mustard doc, ANF glucosinolates can reduce the iodine utilization in animals, also, because of poor palatability, feed intake may reduce. It may contain high

mycotoxin levels. DORB may be used as a diluent which may contain high aflatoxin levels and less digestible protein. DDGS may contain very high levels of mycotoxins. Maize DDGS contains high sulphur levels.

QC test: Physical examination, microscopy

**For DDGS:** the following test can be performed.

1. Take the whole sample (sample straight from truck or lot, without grinding)
2. Sieve the sample through laboratory standard sieve mesh size 20 (850 microns)
3. Observe the material which has passed through 20 mesh. If Corn DDGS is present, it will have characteristic strong smell to the powder.
4. Take 10 gm of this sieved powder and add distilled water to make the volume 100 ml. Take pH of this 10% suspension.
  - a. pH of soybean meal will be around 6.6 to 6.7
  - b. pH of 10% suspension of Corn DDGS will be around 5.0 to 5.1
  - c. If 1% Corn DDGS is mixed in soybean meal, the powder of sample passing through 20 mesh will show pH of 6.5 or lower.



Fig11 Soya DOC pH

**Under toasted or overtoasted soya doc:** Both over and under toasted soya doc because of the mistakes in processing, may be mixed with the normal soya doc by manufacturer. Tests are already discussed above.

### Conclusion

Soybean meal quality is affected by its processing methods and its adulterant content. Feed millers/Animal Nutritionist should check soybean meal quality before included in feed formulation. By performing the above tests one can choose quality soybean meal, thereby ensure the optimum bird's productivity and performance. Apart from stringent quality control measures, use of enzymes such as alpha-galactosidase, beta-mannanase and protease may help the nutritionist to alleviate adverse impacts of indigestible carbohydrates (NSP, OS) and TI.

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# The Significance of Additives in Fish Broodstock Nutrition

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## Abstract

The broodstock nutrition landscape has witnessed significant advancements, with additives emerging as pivotal agents in optimizing reproductive performance and offspring quality. Additives encompass a diverse array of substances, including vitamins, carotenoids, amino acids, probiotics, omega-3 fatty acids, and herbal feed supplements each contributing uniquely to broodstock health and fertility. The diverse role of additives in broodstock nutrition, highlighting their mechanisms of action and effects on essential physiological processes. By modulating hormonal balance, antioxidant defense mechanisms, and immune responses, additives exert profound effects on reproductive performance, mitigating stress and enhancing adaptability to environmental fluctuations. These additives play a pivotal role in shaping the nutritional profile of eggs and larvae, thereby influencing early developmental stages and subsequent progeny viability. This article provides a comprehensive overview of the role of additives in broodstock nutrition, emphasizing their potential to revolutionize aquaculture practices and ensure sustainable production of high-quality seeds. By leveraging the synergistic effects of additives, aquaculture stakeholders can unlock the full reproductive potential of broodstock, fostering growth and resilience in the face of evolving challenges.

## Introduction

Aquaculture is a practice that varies widely across the globe in terms of the variety of species with potential for culture. Diversification depends on captive broodstock in order to be successful. This includes closing parts or all of the life cycle, managing temperature and photoperiod, controlling the ratio of males to females, choosing the best broodstock in terms of embryo, sperm, and water quality, and choosing the best diet to maintain a healthy broodstock. Aquaculture enterprises aim to maximize the production of eggs consistently and under controlled conditions to meet their sales goals and operational requirements. Consequently, ongoing research endeavours within the field are primarily

directed towards refining the methods of rearing broodstock and facilitating spawning. A significant obstacle encountered in the reproduction of marine fish within aquaculture settings lies in obtaining viable gametes possessing the requisite attributes for nurturing robust larvae capable of enduring the developmental stages effectively.

## Importance of nutrition in Broodfish

Nutrition plays a critical role in broodfish, impacting reproduction, development, and larval survival. Adequate intake of essential nutrients, including proteins, fatty acids, vitamins, and minerals, is vital for optimal growth, reproductive success, and overall health. Proper nutrition ensures the accumulation of vital nutrients necessary for gonadal development and egg quality, ultimately influencing the quality and viability of offspring. Insufficient or imbalanced nutrition can lead to disruptions in reproductive processes, such as interrupted vitellogenesis and reduced fertility. Fish in the reproductive stage are highly influenced by nutrition, which is a crucial element that can limit reproduction, development, and larval survival. If there is a shortage of vital nutrients, the quality of the food fed to captive fish can impact gonadal development and reproductive rate. Similarly, development, egg viability, and larval survival are all impacted by the nutrients that are consumed.

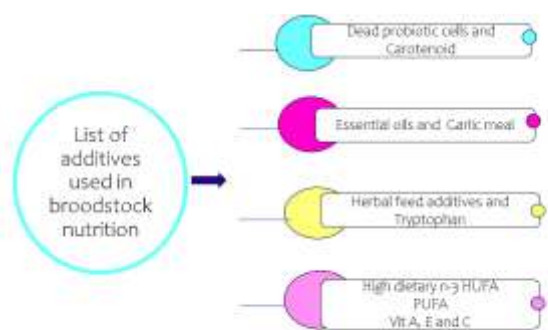


Fig.: Different additives used for fish broodstock nutrition

## Nutritional requirements for Broodfish

Broodfish have specific nutritional requirements essential for their reproductive health and the production of high-

quality offspring. Providing a balanced diet rich in proteins, lipids, vitamins, minerals, and essential fatty acids is crucial for optimizing reproductive performance and ensuring the production of healthy offspring in broodfish. Growth, reproduction, and other physiological processes are significantly impacted by the kind and degree of nutrients in fish feed. Different proteins, fatty acids, vitamins, and minerals are needed by these organisms in their various stages. Fresh or frozen foods such as fish and squid, as well as processed options like pellets, may contain essential macronutrients. However, there are instances where additional functional feed additives, including probiotics, prebiotics, fatty acids, amino acids, and vitamins, are necessary. The ability of fish to naturally obtain their optimal nutritional needs may be limited when they are confined within ponds or cages in the aquaculture industry. Therefore, it is vital to enhance their diets with proteins, lipids, vitamins, and inorganic components to foster robust growth and ensure survival, all while maintaining their developmental processes intact.



### Functional additives and Reproductive performance

The inclusion of functional supplements in traditional broodstock diets is meant to enhance offspring quality. A significant number of eggs of the best quality are required to allow the cultured organism to continue developing, the quality of the larvae and eggs is a crucial criterion in the aquaculture sector. The three primary factors taken into account while assessing the quality of progeny are hatching rate, survival, and egg viability. On the other hand, various indicators, such as egg morphometry, oil drop, the biochemical makeup of yolk reserves, and larval deformities, can be used to determine the quality of an embryo during its development or during the vitelline larval stage.

### Dead probiotic cells as immune stimulants and growth promoting additives

Probiotics are beneficial microorganisms that enhance the microbiota of the gastrointestinal tract of their host. The probiotic may include immunostimulant-acting compounds or fractions of dead bacterial cells. Despite challenges related to feed handling, processing, and storage, which may

compromise the viability of bacteria, incorporating viable probiotics into diets for broodstock species can be challenging. As a result, recent research has focused on non-viable probiotic formulations. For example, the inclusion of heat-killed and lysed cells in fish feed formulations has demonstrated positive effects on immunostimulant, leading to improved spawning quality and favourable hatching rates.

### Essential oils in diet

Essential oils play a crucial role in fish broodstock nutrition by enhancing liver protein levels and hepatosomatic index in females without compromising overall performance. They improve digestive system function, promoting growth vital for broodstock development, thus serving as essential management tools in the early stages of fish farming. Increased levels of essential oils have been associated with elevated crude protein levels in the livers of female fish. There is a correlation between essential oil supplementation and the hepatosomatic index of female fish. When Nile tilapia broodstock are fed meals containing an essential oil component like SALUTO®, the females exhibit changes, resulting in higher liver protein inclusion and hepatosomatic index without compromising overall performance. Propolis has been effectively used for Nile Tilapia, while garlic extract has shown benefits for Silver Catfish (*Rhamdia quelen*). The use of essential oils in fish diets can enhance digestive system function, leading to improved performance. These compounds achieve this by stimulating the release of digestive enzymes, delaying stomach emptying, accelerating glucose absorption in the intestines, and hindering pathogen adherence to intestinal mucosa. Since optimal growth is crucial for broodstock development, especially in the early stages of fish farming, employing additives that promote maximum growth becomes a vital management strategy during broodstock generation.

### Garlic meal as a natural additive

Garlic meal is essential in fish broodstock nutrition due to its beneficial effects on reproductive performance and immune system enhancement. Its inclusion in diets can improve spawning quality, increase egg production, and enhance larval survival, contributing to the overall health and productivity of broodstock populations. In Silver Catfish (*Rhamdia quelen*), incorporation of Garlic meal improved digestive system function and overall health, contributing to optimal broodstock development and subsequent progeny viability.

Garlic meal has great nutritional value this is abundant in phosphorus, calcium, and carbohydrates. It contains a variety of significant substances, including silicate, iodine salts, and sulphur salts, all of which improve the health of the skeletal system, disorders of the liver, and circulatory system. It also contains a variety of vitamins, including linoleic acid, vitamins A, B complex, and C. Garlic also has immune-



stimulating, antifungal, antioxidant, antiviral, antibacterial, and antiparasitic properties when incorporated in broodstock diet.

### Role of herbal feed additives

The antioxidants and phytochemicals present in medicinal plants' leaves, roots, and seeds can enhance sperm movement, number, and shape. Studies have been conducted on how feeding *Clarias gariepinus*, *Prunus amygdalus dulcis* affects sperm concentration, motility percentage, milt volume, and motility duration, revealing insights into sperm quality. Several studies have shown that *Mucuna pruriens* seed extracts improve animal reproductive performance. Benefits include enhanced sperm motility and reproductive performance in *Clarias gariepinus*, increased GSI (Gonadosomatic index), fertilization, and hatching rates in *Etroplus suratensis*. Broodstock treated with an herbal maturation diet containing *Mucuna pruriens*, *Withania somnifera*, and *Moringa oleifera* (in a ratio of 150:300:150 mg kg<sup>-1</sup>) exhibited these positive effects. *Penaeus monodon* received a bioencapsulated *Artemia* diet along with an herbal maturation diet containing *Withania somnifera*, *Mucuna pruriens*, *Ferula asafoetida*, and *Piper longum* resulted in a shortened intermolt period, a 42% increase in fertility, and a 38% increase in gonad weight.

### Importance of vitamin E

In aquaculture, vitamin E supplementation in feed enhances growth, disease resistance, and survival rates. Vitamin E deficiency impairs reproduction, causing underdeveloped gonads, reduced hatching rates, and lower offspring survival, mirroring effects observed in larger vertebrates. In a study investigating the influence of growth hormone and vitamin E on gonadal maturity in common carp (*Cyprinus carpio*), dietary vitamin E resulted in larger ova, increased egg quantity with improved hatchability, and a higher gonadosomatic index compared to the control group. Additionally, fish fed a vitamin E-deficient diet only partially completed spawning, whereas those receiving vitamin E supplementation completed the process. As fish cannot produce vitamin E internally, the maternal food composition plays a crucial role in determining reproductive fitness before oogenesis. Vitamin E is indispensable for fish fertility and reproduction. The nutritional status of broodstock can influence the quality of offspring. Nutrient reserves in the mother, determined by her dietary intake leading up to gonadogenesis, impact the accumulation of vital nutrients like vitamins and essential fatty acids. Inadequate food or vitamin intake in goldfish (*Carassius auratus*) may disrupt vitellogenesis, lead to oocyte resorption, and reduce fertility.

### Observed effects of additives used in broodstock nutrition

The effects of additives in fish broodstock nutrition have been

observed to include improved reproductive performance, enhanced offspring quality, increased fertility rates, and better survival of larvae. It may contribute to hormonal balance, antioxidant defense mechanisms, and immune responses, mitigating stress and promoting adaptability to environmental changes.

- Additives like vitamins, amino acids, and probiotics have been shown to improve reproductive outcomes, including increased egg production, higher hatch rates, and improved larval survival.
- Certain additives such as vitamins, probiotics, prebiotics and herbal extracts contribute to the overall health of broodstock, resulting in the production of healthier offspring with better growth rates and disease resistance.
- Additives such as vitamins and omega-3 fatty acids may play a role in modulating hormonal balance, which is crucial for successful spawning and reproduction in broodstock.
- Some additives such as herbal extracts, vitamin c and omega -3 fatty acids have stress-reducing properties, helping broodstock cope with environmental stressors and optimizing their reproductive potential.
- Additives such as Garlic meals, probiotics and prebiotics can enhance nutrient absorption and utilization, ensuring that broodstock receive adequate nutrition to support optimal reproductive function.

Overall, the observed effects of additives in fish broodstock nutrition highlight their importance in promoting reproductive success and ensuring the production of high-quality offspring in aquaculture.

### Conclusion

In conclusion, advancements in broodstock nutrition have highlighted the pivotal role of additives in optimizing reproductive performance and offspring quality. From vitamins to herbal supplements, additives contribute to broodstock health and fertility, shaping the nutritional profile of eggs and larvae. They modulate physiological processes, enhance stress resilience, and improve nutrient absorption, revolutionizing aquaculture practices for sustainable high-quality seed production.

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# Prospect of Nutraceutical towards Promoting Health in Humans and Animals

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The term "nutraceutical" was coined by Stephen De Felice by combining "nutrition" and "pharmaceutical." He defined nutraceutical as "a food or a part of food" that provides medical or health benefits, including the prevention and/or treatment of a disease. Nutraceuticals are beneficial health products obtained from various industries such as food, herbal, and pharmaceutical manufacturing. These products have been associated with treating many disorders such as cancer, metabolic problems, cold and cough, diabetes, arthritis, osteoporosis, blood pressure, cholesterol control, pain relief, depression, sleeping disorders, coronary heart disease, delayed gastrointestinal emptying, and more conditions that require special care. The nutraceutical market has been developed from past few years due to growing attention of researchers and sophisticated techniques for determination of qualitative and quantitative parameters.

The Indian nutraceutical market segment has undergone annual growth at 20% rate for past 3 years which contributes to 2% of global market. Currently, India is in the category of showing promising drift toward nutraceuticals also known as Fast Moving Health Care Goods. The greatest scientific need pertains to standardization of the nutraceutical compounds or products carefully develop and execute clinical studies to provide the basis for health claims to produce an impact on the consumers as well as on the nutraceutical companies. As per Hippocrates (460-377 BC), the well-recognized father of modern medicine, stated "Let food be thy medicine and medicine be thy food" to predict the relationship between appropriate foods for health and their therapeutic benefits.

## Importance of nutraceuticals

- ✓ Help us to avoid particular medical conditions
- ✓ Helps to increase the longevity
- ✓ Increase the health value of our diet
- ✓ It can be administered with a view to restoring, correcting or modifying physiological functions in living beings
- ✓ May present food for populations with special needs (nutrient-dense foods for the elderly)
- ✓ Nutraceuticals not only supplement the diet but also aid in the prevention and/or treatment of disease and/or disorder, For example, glucosamine and chondroitin are used to manage arthritis in pets.
- ✓ Perceived to be more natural than traditional medicine and less likely to produce unpleasant side-effects
- ✓ Use as a conventional food or as the sole item of meal or diet
- ✓ Used for the prevention, treatment or cure of a condition or disease
- ✓ Improve the nutritional quality of animal feed, leading to better growth rates, reproductive performance, and overall health in livestock and pets.
- ✓ Tryptophan or omega-3 fatty acids, can have calming effects and improve behavior in animals, particularly in pets with anxiety or hyperactivity.

## Classification of nutraceuticals

Microbes	Polyunsaturated fatty acids	Dietary fibre	Antioxidant Vitamins	Antioxidant Minerals	Carotenoids	Polyphenols
Probiotics	Omega-3 fatty acids	Insoluble dietary fibre	Vitamins- C	Se	β-Carotene	Flavonols
Prebiotics	Omega-6- fatty acids	Soluble dietary fibre	Vitamins- E	Cu	Lycopene	Flavonones
Synbiotics				Zn	Lutein	Coumarins
Postbiotic					Zeaxanthin	Isoflavones
						Anthrocynins



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### A. PROBIOTICS

Probiotics are living microbial feed supplement, which when administered in adequate amounts beneficially affects the host animal by improving its intestinal microbial balance. Probiotics generally include the following categories of bacterial like:

- ✓ *Lactobacilli* such as *L. acidophilus*, *L. casei*, *L. delbrueckii subsp. bulgaricus*, *L. brevis*, *L. cellobiosus*
- ✓ Gram-positive cocci such as *Lactococcus lactis*, *Streptococcus salivarius subsp. thermophilus*, *Enterococcus faecium*
- ✓ Bifidobacteria such as *B. bifidum*, *B. adolescentis*, *B. infantis*, *B. longum*, *B. thermophilum*

Probiotics are available in various forms as powder, liquid, gel or paste or granule, capsule forms etc. Probiotic agents possess the properties of non-pathogenic, non-toxic, resistance to gastric acid, adherence to gut epithelial tissues producing antibacterial substances. Specific probiotics are generally used to treat gastrointestinal conditions such as cholesterol reduction, lactose intolerance, acute diarrhea/gastroenteritis, irritable bowel syndrome and antibiotic associated gastro-intestinal side effects. There are evidences that administration of probiotics decreases the risk of systemic conditions, such as allergy, asthma, cancer and several other infections of the ear and urinary tract.

### B. PREBIOTICS

Prebiotics are dietary ingredients that are non-digestible but fermentable oligosaccharides that are specifically designed to change the composition and activity of the gut microbiota with prospect to promote the health of the host. Vegetables like chicory roots, banana, tomato, alliums are rich in fructo-oligosaccharides. Some other oligosaccharides are raffinose and stachyose, found in beans and peas. The prebiotic consumption generally promotes the *Lactobacillus* and *Bifidobacterial* growth in the gut, thus helping in metabolism.

#### Health benefits

- ✓ Improved lactose tolerance
- ✓ Antitumor properties
- ✓ Neutralization of toxins and stimulation of intestinal immune system
- ✓ Reduction of constipation, blood lipids and blood cholesterol levels

Consumption of large amounts of such oligosaccharides causes diarrhea, abdominal distension and flatulence.

### C. SYNBIOTICS

It is a fusion of probiotics and prebiotics products and helps

in enhancing the survival and the implantation of live microbial dietary supplements in the gut. It improved the survival of probiotics during passage through upper gastrointestinal tract (*Bifidobacteria* and fructo-oligosaccharides). The synergistic benefits are more efficiently promoted when both the probiotic and prebiotic work together in the living system. The symbiotic relationship between prebiotics and probiotics contributes significantly to health. Commercial interest in functional foods containing synbiotics has consistently increased due to the awareness of the benefits for gut health, disease prevention and therapy.

Commonly used synbiotic (Probiotics + Prebiotics) compositions are:

- ✓ Lactulose + *Bifidobacteria lactis*, *Lactobacillus acidophilus*
- ✓ Galacto-oligosaccharides + *Bifidobacterium longum*
- ✓ Fructo-oligosaccharides + *Bifidobacterium bifidum*, *B. lactis*
- ✓ Inulin + *Bifidobacterium animalis*, *Lactobacillus acidophilus*
- ✓ Fructo-oligosaccharides + *Bifidobacteria bifidum*, *Bacteroides fragilis*

### D. POLYUNSATURATED FATTY ACIDS (PUFA)

PUFAs are also called “essential fatty acids” as these are crucial to the body’s function and are introduced externally through the diet. PUFAs have two subdivisions: omega-3-(n-3) fatty acids and omega-6-(n-6) fatty acids. The major omega-3-fatty acids are  $\alpha$ -linolenic acid (ALA), eicosapentanoic acid (EPA), docosahexanoic acid (DHA). EPA and DHA are found mainly in fatty fishes such as mackerel, salmon, herring, trout, blue fin tuna and in fish-oils. Principal sources of ALA are mainly flaxseed, soybeans, canola, some nuts (walnuts) and red/blackcurrant seeds. The omega-3-fatty acids have major effects in cardiovascular diseases as anti-arrhythmic (preventing or alleviating irregularities in the force or rhythm of the heart), hypolipidemic (promoting the reduction of lipid concentrations in the serum), antithrombotic (decreased arteriosclerosis), asthma, bipolar and depressive disorders, dysmenorrhea and diabetes.

Omega-6- PUFAs mainly consist of linoleic acid (LA),  $\gamma$ -linolenic acid (GLA) and arachidonic acid (ARA). LA occurs mainly in vegetable oils like corn, safflower, soyabean and

sunflower. ARA is found in animal products such as meat, poultry and eggs. Omega 6 fatty acids are necessary for normal immune function and clotting, too much omega 6 fatty acid may promote abnormal clotting and an overactive immune system. Balance of omega-3 and 6 is key for normal immune function. Many health issues depend on a proper balance of omega 3 and omega 6 fatty acids. Modern diets usually have up to 20 times more omega 6 fatty acids than omega 3 fatty acids. Many of the chronic degenerative diseases we experience today are believed to have their origins in an imbalance of omega 3 and omega 6 fatty acids in our diet. This necessitates that n-3 and n-6 be consumed in a balanced proportion. The healthy ratios of n-6: n-3 range from 1:1 to 4:1.

### E. DIETARY FIBRE

Dietary fibre is the plant material that is not hydrolyzed by enzymes secreted by the digestive tract, but digested by microflora in the gut. Dietary fibres mostly include non-starch polysaccharides (NSP) such as celluloses, hemicelluloses, gums and pectins, lignin, resistant dextrins and resistant starches. Foods rich in soluble fibre include fruits, oats, barley and beans.

Based on their water solubility, dietary fibres may be divided into two forms

- ✓ **Insoluble dietary fibre (IDF):** Which includes celluloses, some hemicelluloses and lignins which is fermented to a limited extent in the colon.
- ✓ **Soluble dietary fibre (SDF):** Which includes  $\beta$  - glucans, pectins, gums, mucilages and hemicelluloses that are fermented in the colon.

The soluble components of dietary fibre by virtue of their bulking and viscosity producing capabilities, retards the gastric emptying of the stomach. This affects the rate of digestion and the uptake of nutrients and creates a feeling of satiety. In colon, dietary fibre increases faecal bulking due to increased water retention, increased transit time and increased faecal bacterial mass caused by soluble fibre fermentation. The fibre also promotes the growth of Bifidobacteria in the gut (especially fructo-oligosaccharides).

Soluble fibre has been shown to lower serum LDL, cholesterol and to improve glucose tolerance. Soluble fibre also enhances insulin receptor binding and improves

glycaemic response. The intake of high fibre food improves serum lipoprotein values, lowers blood pressure level, improves blood glucose control for diabetes, obesity, constipation and enhance the immunity in humans. The consumption of excessive amounts of dietary fibre may causes diarrhea. Dietary fibre may reduce absorption of vitamins, minerals, proteins.

### F. ANTIOXIDANT VITAMINS

Vitamins like vitamin C and vitamin E are collectively known as antioxidant vitamins. Vitamin E and selenium has a synergistic role against lipid peroxidation. These vitamins are abundant in many fruits and vegetables and exert their protective action by free-radical scavenging mechanisms.

#### Vitamin C

Vitamin C is water soluble and better known as ascorbic acid, it donate hydrogen atom to lipid radicals, quenches singlet oxygen radical and removes molecular oxygen. Scavenging of aqueous radicals by the synergistic effect of ascorbic acid along with tocopherol supplementation is a well known antioxidant mechanism. Bodily concentrations are maintained through consumption of vitamin C, as animals and humans cannot synthesize ascorbic acid de novo. Food sources containing the highest concentrations of vitamin C are awala, raw red and green peppers, oranges, grapefruits, kiwifruit, broccoli, strawberries, and Brussels sprouts.

Studies have shown that oral vitamin C supplementation leads to an increase in its plasma and skin content. Oxidation of vitamin C produces dehydroxy ascorbic acid, which is shifted into our cells via glucose transporters and then reduced back to ascorbic acid for cellular use. Vitamin C is a powerful antioxidant and free radical scavenger that protects our tissues, cell membranes, and DNA from oxidative damage. It also serves as an essential cofactor and electron donor during collagen hydroxylation, encouraging the maturation of intracellular and extracellular collagen. Vitamin C has been shown to reduce UV-induced oxidative damage and skin neoplasms and protect keratinocytes from UVA-induced lipid peroxidation. Vitamin C also decreases the malondialdehyde content in the skin, which is a marker of oxidative stress.

#### Vitamin E

Vitamin E is a group of fat-soluble compounds. Naturally

occurring oral sources of vitamin E are found in highest concentrations in plant seeds such as sunflower seeds, peanuts, almonds, walnuts, pecans, pistachios and sesame seeds and in lesser amounts in fruits and vegetables. The most abundant and biologically active form of vitamin E, alpha-tocopherol is the leading form used in metabolism. Alpha-tocopherol is also believed to be photoprotective as multiple studies have shown that its combination with vitamin C supplementation increases the minimal erythema dose. It protects the skin from UV damage by halting the formation of ROS, scavenging free radicals, stabilizing the surface and membranes of cells, reducing the number of apoptotic cells, and minimizing the activation of nuclear factor kappa B.

UV light reduces the skin's concentration of alpha-tocopherol, promoting skin aging. The tocopherols together with tocotrienols transfer hydrogen atom and scavenge singlet oxygen and other reactive species thus protecting the peroxidation of PUFA within the biological membrane and LDL. Tocotrienols are more mobile within the biological membrane than tocopherols because of the presence of the unsaturated side-chain and hence penetrate tissues with saturated fatty layers (i.e. in brain and liver more efficiently). They have more recycling ability and are a better inhibitor of liver oxidation. No adverse effects have been reported from consuming vitamin E in food. However, hemorrhage and altered blood coagulation were reported in animals who consumed supplements containing high doses of alpha-tocopherol.

## G. ANTIOXIDANT MINERALS

### *Selenium*

It is an essential trace element that is involved in the defense against the toxicity of ROS, the regulation of the redox state of cells and in the regulation of thyroid hormone metabolism. Brazil nuts are the richest known source of selenium.

- ✓ Acts as antioxidant in the form of selenoproteins or selenoenzymes such as glutathione peroxidase, thioredoxin reductase.
- ✓ Glutathione peroxidase plays a significant role in protecting cells against oxidative damage from reactive oxygen species and reactive nitrogen species (RNS), which include superoxide, hydrogen peroxide, hydroxyl radicals and nitric oxide and peroxynitrite.

The pentose phosphate pathway assists glutathione peroxidase, an enzyme that contains selenium as the trace element, in protecting erythrocytes against haemolysis.

- ✓ Selenoenzymes may prevent the formation of oxidized LDL and hence reduce the incidence of heart diseases. Its deficiency has caused serious health effects, a potentially fatal form of cardiomyopathy.
- ✓ Act as a chemoprevention agent reducing oxidative stress, limiting DNA damage, inducing apoptosis, cell-cycle arrest. Epidemiological studies have increasingly indicated an inverse relationship between Se status and cancer risks in human populations.
- ✓ Increasing the activity of natural killer (NK) cells, the production of interferon  $\gamma$ , and stimulating vaccine-induced immunity to boost immune system
- ✓ Prevent impairment of thyroid immunity with involving the action of glutathione peroxidase and thioredoxin reductase thereby removing ROS and excess H<sub>2</sub>O<sub>2</sub> produced by thyrocytes during thyroid hormone synthesis.
- ✓ High blood levels of selenium may lead to a condition called selenosis which has symptoms like gastrointestinal upsets, hair loss, white blotchy nails fatigue, garlic breath odour, irritability and mild nerve damage.

### **Copper**

Copper serves as an important cofactor in enzymatic reactions during collagen crosslinking with lysyl oxidase and skin pigmentation with tyrosinase. Dietary copper is found in highest concentration in nuts, seeds, seafood, meat, and grains. Copper promotes keratinocyte and fibroblast proliferation leading to skin rejuvenation and wound repair through its collagen crosslinking properties. Copper has been used in topical treatments for wound healing to promote repair of damaged skin because of its anti-inflammatory and anti-bacterial effects.

### **Zinc**

Zinc is an essential mineral found naturally in whole grains, red meat, seafood, and fortified in products such as cereal. Zinc is found in highest dietary concentrations in foods such



as non-milled whole grains, red meats and seafood. Zinc is an important cofactor for cellular activity and defense. It protects against lipid peroxidation, UV-induced cytotoxicity, and oxidative stress induced by ROS made and distributed within the cytosol by macrophages.

The majority of the skin's zinc stores are found in the epidermis, where it is a necessary element for epidermal proliferation and keratinocyte differentiation. Zinc plays a major role in wound healing and keratinocyte cell survival. It is also anti-inflammatory by hindering intercellular adhesion molecule 1, a pro-inflammatory marker of keratinocytes and decreasing the production of nitric oxide.

## H. CAROTENOIDS

Carotenoids are a family of over 600 fat-soluble plant pigments. They are potent reactive oxygen species scavengers, protecting the skin from oxidative stress. Humans and animals cannot synthesize carotenoids, so they must obtain them via ingestion of foods or supplements. Skin concentrations of carotenoids increase with ingestion of the components, but decrease with oxidative stress and UV exposure. There are four of the major dietary carotenoids:  $\beta$ -carotene, lycopene, lutein, and zeaxanthin.

### $\beta$ -Carotene

It is a precursor to vitamin A. It protects cells from damage by inhibiting free radical and singlet oxygen-induced lipid peroxidation. It also has photoprotective properties, which increase the minimal erythema dose, and protects against sunburn development and photo-suppression of the immune system. Foods rich in  $\beta$ -carotene are green leafy vegetables, orange root vegetables, and yellow or orange fruits.

### *Lutein and Zeaxanthin*

Lutein and zeaxanthin are the two primary xanthophyll carotenoids in the retina and are generally thought to promote eye health. In both the skin and eyes, these carotenoids work as a filler to block damaging blue wavelengths and as antioxidants to prevent free radical damage. It protects keratinocytes from UV radiation-induced photo aging, stop extracellular matrix degradation by inhibiting matrix metalloproteinase and decrease lipid peroxidation in the skin. These skin effects can be seen with lutein and zeaxanthin oral supplementation, topical

application or both simultaneously for enhanced benefit. Humans and animals are unable to produce lutein or zeaxanthin, so they must be obtained exogenously. Both are found in highest concentration in green leafy vegetables, but are found in a more bioavailable form in eggs.

### *Lycopene*

Lycopene has no vitamin A activity, but is considered the best singlet oxygen quencher in the carotenoid family. Foods rich in lycopene are tomatoes, pink grapefruit and watermelon. Tomato paste high in lycopene, significantly lowers UV induced erythema and decreases MMP-1 activity, an enzyme involved in the breakdown of collagen. Lycopene have shown its ability to inhibit proliferation of several types of cancer cells via cell-cycle arrest and induction of apoptosis. There is also a significant correlation between higher skin concentrations of lycopene and a decrease in skin roughness..

## I. POLYPHENOLS

Polyphenols form a large group of phytochemicals, which are produced by plants as secondary metabolites to protect them from photosynthetic stress and reactive oxygen species. There are approximately 8,000 different classes of polyphenols, the most important being flavonols, flavones, flavan-3-ols, flavanones and anthocyanins. Dietary polyphenols can affect numerous cellular processes like gene expression, apoptosis, platelet aggregation, intercellular signaling that can have anti-carcinogenic and anti-atherogenic implications. Polyphenols are mostly acknowledged for their antioxidant activities on the basis of their structural chemistry. Polyphenols have been shown to be more effective antioxidants in vitro than vitamin E and C on a molar basis. Bioavailability of polyphenols is an important factor determining their biological activity. This depends on the chemical properties of polyphenol, conjugation and reconjugation in the intestines, intestinal absorption and enzymes available for metabolism.

Flavonoids modulate the expression of  $\gamma$ -glutamylcysteine synthetase an important rate-limiting enzyme involved in glutathione synthesis. Glutathione being important in redox regulation of transcription factors and enzymes for signal transduction, polyphenol mediated regulation of glutathione significantly alters cellular effects, as detoxification of xenobiotics, glutathionylation of proteins. Polyphenols also possess antioxidant, anti-inflammatory, anti-microbial,

anti-ageing, cardioprotective activities and play a role in the prevention of neurodegenerative diseases and diabetes mellitus.

#### ***Cardio-Protective Effect***

It has ability to amend the activity of an enzyme, nitric oxide synthase and its level and the bioavailability of nitric oxide for endothelium. Investigations revealed that endothelium-dependent relaxation has been seen by consumption of polyphenols. Coffee, cocoa, black tea and purple grape juice are all associated with the chronic or acute inhibition of platelet aggregation and activation.

#### ***Anticancer effects***

Polyphenols can interact with nutrients, reactive metabolites, activated carcinogens, and mutagens. It also can modulate the activity of key proteins involved in the control of cell cycle progression and influence the expression of many genes associated with cancer. There is strong enough evidence that polyphenols compounds found in tea, red wine, cocoa, fruits, fruit juices and olive oil influence the carcinogenesis and tumor development at the cellular level.

#### ***Anti diabetic effect***

Polyphenols may affect glycemia through different mechanisms. It helps in maintenance of the insulin secretion from  $\beta$  -cells. A high intake of phenolic contents has also been seen with the protection from oxidative damage. It reduce the activity of enzymes like  $\alpha$  -amylase and  $\alpha$  -glucosidase involved in the release of glucose in gastrointestinal tract from the starch and inhibition of glucose absorption in the gut or of its uptake by peripheral tissues. Onion polyphenols especially quercetin is known to possess strong anti diabetic activity. Quercetin significantly protected alterations in diabetic patients during oxidative stress along with lipid peroxidation and inhibition by antioxidant system.

#### ***Neuro-Protective Effects***

Oxidative stress and damage to brain macromolecules is an important process in neurodegenerative diseases. Alzheimer' s disease is one of the most common occurring neurodisorder. Polyphenols from fruits and vegetables seem to be invaluable potential agents in neuroprotection by virtue of their ability to influence and modulate several cellular processes such as signaling, proliferation, apoptosis, redox balance and differentiation.

#### ***Anti-Aging Effect***

Free radical/ oxidative stress theory is one of the most accepted one explaining the mechanism of aging. The combination of antioxidant/anti-inflammatory polyphenolic compounds found in fruits and vegetables may show efficacy as anti-aging compounds. Polyphenols are also beneficial in ameliorating the adverse effects of the aging on nervous system or brain. The flavonoids known as anthocyanins are particularly abundant in brightly colored fruits such as berry fruits and concord grapes and grape seeds. Anthocyanins are responsible for the colors in fruits and they have been shown to have potent antioxidant/anti-inflammatory activities as well as to inhibit lipid peroxidation and the inflammatory mediators cyclo-oxygenase (COX)-1 and -2.

Overall, nutraceuticals offer a promising approach to enhancing health and well-being in both humans and animals, with ongoing research and development crucial to unlocking their full potential.

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<sup>3</sup>Assistant Professor cum Junior Scientist, College of Veterinary Science & A.H., BAU, Ranchi, Jharkhand



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### 09-11 SOUTHERN DAIRY SUMMIT 2025

At Convention Centre, NIMHANS,  
Bengaluru -560 029  
Contact : Dr. K. S. Ramachandra  
Mobile: +91 9448132682  
Email:sds2025.organizingsecretary@gmail.com

### 15-16 SOUTH ASIA AGRI FORUM 2025

At Colombo, Sri Lanka  
Contact : Vijay Narasimhan  
Mobile: '91 9763877088  
Email: info@bsaf.in

### 18-20 BHARAT POULTRY EXPO 2025

At The Dome, Thakkar Estate, Lavae Nagar,  
Near City Centre Mall, Nashik  
Contact : B V Shiv Shankar  
Mobile: 9849368003, 9644233397  
Email: tezasvievents@gmail.com

### 28-30 IPPE 2025

At Georgia World Congress Center,  
285 Andrew Young International Blvd NW  
Atlanta, Georgia, USA  
Ph : +1 678 514 1976  
Email: ascuthorpe@ippexpo.org  
Website: www.ippexpo.org

## FEBRUARY 2025

### 08-10 PDFA INTERNATIONAL DAIRY & AGRI EXPO 2025

At Cattle Fair Ground, Jagraon,  
Distt. Ludhiana (Punjab)  
Contact: Jatinder Uppal  
Mobile : 084278 00484  
Email: expopdfa@gmail.com  
Website: www.pdfapunjab.com

### 11-14 11<sup>TH</sup> KOLKATA INTERNATIONAL POULTRY FAIR, 2025

At Biswa Bangla Exhibition Centre,  
Newtown, Rajarhat, Kolkata  
Contact: Madan Mohan Maity  
General Secretary - West Bengal Poultry  
Federation  
Convener - Kolkata International Poultry  
Fair, 2025  
Email: info.kipf@yahoo.com

### 19-20 FUTURE FOOD, LIVESTOCK & POULTRY EXPO (FLIP) 2025

At Nairobi, Kenya  
Contact: Mrigank Goel  
Strategic Partnerships & Communications  
E14-B, Sector 8, Noida 201301 - India  
Mobile: +91 8287082284  
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### 28-02 IPDL Expo 2025

At Karnal, Haryana  
Contact : Yogesh Kaushik  
Mobile: 9034366069  
Email: info@ipdlexpo.com

## MARCH 2025

### 12-14 VIV ASIA 2025

At Bangkok, Thailand  
Contact: Panadda Kongma  
Ph : +662 670 0900 Ext 204  
Email: panadda@vnuexhibitionsap.com  
Website: www.vivasia.nl

## MAY 2025

### 22-24 POULTRY EXPO 2025

At International Exhibition Centre,  
Bangalore  
Contact : Priya Goud, Media Day Marketing  
Mobile: 9052538612  
Email: team@mediaday.co.in



## JUNE 2025

### 25-27 LIVESTOCK VIETNAM 2025

At Saigon Exhibition and Convention Center (SECC),  
Ho Chi Minh City, Vietnam  
Contact : Shirley Abraham  
Mobile: +91 9840641101  
Email: shirley.ab@veas.com.vn

### 25-27 LIVESTOCK PHILIPPINES 2025

At World Trade Center Metro Manila, Philippines  
Contact : Ms. Apple Limbo  
Ph: +63 (2) 8581 1920  
Email: apple.limbo@informa.com

## JULY 2025

### 10-14 AGRI INTEX 2025

At CODISSIA Trade Fair Complex, Coimbatore  
Contact : Malati C Shekhar,  
Marketing Executive -Trade Fairs  
Mobile: 83449 22000  
Email: agriintex@codissia.com

## AUGUST 2025

### 27-29 LIVESTOCK MALAYSIA 2025

At Kuala Lumpur Convention Center, Kuala Lumpur, Malaysia  
Ph: +60 3 9771 2688  
Email: livestockmalaysia-my@informa.com

## SEPTEMBER 2025

### 16-18 SPACE 2025

Rennes in France  
Email: info@space.fr

## OCTOBER 2025

### 08-10 VIETSTOCK EXPO & FORUM

At Saigon Exhibition and Convention Center (SECC),  
Ho Chi Minh City, Vietnam  
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Email: vietstock@informa.com

### 23-25 AGRENA MIDDLE EAST

At EEC, New Cairo, Egypt  
Mobile : 8295733669  
Email: maarcservices@gmail.com

## NOVEMBER 2025

### 26-28 POULTRY INDIA 2025

At Hyderabad International Convention Centre  
HITEX Exhibition Centre, Izzat Nagar, Hyderabad - 500 084, A.P.  
Contact: Mr. Uday Singh Bayas  
President - IPEMA / Poultry India  
Mobile : 7997994331 / 7997994332  
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