

Livestock & Feed Trends



VOLUME - 17 • NUMBER - 1 • APRIL - JUNE 2019



CLFMA TECHNICAL SEMINARS

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के लिए सहायता करता है.



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3 रे सप्ताह से 6 महीने
की उम्र तक

- निरंतर विकास
- सेहत

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6 महीनों से गर्भधारणा
तक

- निरंतर विकास
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From the Chairman's Desk.....



Dear Friends,
Greetings!

The new financial year has really gotten off to a good start for CLFMA!

In the last three months, as we spread our wings out, we continue to significantly enhance our engagement with diverse stakeholders including government as well. Our policy advocacy efforts are on with improved liaison with the new leadership at the helm of affairs at the DADF. We are investing significant time and efforts to protect our industry's interests and in turn livelihoods of hundreds of millions of farmers. CLFMA successfully conducted three more technical Seminars in this quarter.

Following the success of technical seminar in Pune CLFMA extended similar event in Karnal recently under my leadership supported by PFI and Broiler Breeder Association North India. On 17th April 2019, at The Vivaan Resort, Karnal around 200 delegates from North India, Central India attended the Seminar. Dr. Devender Hooda, North Zone President of CLFMA & Dr. Sujit Kulkarni, Managing committee member of CLFMA and Convenor of program successfully conducted the Seminar. Dr. Sudheer Rukadikar, well known Poultry consultant, Dr. Ajay Deshpande, Poultry Entrepreneur & Dr. N.K. Mahajan, Dean of College of Dairy Science and Technology Hisar shared their technical presentations to the participants of the Seminar. It was really a good technical Seminar.

CLFMA of India organized Poultry seminar on 17th May 2019 at Nashik under my leadership. The Theme of this presentation was Recent Trends in Poultry Feed Formulation, Health & Welfare. Dr. Vijay Makhija Managing Committee of CLFMA under the guidance & support have, Chairman - CLFMA of India conducted this Seminar. Close to 140 participants attended this Seminar. I have introduced CLFMA and CLFMA's active role in developing Livestock Sector. Local industry leaders Shri. Udhav Ahire, Shri. Shrikrishna Gangurde & their team extended full-fledged support to CLFMA Poultry Seminar. Eminent Nutritionists Dr. S.V. Rama

Rao presented on the topic of Strategies for Feed Cost Savings. Renowned Avian Pathologist Dr. K.S. Prajapati shared solution for respiratory diseases for broilers & layers, Associate Dean of Mumbai Veterinary College Dr. Ajit Ranade shared very well the latest update on poultry welfare scenario.

FSSAI, FDA Bhawan, New Delhi scheduled a meeting to discuss consideration of animal feed under the ambit of FSS Act 2006 and way forward on 30th May, 2019 at 11:00 am. The Agenda was on Regulations including licensing and registration of animal feed, standards of animal feed, testing infrastructure for animal feed, inspection and third-party auditing agencies, monitoring of imported feed and any other issue. I had a detailed discussion on this with Director FSSAI, Mr. Anil Sharma. Mr. Divya Kumar Gulati and Mr. Suresh Deora has taken a lead and followed up with the team of experts.

The second meeting and third meeting conducted in connection with the updation of feed standards at Mumbai Veterinary College on 8th May, 2019 and on 6th June, 2019 at Pune. The meeting attended by Mr. Divya Gulati, Mr. Suresh Deora, Dr. Dinesh Bhosale, Dr. A. S. Ranade, Dr. P. N. Narkhede, Dr. R. S. Masali, Dr. Satyajit Jagtap & Dr. Pradeep Mahajan.

After successful completion of technical seminars at Pune, Karnal & Nashik, CLFMA organized fourth technical seminar on "Trends in Feed milling Technology, Nutrition and Disease Management in Poultry in Patna". On 12th June 2019 at Hotel Panache, Patna, the seminar was well attended by more than 150 progressive layer farmers, feed manufacturers, integrators and veterinary consultants of Patna and nearby areas. Dr. Saikat Saha, managing committee member of CLFMA, welcomed the guests and introduced speakers to the guests. Myself introduced about CLFMA and highlighted the recent activities of CLFMA for Indian Poultry industry. Dr. Rameshwar Singh, Vice Chancellor of Bihar Animal Sciences University briefed about Industry scenario & future prospectus for animal industry in state of Bihar. The central theme of the seminar feed milling & disease management was briefed by Dr. Saikat Saha. Dr. Sudheer Rukadikar, who is well known Poultry consultant & pathologist, Mr. Shrikrishna Gangurde, Poultry Entrepreneur & Dr. Ajit Ranade, Associate Dean, Mumbai Veterinary College shared their technical presentations to the participants. Mr. Divya Kumar Gulati, Secretary CLFMA, has given vote of thanks to the participants speakers & honourable members of Bihar Animal Sciences University. With this, CLFMA successfully conducted one more technical seminar at Patna.

Also, we would be grateful for your feedback or inputs anytime for our improvement.

Now, I would suggest your active participation by sponsoring our grand annual symposium, which is scheduled on 22-23 August 2019 in New Delhi and make the same successful.

With warm regards,

For CLFMA OF INDIA,

A handwritten signature in blue ink, which appears to read 'S.V. Bhawe', is written over a light blue rectangular stamp.

S. V. Bhawe
Chairman



05CHAIRMAN'S DESK

COMMODITY UPDATE.....

09



28

.....SEMINAR - KARNAL

SEMINAR - NASHIK

34



42

.....SEMINAR - PATNA

49NEW & VIEWS



54

..... POULTRY

POULTRY.....

55



59

..... POULTRY

DAIRY.....

68



72

.....CALENDAR OF EVENTS

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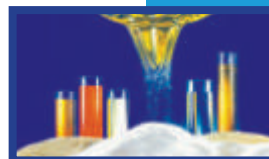
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Commodity Updates

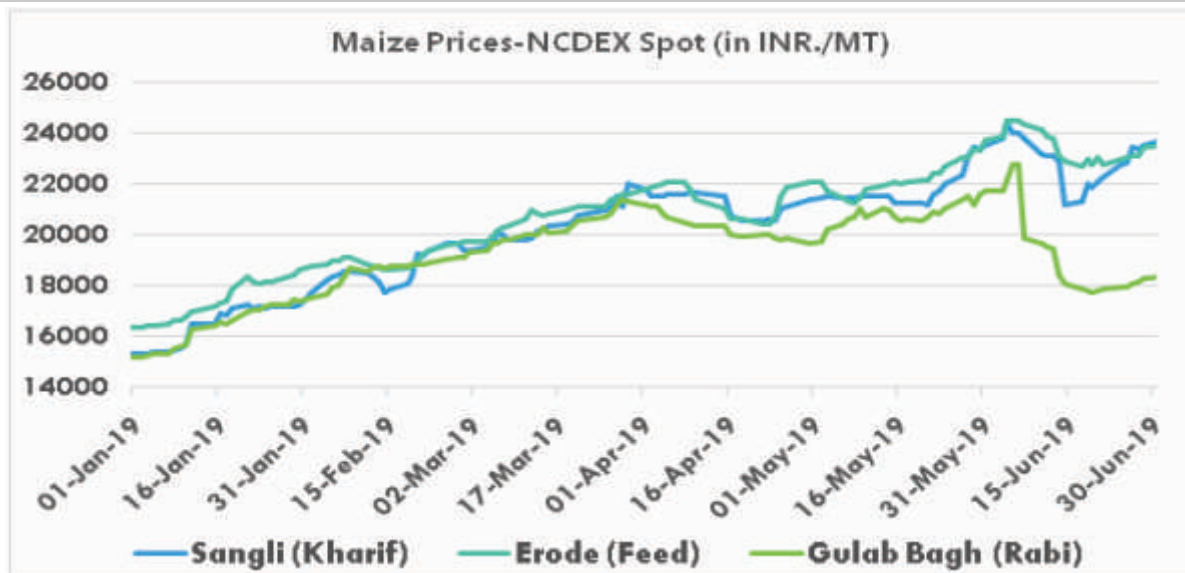


Index

1. [Domestic Prices](#)I. [Maize](#)II. [Soy meal](#)III. [Egg rates](#)IV. [Broiler rates](#)2. [Trade Details](#)3. [Market Updates](#)4. [Market Drivers](#)

Domestic Prices in INR/Qtl:
Maize NCDEX Spot Price (in INR/Qtl.):

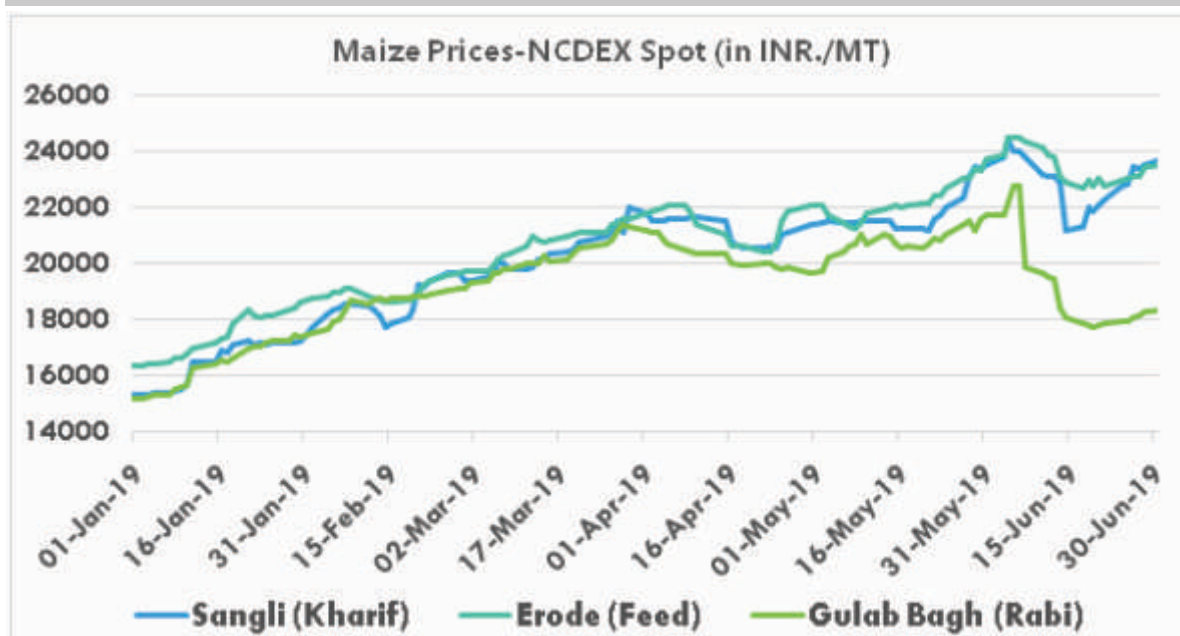
Location	28-06-2019	31-05-2019
Gulab Bagh	20200	18210
Sangli	24950	23300
Erode	24950	23720



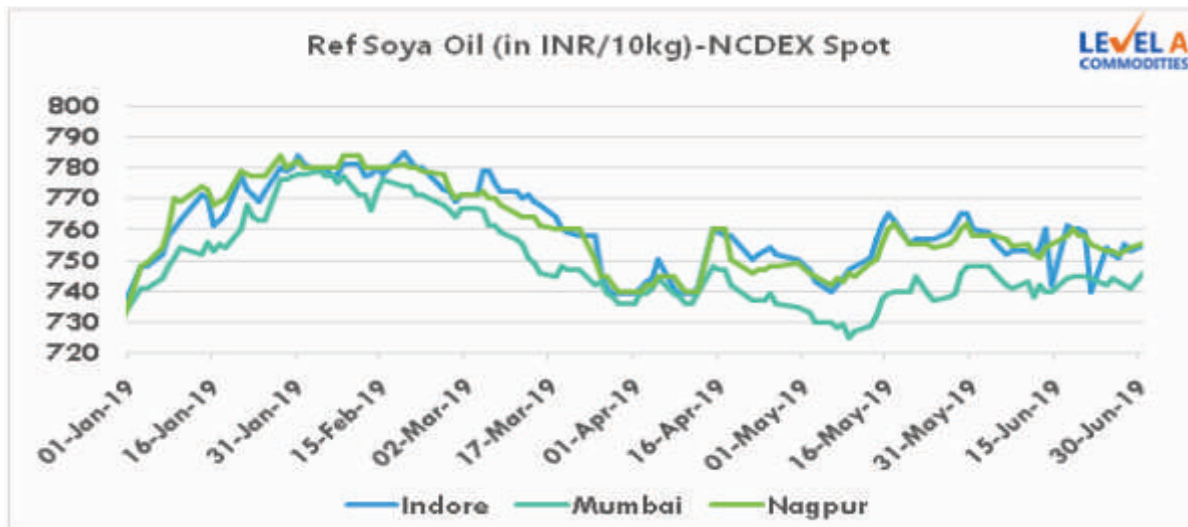
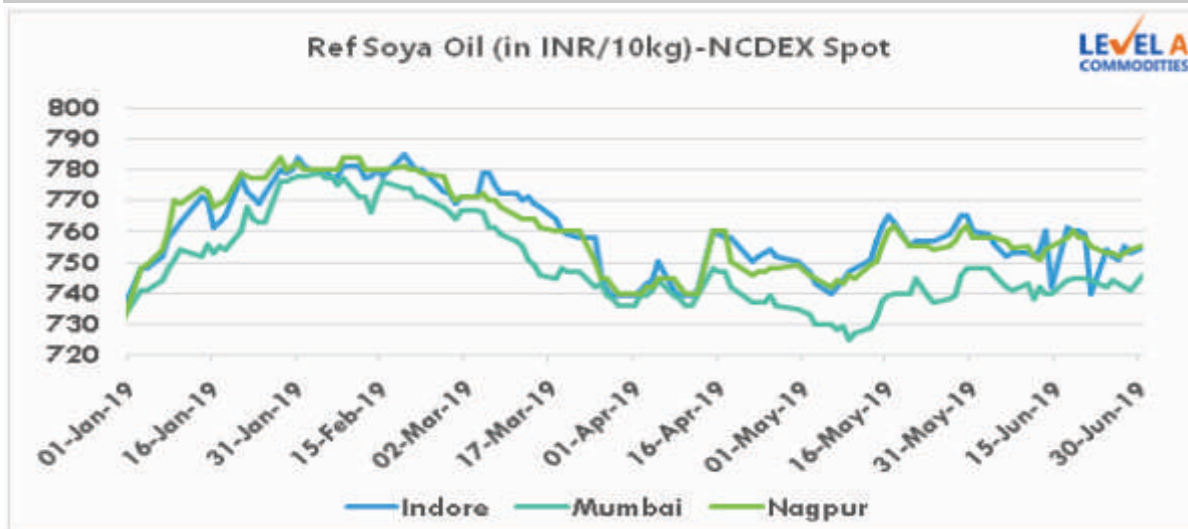
Soybean:
Soybean Complex Prices-NCDEX Spot:

Commodity (Unit)	Location	28-06-2019	31-05-2019
Degummed Soy oil (in INR/10kg)	Kandla	-	717
Ref Soya Oil (in INR/10kg)	Indore	753	760
	Mumbai	741	748
	Nagpur	754	758
Soymeal (in INR/MT)	Indore	30,883	31,550
Soybean Seed(in INR/Qtl)	Akola	3,688	3,700
	Indore	3,746	3,828
	Kota	3,700	3,913
	Nagpur	3,750	3,833

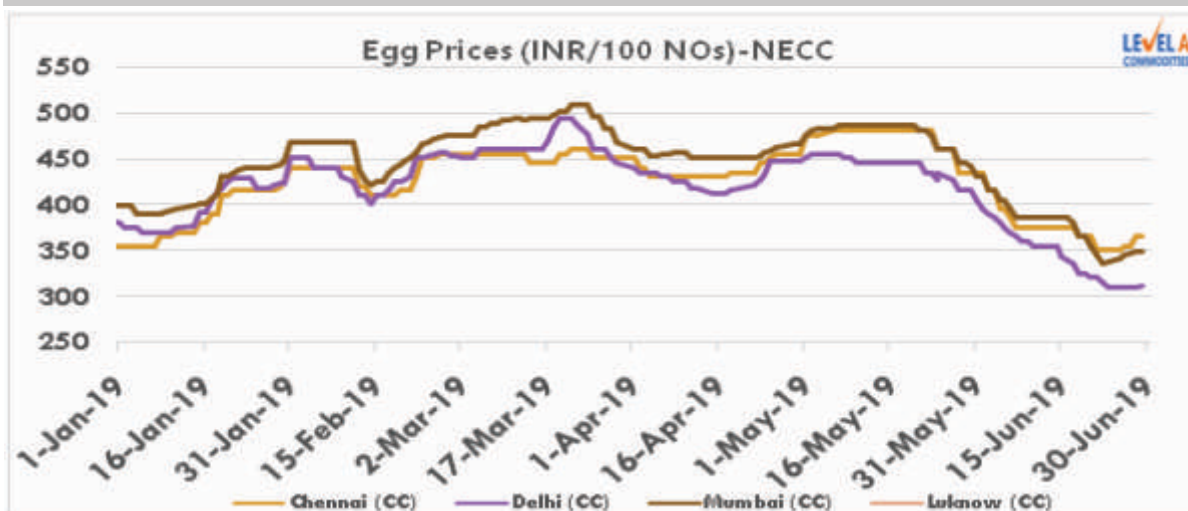
Soybean Seed



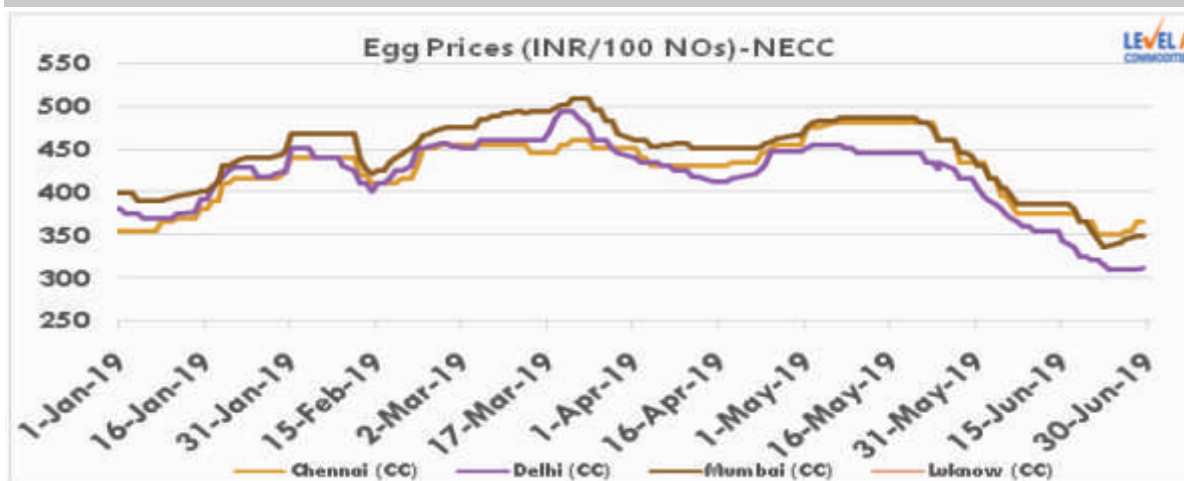
Soya Oil



Soymeal Prices-NCDEX Spot:



Egg Prices



Egg Rates

NECC Prices

Market	28-06-2019	31-05-2019
Ahmedabad	427	335
Ajmer	381	272
Banglore (CC)	445	345
Chennai (CC)	470	375
Chittoor	463	368
cochin	410	295
Delhi (CC)	390	295
E.Godavari	420	310
Hyderabad	415	305
Mumbai (CC)	472	360
Mysore	455	355
Nagpur	415	305
Namakkal	455	370
Pune	465	340
Punjab	370	285
Vijayawada	420	310
Vizag	435	310
West Godavari	420	310
Warangal	418	308



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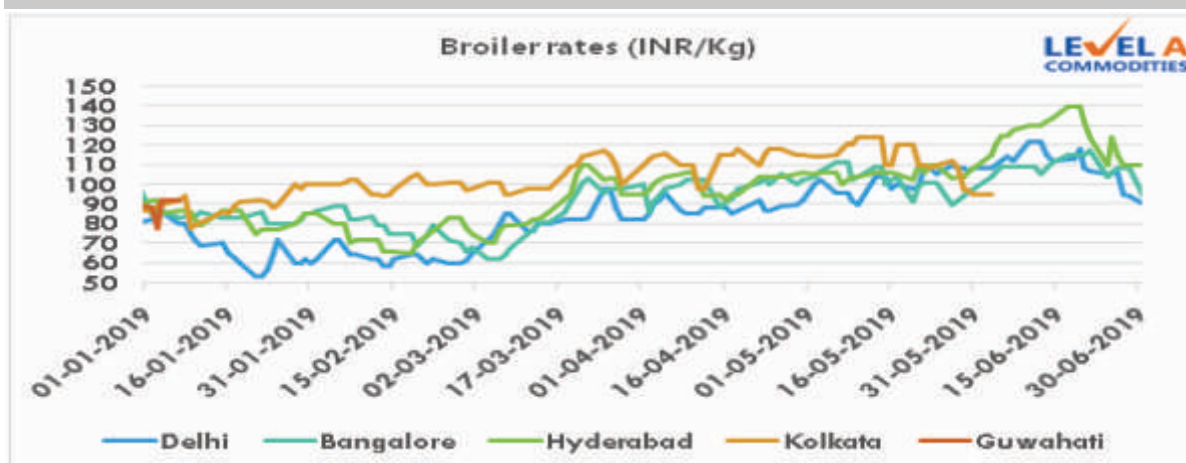
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Prevailing Prices

Market	28-06-19	31-05-2019
Allahabad (CC)	409	324
Barwala	375	276
Bhopal	407	315
Hospet	410	310
Jabalpur	420	315
Kanpur (CC)	381	305
Kolkata (CC)	453	350
Lucknow (CC)	417	333
Raipur	425	330
Varanasi (CC)	427	343

Broiler Rates



Broiler rates (INR/Kg)

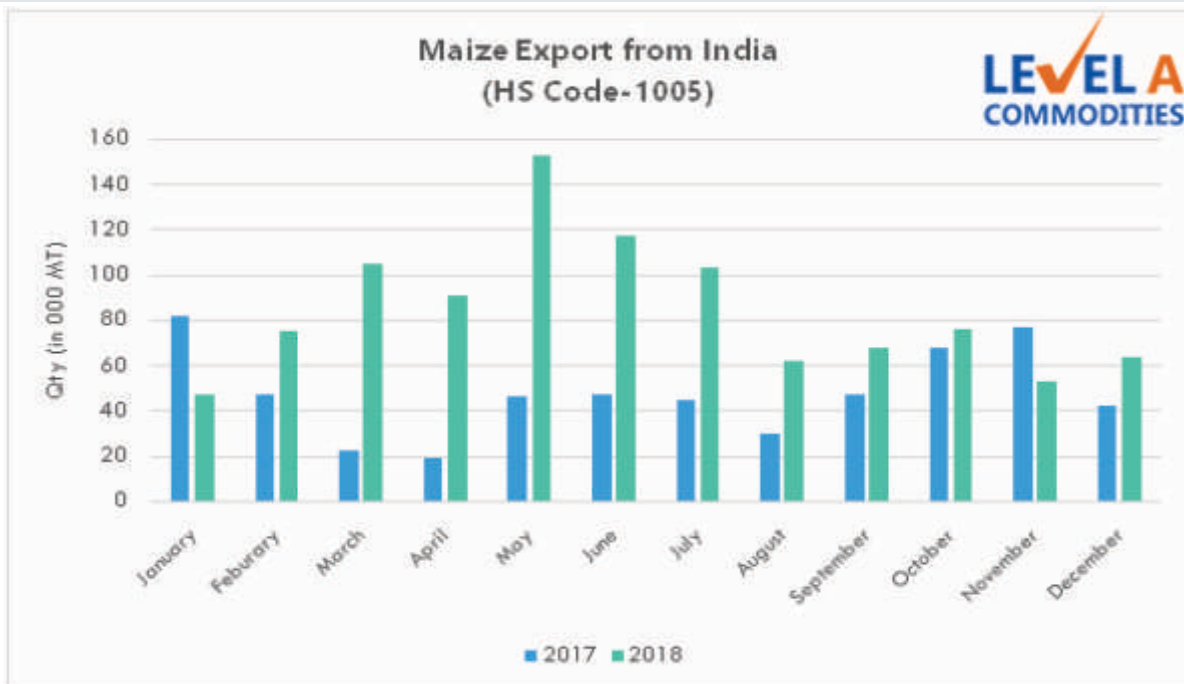
Market	28-06-2019	31-05-2019
Delhi	94	108
Punjab	88	98
Raipur	106	81
Pune	100	89
Bangalore	108	98
Hyderabad	108	106
Gujarat	110	108
Kolkata	105	92
Lucknow	-	95
Guwahati	102	103

Chicks Price (INR/Unit)

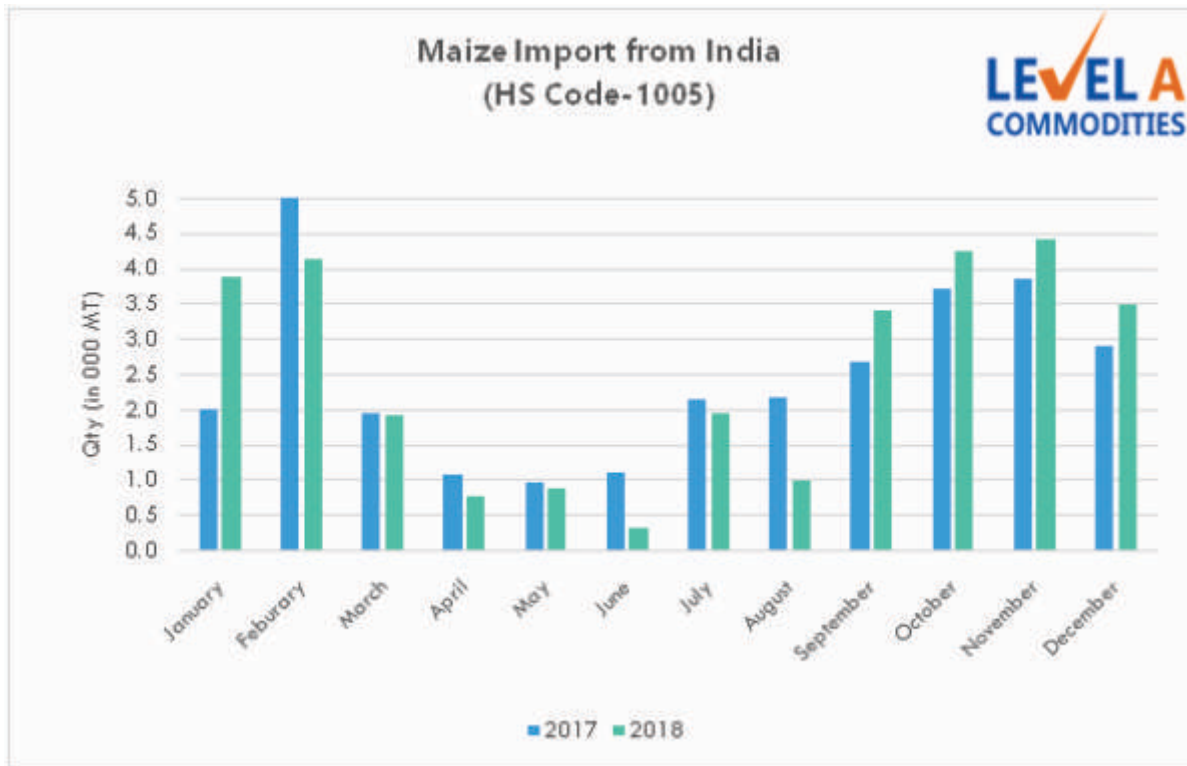
Market	28-06-2019	31-05-2019
Punjab	14	37
Chandigarh	14	37
Haryana	14	36
Himachal Pradesh	15	47
Rajasthan	15	37
Jammu & Kashmir	15	37
Uttarakhand	17	38
Uttar Pradesh	22	43
Madhya Pradesh	22	43
Chhattisgarh	22	43
Bihar	25	43
Jharkhand	25	43

Trade Details

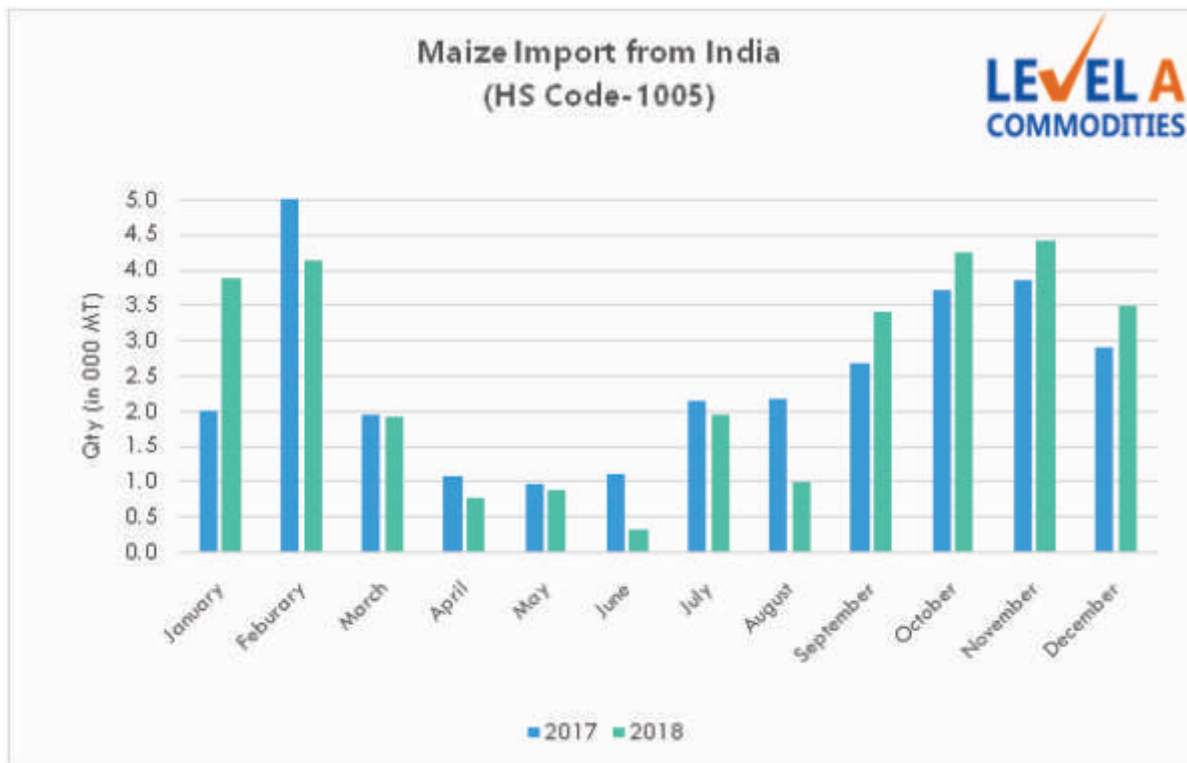
Maize export from India



Maize import from India



Soy Meal Export from India(In MT)



Market Updates

Maize Domestic

Kharif maize acreage at 482,000 ha as, down 22%

Kharif maize was sown on more than 482,000 ha of land, down over 22% on year. Acreage was down nearly 32% than the normal of 707,000 ha for the period. The normal area under maize for the entire kharif season is 7.47 mln ha. The overall fall in acreage is due to the slow progress of monsoon current over the mainland and significantly lower pre-monsoon showers during Mar-May. Till Wednesday, India received an average 50.8 mm rainfall, 43% below the normal weighted average of 88.4 mm, while pre-monsoon showers this year were at 96.6 mm, 25% below the long-period average. In Karnataka, one of the largest producers of kharif maize, the coarse grain was sown over 78,000 ha, down from 219,000 ha a year ago. Maize sowing is yet to begin in the key growing states of Telangana and Maharashtra. Area under the coarse grain, however, rose in Punjab, Uttarakhand, and Uttar Pradesh. The on-year rise in acreage in Punjab, and Uttarakhand can be attributed to the multiple western disturbances that brought heavy showers during the last few weeks. The overall maize acreage during the kharif season is also seen rising as farmers expect better returns on the crop due to higher spot prices. Currently, maize prices are at 2,000-2,050 rupees per 100 kg in Nizamabad, compared with 1,100-1,200 rupees a year ago. Rains are expected to get better during this monsoon season, which may also aid higher sowing going ahead. For 2019, monsoon rains in the country are expected to be normal at 96% of the long-period average. Last year, farmers had sown maize across 7.9 mln ha during the kharif season.

Fall Army Worm infestation has come down in Mizoram

The Fall Army Worm (FAW) infestation in maize crops in Mizoram has come down and is now more or less contained. The Fall Army Worm, a pest attack maize and other crops. The total area of infestation in the maize fields has come down by 359.80 hectares as compared to the peak period as also the number of families affected. Of the 3,024.99 hectares maize cultivation areas infested by the outbreak, 1,757.98 hectares were declared as 'recovered areas' there was a great chance of recovery of the infested maize stems and leaves as a whole.

MMTC postpones tender to buy corn for seventh time

Indian state-run trading company MMTC has for the seventh time postponed the deadline for offers to be submitted in an international tender to import yellow corn, this time to June 27. The deadline for the tender, seeking corn (maize) free of genetically-modified organisms (GMOs), was originally May 8 and has been frequently postponed since then. The volume purchased will be decided by MMTC depending on the level of prices received. Offers must remain valid up to July 11.

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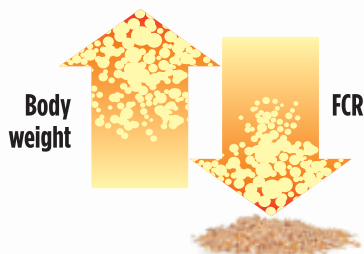
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Fall armyworm invades crops across Asia

Fall armyworm, a caterpillar that got the name because it invades croplands in droves, much like an army, has rapidly spread across Asia since it was detected in southern India late last year. Fields in Bangladesh, Myanmar, Vietnam, Indonesia and Taiwan have fallen victim. In Thailand, it has badly affected the country's corn crop, much of which is sold to the animal feed industry. The pest has also been found in 18 of China's 33 provinces and regions and is now threatening to spread across the key corn region in the northeast. China is the world's second biggest corn consumer and producer. A dip in the production of corn, largely used in Asia to feed animals, could force hog, poultry and cattle growers to rely on expensive imports and dent incomes of millions of small farmers. The fall armyworm invasion comes against the backdrop of planting delays in the United States which lifted benchmark Chicago corn futures Cv1 by nearly a fifth last month. Asia is the world's biggest consumer and importer of corn. The region accounts for 34% of global corn imports and nearly 36% of world corn consumption, according to the US Department of Agriculture data. Fall armyworm attacks the corn crop in all stages, right from the germination of seeds and early establishment of the crop, which is the most vulnerable stage, till the harvesting stage.

EU Crop Monitor Raises Maize Yield Forecasts

Beneficial rainfall in much of the European Union has led the bloc's crop monitoring service to raise monthly yield forecasts for this year's wheat and maize harvests, but parched conditions in Spain contributed to a downward revision for barley. Its EU grain maize yield projection was raised to 8.05 t/ha from 7.92 t/ha, now 5.7% above the five-year average. In contrast, hot, dry weather in Spain had lowered yield potential for winter cereals and spring barley, while raising the risk of water restrictions for summer irrigation of crops such as maize.

Maize International

IGC cuts forecasts for 2019/20 world corn

The International Grains Council (IGC) cut its forecast for world corn and soybean crops in the 2019/2020 season after heavy rains disrupted plantings in the United States. The inter-governmental body said in a monthly update it had cut its global corn crop forecast by 23 million tonnes to 1.095 billion tonnes "largely owing to a difficult start to the growing season for US maize (corn)." The IGC forecast a US corn crop of 333.5 million tonnes, down from a previous forecast of 362.4 million and the prior season's 366.3 million. An improved outlook for 2019/20 corn crops in the European Union (67.0 million from 64.4 million) and Ukraine (32.6 million from 31.0 million) helped to limit the extent of the decline in global production. Global stocks of corn at the end of the 2019/20 season were forecast to fall to 271 million tonnes, down from 319 million tonnes a year earlier.

Taiwan's MFIG buys 65,000 tonnes of corn from Brazil

Taiwan's feed industry procurement association MFIG purchased about 65,000 tonnes of corn expected to be sourced Brazil. The corn was all bought at a premium of 101.08 U.S. cents c&f over nearby Chicago corn futures. The tender had sought yellow corn sourced from either the United States, Brazil, Argentina or South Africa. Only corn from Brazil was offered in the tender. The tender had sought shipment between Oct. 10 and Oct. 29 if the corn is sourced from the U.S. Gulf, Brazil or Argentina. If sourced from the U.S. Pacific Northwest coast or South Africa, shipment was sought between Oct. 25 and Nov. 13.

Soy meal Domestic

Soybean prices in Indore fell

Soybean prices in Indore fell, due to a decline in demand from millers and stockists. However, a decline in arrivals limited the fall in prices. In Indore, the oilseed was sold at 3,860 rupees per 100 kg, down 10-15 rupees from previous day. Arrivals in Madhya Pradesh were pegged at 35,000 bags (1 bag = 100 kg), compared with 40,000 bags on previous day. Tracking spot cues, soybean futures on NCDEX also fell. The most active July contract was last at 3,619 rupees per 100 kg, down 0.3% from the previous close.

Soybean sowing down 57% from the year-ago period

Farmers in the country have sown soybean across 53,400 ha, down 57% from the year-ago period. Absence of monsoon rains has halted sowing operations in key growing areas of Madhya Pradesh and Rajasthan, the top growers. The government has recommended that farmers wait for adequate monsoon rains and start sowing if rain water reaches 4 inches in the soil. Sowing has been kicked off in Gujarat, Karnataka, Uttarakhand, Maharashtra, and some minor growing states. Sowing may pick up as monsoon has entered Madhya Pradesh today after covering Maharashtra, the second largest grower. Lag in sowing is also due to delay in onset of monsoon by eight days and due to delay in announcement of minimum support price by the Centre. A higher minimum support price motivates farmers to add more area under a crop. The government had fixed a minimum support price of 3,399 rupees per 100 kg for the oilseed for 2018-19.

Soybean meal exports rise by 28% in FY19

Soybean meal exports during April 2018 to March 2019 has risen by 28.56 % to 24.35 lakh tonne. Exports were 18.94 lakh tonne in the same period of previous year. According to the data released by the Soybean Processors Association of India (SOPA), this year total exports will remain high. By the end of the season, total exports are likely to touch 20 lakh tonne as the country had a good crop last year. The total carry forward stock from the previous year comes upto 0.19 lakh tonne with total production coming upto 74.71 lakh tonne. Around 20 lakh tonne is expected to be exported while 6 lakh tonne would be used as food for domestic consumption and another 47 lakh tonne as feed for domestic consumption. Balance stock of soyabean meal in June is 1.148 lakh tonne. According to the data, around 101.83 lakh tonnes of soybean is available for crushing, direct use and exports. In May 2019, soybean meal exports dropped to 38000 tonne as compared to 75,265 tonne in April 2019. Iran was the main buyer for Indian soyabean meal in May. According to market reports, farmers are expected to plant more soybean this season as they received 15% higher prices at `3,800-3,900 compared to the minimum support price. "At current prices, soybeans are more lucrative than other crops. We could see shift towards soybeans from maize in Madhya Pradesh and cotton in other regions," said DN Pathak, executive director, SOPA. SOPA in its first survey of soybean crop for 2018-19 season has estimated the total area under soybean for the year 2018 at 108.396 lakh hectare. The area has increased by 6.83 lakh hectare (6.7%) as compared to previous year. The area under cultivation in Maharashtra was 36.390 lakh hectare, 10% less than the government estimates of 40.433 lakh hectare. Similarly the actual area in Rajasthan was 9.212 lakh hectare as compared to 10.112 lakh hectare given by the government. The area in Madhya Pradesh has however, increased to 54.1 00 lakh hectare in 2018 as against 50.100 lakh hectare in 2017.

Soy meal International

Argentina soybean crush up 4% on the month in May

The volume of soybeans crushed in Argentina rose close to 4 million mt in May, up by 150,000 mt or 4% on the month and up 300,000 mt on the equivalent month in 2018. Crushers produced 2.9 million mt of soymeal and 760,000 mt of soyoil, up 100,000 mt and 10,000 mt respectively. The crush yielded 73% soymeal and 19.1% soyoil. The May figures take this year's total crush to 15.6 million mt, compared with 15.1 million mt earlier and a three-year average of 16 million mt. The figures remained slow considering the 2019 soybean crop was larger than the 2018 drought-hit crop. The crushing figures for the first months of the year show an increase compared to 2018 as last year the country was affected by a severe drought which negatively impacted soybean production. The comparative base is low due to this. If we compare current crushing volumes with average production [in previous years] we can say that the current crushing levels are 10% lower. Domestic crush margins hit a monthly low of \$21.75/mt on 23 May and down from an annual high of \$36/mt on 26 April.

US soybean sales fall 70%, below market expectations

Net sales of US soybeans came in at 168,175 mt for the seven-day period ending 20 June, down more than 70% from the previous week's total of 571,512 mt and missing market expectations of 200-500,000 mt. A rise in cancellations and fewer large volume purchases contributed to the week-on-week decline, despite an unexpected uptick in new sales to China. Purchases by China came in at 79,643 mt or more than one full cargo. Mexico was the only other country that booked a large volume approaching one cargo, at 58,157 mt, and volumes to other destinations dwindled on the week with cancellations also rising. Cancellations to unknown destinations came in at 38,700 mt with Taiwan also countermanding an order of 21,498 mt. Total sales commitments for the current marketing year now stand at 47.65 million mt, continuing to exceed the June Wasde export estimate of 46.37 million mt with nine weeks of the marketing year left. In exports, 725,000 mt of beans left US ports in the period, largely steady on the week before, when 750,000 mt was exported. Accumulated exports now stand at 37.11 million mt with 9.26 million mt left to be shipped over the remaining 9 weeks in order to hit the Wasde export target. Alongside new soybean sales to China, China bought 10,400 mt of US pork – despite retaliatory tariffs on US exports – as the ASF outbreak strangles domestic pork production. The purchase took total pork commitments this calendar year to 263,389 mt, the highest ever been recorded since the USDA started publishing the data in March 2013.

IGC cuts forecasts for 2019/20 world corn, soy crops

The International Grains Council (IGC) cut its forecast on June 27 for world corn and soybean crops in the 2019/2020 season after heavy rains disrupted plantings in the United States. The inter-governmental body said in a monthly update it had cut its global corn crop forecast by 23 million tonnes to 1.095 billion tonnes "largely owing to a difficult start to the growing season for US maize (corn)." The IGC forecast a US corn crop of 333.5 million tonnes, down from a previous forecast of 362.4 million and the prior season's 366.3 million. An improved outlook for 2019/20 corn crops in the European Union (67.0 million from 64.4 million) and Ukraine (32.6 million from 31.0 million) helped to limit the extent of the decline in global production. Global stocks of corn at the end of the 2019/20 season were forecast to fall to 271 million tonnes, down from 319 million tonnes a year earlier. The council said it had also cut its forecast for global soybean production in 2019/20 to 349 million tonnes from a previous projection of 358 million also driven by a downgrade for the US "where crop weather has been very challenging." Inventories (of soybeans) are predicted to tighten, mainly on a contraction in the major exporters, albeit remaining above average," the IGC said, putting global soybean consumption in the 2019/20 season at 358 million tonnes. The IGC nudged up its forecast for 2019/20 world wheat production by 3 million tonnes to 769 million tonnes reflecting upward revisions for India, the EU and Ukraine. Global stocks of wheat at the end of the 2019/20 season were forecast to rise to 275 million tonnes, up from 263 million tonnes a year earlier.

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CHINA: Soybean planting area rises 0.66m hectares

The nation's soybean revitalization plan is off to a good start, with the planting area of spring-sown soybeans and summer-sown soybeans both expanding, especially in Northeast China, the agriculture ministry said on Wednesday. The nationwide soybean planting area will exceed 130 million mu (8.67 million hectares) in 2019, and increase more than 10 million mu year-on-year. The increase, which is now in its fourth consecutive year, has improved China's domestic soybean supply capacity and enhanced the nation's confidence in coping with the complex external environment and risks, said the ministry. China will continue to provide subsidies to soybean farmers in Northeast China, and expand trials of crop rotation to improve cultivation efficiency, and increase rewards to certain soybean producers, the ministry said.

Market Drivers

Maize

Market Drivers	Monthly Outlook
Overall maize cash markets	Bullish
Feed makers demand market	Bullish
India has allowed 1 lakh ton Non- GM maize import on 15 % duty for actual users	Bullish
U.S, corn planting	Bearish

Soymeal

Market Drivers	Monthly Outlook
USDA June Acreage Report	Bearish
Improving Monsoon in India	Bearish
US China trade war re-initiated talks	Bullish
NASS Report	Bullish

****The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.**

REACH US



Technical Seminar at Karnal

Following the success of technical seminar in Pune CLFMA extended similar event in Karnal recently under the leadership of CLFMA Chairman Mr.S.V.Bhave with supported by PFI and Broiler Breeder Association North India.

On 17th April 2019 at The Vivaan Resort, Karnal around 200 delegates from North India, Central India attended the Seminar.

Dr.Devender Hooda, North Zone President of CLFMA welcome all delegates.

Mr.S.V.Bhave ,Chairman of CLFMA introduced about CLFMA and highlighted the recent activities of CLFMA for Indian Poultry industry. He emphasized on present situation of raw material crisis and assured further discussion with Government authority from CLFMA.

Dr.Sujit Kulkarni, Managing committee member of CLFMA and Convenor of program introduced agenda of program and introduced technical speakers.

Dr.Sudheer Rukadikar, well known Poultry consultant explained about "Immuno suppression –Reasons & solutions for most critical condition of Poultry Farming." He shared useful information about how immunosuppression has negative impact on performance of poultry, different disease conditions, which causes immuno suppression, bacterial diseases, viral diseases, mycotoxins, Coccidiosis, poor management, etc. Further, Dr. Sudheer Rukadikar explained how to prevent immunosuppression by good quality feed, good control over mycotoxicosis, better management, vaccination etc.

Second speaker was Dr.Ajay Deshpande , Poultry Entrepreneur from Pune . In his presentation on "Breeder Farming – An Art, Skill and Dedication ". He quoted basic management of breeder farming is one of key factor of success. Selection of Vaccination, accurate feed formulation and most important record keeping and analysis or review of all record is very crucial.

Third and last speaker was Dr.N.K.Mahajan, Dean of College of Dairy Science and Technology Hisar.His presentation was on "Recent development in AI and its impact on Poultry" He started his presentation with history and origin of AI virus and how its mutation happen in different strains .

In prevention program he highlighted about vaccination program, biosecurity management etc.

After technical seminar short note given by PFI Treasurer Mr.Ricky Thapar and North India Broiler Breeder Association President Mr.Gurminder Bisla .

As a token of love CLFMA presented mementoes to all speakers, PFI president, North India Broiler Breeder Association, sponsors.

All mementoes given by Mr.S V Bhave, Chairman CLFMA, Mr.Naveen Pasupathy, Treasurer CLFMA, Mr.Divya Kumar Gulati, Secretary CLFMA, Mr.Suresh Deora, West Zone President CLFMA, Dr.Saikat Saha, Mr.Balaram Bhattacharya , Managing Committee Member CLFMA. Dr.Sujit Kulkarni, given vote of thanks to all participants, speakers, sponsors. All participants enjoyed delicious lunch with great social networking. With this, CLFMA had one more successful Poultry Seminar in series at Karnal.



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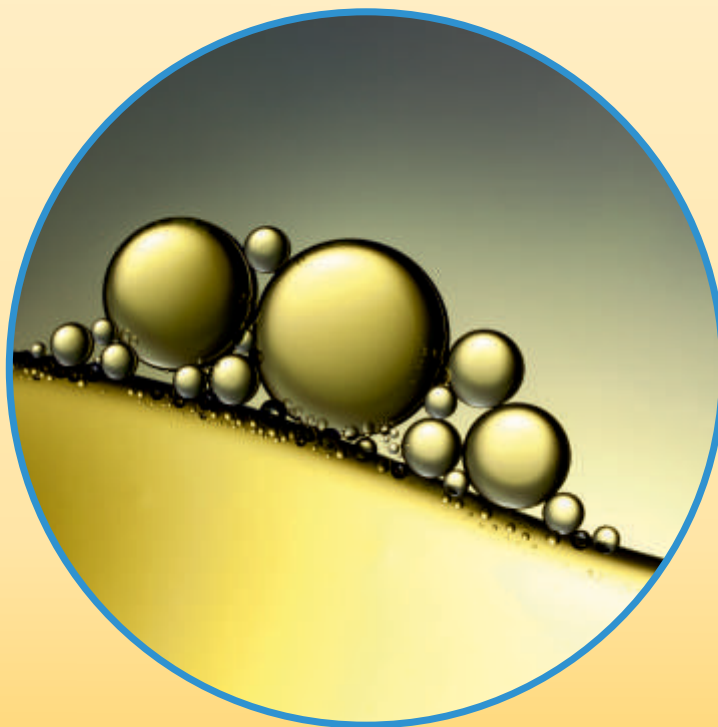


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Technical Seminar at Nashik

CLFMA of India organized Poultry seminar on 17th May 2019 at Nashik under the leadership of Mr. S. V. Bhavé.

The Theme of this presentation was Recent Trends in Poultry Feed Formulation, Health & Welfare.

Dr Vijay Makhija Managing Committee of CLFMA under the guidance & support of Shri.S.V.Bhave, Chairman - CLFMA of India conducted this Seminar. Close to 140 participants attended this Seminar.

Mr. S. V. Bhavé, Chairman of CLFMA briefly introduced CLFMA and CLFMA's active role in developing Livestock Sector.

Local industry leaders Shri. Udhav Ahire, Shri.Shrikrishna Gangurde & their team extended full-fledged support to CLFMA Poultry Seminar. It was reinforced that these seminars shall bring latest knowledge on improvement in efficiencies & increasing the competitiveness

Eminent Nutritionists Dr. S. V. Rama Rao presented on the topic of Strategies for Feed Cost Savings. The key takeaway messages from his talk were Optimize nutrient allowance, Increase Nutrient Digestion, Alternate Raw Material usage

Renowned Avian Pathologist Dr. K.S. Prajapati shared solutions for respiratory diseases for broilers & layers. In his talk he focused on solutions for viral diseases like Low Pathogenic Avian Influenza (LPAI), Infectious Bronchitis (IB)

& New Castle Disease / Ranikhet Diseases.

Associate Dean of Mumbai Veterinary College Dr. Ajit Ranade shared very well the latest update on Poultry welfare scenario. He shared the evolution of different housing systems in poultry farming & shared insights on productivity. His key message for the participants was "Welfare and productivity Should go parallel to each other".

The topics selected for this seminar were very much appreciated by farmers as these issues are impacting the profitability & sustainability of farmers. Great amount of enthusiasm was seen among farmers during the interactive Q&A session with the invited speakers.

As a token of love CLFMA presented mementoes to all speakers, sponsors, press personnel, who attended the Poultry Seminar.

The seminar was followed by scrumptious food and all participants enjoyed the same with good social networking.

This poultry seminar reflects the CLFMA's VISION, Missions & Objective of fostering and encouraging the exchange of scientific information among the poultry industry's stakeholders" says Dr. Vijay Makhija.

With this CLFMA had done one more successful Seminar at Nashik.





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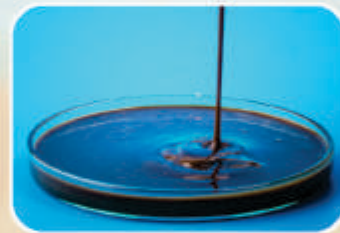
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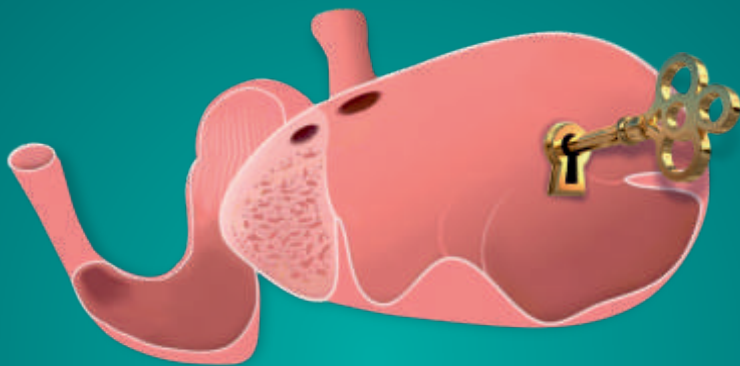
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52nd Annual General Meeting (AGM) & 61st National Symposium 2019

August 2019						
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Technical Seminar at Patna

After successful completion of technical seminars at Pune, Karnal & Nashik, CLFMA organized first ever technical seminar on “Trends in Feed milling Technology, Nutrition and Disease Management in Poultry in Patna”.

On 12th June 2019 at Hotel Panache, Patna, the seminar was well attended by more than 150 progressive layer farmers, feed manufacturers, integrators and veterinary consultants of Patna and nearby areas. Dr. Saikat Saha, managing committee member of CLFMA, welcomed the guests and introduced speakers to the guests.

Mr. S. V. Bhave, Chairman of CLFMA introduced about CLFMA and highlighted the recent activities of CLFMA for Indian Poultry industry. He emphasized on present situation of raw material crisis and assured further discussion with Government authority from CLFMA.

After lighting of lamp ceremony Dr. Rameshwar Singh, Vice Chancellor of Bihar Animal Sciences University briefed about Industry scenario & future prospectus for animal industry in state of Bihar. During his speech Vice Chancellor extended his support and help to poultry farmers as well as CLFMA for futuristic growth of Poultry Industry in Bihar.

The central theme of the seminar feed milling & disease management was briefed by Dr. Saikat Saha. After his inaugural speech he invited first speaker of the seminar.

Dr. Sudheer Rukadikar, who is well known Poultry consultant & pathologist, he delivered talk on “Immuno suppression –Reasons & solutions for most critical condition of Poultry Farming.” The impact of viral subclinical bacterial, viral and nutritional diseases is huge in all three segments viz. broiler, breeder and layers, this leads to direct economic losses. This topic was further discussed in detail with the audience, he also added that biosecurity has a key role to play in fighting against disease challenges for successful poultry farming. During his talk he emphasized that you must know your enemy in order to fight them in a proper and cost-effective way. Further to this he presented few insights on how immunosuppression impacts overall health & performance.

During his presentation he enlightened audience with different disease conditions, which are responsible for immuno suppression, like bacterial, viral, parasitic diseases & mycotoxins. At the end of his presentation Dr. Rukadikar informed audience about different strategies & solutions which could be beneficial to address the immunosuppression.

Second Speaker, Mr. Shrikrushna Gangurde, Poultry Entrepreneur from Nasik shared his experience on feed milling Technology. In his presentation he addressed audience with practical ideas to improve production and efficiency in poultry feed production. Moreover, he discussed in detailed about all milling functions from receiving ingredients to feed manufacturing to delivery of feed at farmers place.” audience extended thanks to Mr. Gangurde for excellent presentation on feed milling.

Our last speaker Dr. Ajit Ranade, Associate Dean, Mumbai Veterinary College, started his interesting talk with a brief introduction on Gut morphology and continued to discuss gut health enhancement solutions. Furthermore, he pointed out that stimulation of a good gut health is immense important in the first 2-3 weeks of the broilers' life to prepare for the last weeks before slaughter. This can be explained by the fact that 70% of the immune cells are in the gut and thus promotion of gut health will help to fight disease challenge.

Mr. Divya Kumar Gulati, Secretary CLFMA, has given vote of thanks to the participants speakers & honorable members of Bihar Animal Sciences University for sparing their time and for valuable exchange of information. Seminar ended with lunch & social networking. “The feedback from the seminar was excellent, with many delegates feeling that they would like to associate themselves with CLFMA activities.

At the end of the session CLFMA MC members presented mementoes to all speakers & sponsors.

With this, CLFMA successfully conducted one more technical seminar at Patna.

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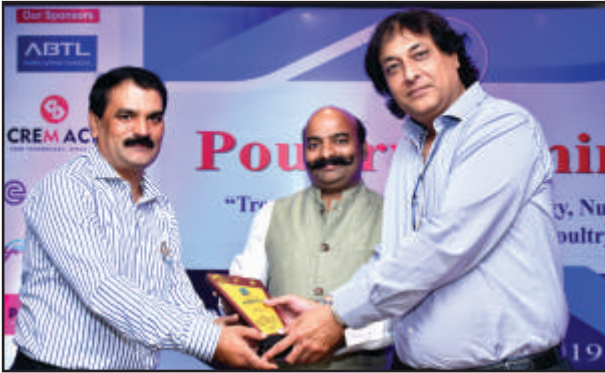
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Agriculture sector representatives submit Budget wish list to finance minister

Promote agri- startups particularly in rural regions, expand micro-irrigation, treat solar energy as third crop to augment income of farmers and enact labour reforms to push creation of off-farm jobs, were few of the suggestion which representatives of the agricultural and rural development sectors submitted to the Finance minister Nirmala Sitharaman to boost investment in agricultural sector and enhance market access to farmers.

Incentive and popularize usage of organic manure for improving carbon content in soil, promote aqua -culture, dairy development in eastern states, reduce the good and service tax (GST) on branded food produce, incentive agro processing units in the border districts and enhance investments in research and development in agriculture centre, were the other suggestions.

The government must extend benefits of the PM Kisan scheme to landless farmers and farm workers, said Ajay Vir Jakhar, chairman of the Bharat Krishak Samaj, a farmers' organization who was part of the pre-budget consultations.

"I suggested that we fill all 50% vacancies in sanctioned posts in agriculture research institutions and state agriculture extension system. Also the centre-state funding ratio for centrally sponsored schemes such as Agricultural Technology Management Agency and Rashtriya Krishi Vikas Yojana - Raftaar (Remunerative Approaches for the Agriculture and Allied Sector Development) should be 90:10. The investment for micro-irrigation and solar pumps should be tripled and GST on processed foods to be reduced to 5%. Also 6,000 smart census towns should be developed instead of smart cities,"he said.

The Confederation of Indian Industry (CII) urged the government to enhance private investment in the food processing sector and rural start-ups. Chandrajit Banerjee, DG, CII suggested that a capital subsidy to farmers who install solar roof top through Direct Benefit Transfer would encourage adoption of solar as third crop. The energy can be used on their farms while the surplus can be sold back to the grid to earn additional money, he said.

Mr Banerjee also proposed a budgetary allocation of Rs 100 crore for 10 district level incubation centres on a pilot basis where district level incubation centres can be set to nurture rural start-ups promoted by rural youth especially rural women and using rural resources.

Additionally, to stimulate investments by venture capital and private equity firms in agri startup businesses, he proposed that this sector be treated as a special category to lower the tax rate on investments in order to compensate for longer business maturity time and risks associated.

On a similar note, while addressing government officials and the farmer representatives, the Finance Minister, Ms Sitharaman also stressed upon encouraging start-ups which can remove the segmentation in agriculture market and help in providing remunerative markets for agriculture products and supplying it to the final consumers at reasonable prices, said a government release.

The minister focussed on the measures to boost economic and social infrastructure NSE 0.33 % of rural sector and ways to eradicate unemployment and poverty through development of agriculture and allied sectors as well as non-farm sector. She said that the concerns of agriculture sector are high on the priority of the present government . The Finance Minister said that the ministry will also hold broad based consultations with different stakeholders from fisheries sector to bring about blue revolution by optimally using our maritime resources.

Tushar Shah, senior fellow, International Water Management Institute suggested that the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) should prioritize 112 irrigation NSE -7.35 % deprived districts where less than a quarter of farms have any source of irrigation. To do this, the government can emulate Chhattisgarh's scheme of allocating solar pumps to irrigation-deprived farmers. Shah also suggested Gujarat's Surya Shakti Kisan Yojana which has solarized over 70 agricultural feeders and over 1200 tubewells.

A.E. Joseph, president, United Planters Association of South India said that in this year budget they want under direct taxes ,the IT Rule 7B(1) to be amended to tax coffee only from the stage of roasting and powdering. "This would enable the grower to sell coffee after curing (a process akin to milling) directly and there by increase the share in the value chain,"he said. Further, he said that they proposed the government to levy safeguard duty on import of natural rubber to protect the livelihood of small producers and also to increase allocation of fund for the Commodity Boards.

The fertilizer industry representative from IFFCO said that there is a need to align fertiliser subsidy policy with the objective of balanced fertilization, both chemical and organic. Further, the official asked government to ease regulations of promoting aqua agriculture such as seaweed cultivation which has a huge employment potential. "Encourage cooperatives to play the role of linking food processors and agri startups to farmers," he said according to people in the know how.

Other suggestions include , filling up of vacancies in agricultural universities, increasing investment in micro irrigation and solar pumps, financial incentives to the states for implementing agricultural market reforms, promotion of handlooms and handicrafts in the North Eastern states for employment generation and enhancing rural income, creating of aggregators for farm equipment and promotion of non-IT related rural start-ups.

Goa government to launch digital agriculture platform 'Agricloud': Vijai Sardesai

The Goa government will soon launch 'Agricloud', a digital platform for agriculture management and tracking of farm subsidies, the tender for which will be issued next month, Deputy Chief Minister Vijai Sardesai said on Monday.

Mr. Sardesai, also State agriculture Minister, said 'Agricloud' is a three-way interface that will allow his Ministry to register farmers and track subsidies and inputs to them, while helping cultivators to get information on official advisories, weather, market prices among other things.

"Work on the tender has been completed, including a go-ahead from the Information Technology Department. 'Agricloud' will create an e-commerce platform allowing farmers to sell directly to customers," he said.

He said the move was part of the State's initiatives to fulfil the Centre's commitment to double farm income by 2022. The Minister was speaking at the national conference of All India Agricultural Marketing Board Federation in South Goa.

NDDB develops world's first complete parent-wise genome assembly of buffalo

Building upon the launch of INDUSCHIP, a customized genotyping chip for indigenous cattle and their crosses, Anand-based National Dairy Development Board (NDDB) has now developed world's first complete parent-wise genome assembly of buffalo.

Named as 'NDDB ABRO Murrah', the genome assembly of riverine buffaloes would provide more insights about buffalo genome.

As per Dilip Rath, Chairman, NDDB, the genome assembly would also provide impetus for implementing genomic selection programme in buffaloes to achieve faster genetic progress in Indian buffalo population. Currently, buffaloes contribute to more than 50 per cent of India's milk production.

The estimated population of buffaloes in the world is 224.4 million, of which 219 million (97.58%) are in Asia. India has 113.3 million buffaloes, and they comprise approximately 50.5 per cent of the total world buffalo population.

According to Rath, buffaloes are more resistant to ticks and certain diseases. In comparison to cattle, buffalo milk contains high fat percentage.

"Buffaloes being most widely reared in the developing countries for milk production, developing a reference genome will help in deciphering biological differences and faster genetic improvement of buffaloes," he stated, while adding that the genome shall be India's contribution to genetic improvement of buffalo in the world.

Agriculture and Fisheries Council configuration (AGRIFISH)

The Agriculture and Fisheries Council adopts legislation in a number of areas relating to the **production of food, rural development** and the **management of fisheries**.

How does the Agriculture and Fisheries Council work?

The AGRIFISH Council brings together ministers from each EU member state. Most member states are represented by a single minister for both sectors, although some send two ministers - one for agriculture and another for fisheries.

The European Commissioner for agriculture and rural development, the European Commissioner for health and food safety, or the European Commissioner for maritime affairs and fisheries also take part in meetings.

Meetings usually take place once a month.

About agriculture and fisheries policy

The Council adopts legislation, in most cases together with the European Parliament, in a number of areas relating to the production of food, rural development and the management of fisheries.

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Areas under agricultural policy include the Common Agricultural Policy (CAP), rules on the internal market for agriculture, forestry, organic production, quality of production and food and animal feed safety. Measures relating to CAP aim to increase agricultural productivity, ensure a fair standard of living for the agricultural community, stabilise markets, assure the availability of supplies and ensure that supplies reach consumers at reasonable prices.

The Council also adopts legislation on fisheries policy, the setting of annual Total Allowable Catches (TACs) and quotas for each species, and on the allocation of fishing opportunities. A key challenge is to make fisheries more environmentally sustainable and more economically viable, while addressing issues such as over-fishing and fleet overcapacity.

Priorities of the Agriculture and Fisheries Council during the Romanian presidency

The Romanian presidency of the Council of the European Union started on 1 January 2019 and will conclude on 30 June 2019.

Agriculture

In the field of agriculture, the main priority of the Romanian presidency is to advance negotiations on the modernisation and simplification of the Common Agricultural Policy (CAP) after 2020. As negotiations are correlated to the ongoing negotiations on the Multiannual Financial Framework 2021-2027, the aim is to achieve a partial general approach on the three legislative proposals:

- a regulation on the CAP strategic plans
- a regulation single common market organisation (CMO)
- a horizontal regulation on financing, managing and monitoring the CAP
- Future of the CAP post 2020 (background information)

Identifying measures to encourage the production of plant proteins will be another focus of the Romanian presidency, that will continue discussions on the subject with the objective of ensuring EU's independence in the plant protein sector.

The Romanian presidency will discuss plant health, with the aim of raising public awareness of this issue. Preparations will also continue for the 2020 United Nations International Year of Plant health.

- Plant health (background information)

Priority topics in the field of animal health for the Romanian presidency include:

- monitoring and protecting animal health on EU borders
- implementing measures to control, monitor and eradicate major animal diseases and the role biosecurity plays
- antimicrobial resistance in veterinary medicine
- Animal medicines package (background information)

Strengthening the position of farmers in the food supply chain will remain a priority during the Romanian presidency. The aim is to formally adopt the directive on unfair trading practices. This will improve the position of farmers, who are currently considered the weakest link in the food supply chain.

- Fairer role for farmers in the food supply chain (background information)

Similarly, the presidency will finalise the work on the regulation on the definition, description, presentation, labelling and the protection of geographical indications of spirit drinks with the aim of formally adopting the regulation.

The Romanian presidency will focus on the preparation for the UN forum on forests and also the review of progress achieved in implementing the EU forestry strategy.

- Progress in the implementation of the EU Forest Strategy (European Commission)

Fisheries

Regarding fisheries, the Romanian presidency will continue work on the multiannual management plans, with the aim of achieving political agreement with the European Parliament. These plans include:

- Western Atlantic
- Western Mediterranean waters
- Management of the EU's fish stocks (background information)

The Romanian presidency will also try to advance discussions on the proposal for the European Maritime and Fisheries Fund post 2020.

- European Maritime and Fisheries Fund (background information)

The external dimension of the Common fisheries policy (CFP) remains an important priority, in the Romanian presidency.

Precision Nutrition in livestock feeding

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Expenditure on feeding comprises a huge part of the animal rearing cost. In a farm often least care is taken of the animal till they attain production stage. So, the animal attains delayed maturity and comes to production at a late age. During productive phase livestock owners over fed the animals in fear of losing production. In a herd often mass feeding is practiced which assume all the animals having similar performance quality. So, less productive animals are generally overfed and vice versa. Above factors lay an extra tax on the livestock owner without much enhancing the production. To reduce the feeding expenses and optimizing the production care of the animal should be taken since its birth with precision. Precision feeding is concept when an animal is fed precisely to meet its nutritional requirement for optimum productive efficiency to produce better quality animal products and to contribute cleaner environment and thereby ensure profitability. Precision feeding results in effective utilization of available feed resources with the aim of maximizing the animals' response to nutrients.

The animals with low maintenance requirement divert the absorbed nutrients more towards production. Heat increment consists of energy cost on feeding, heat of fermentation, digestion and nutrient metabolism. Forages have higher heat increment than grains. The work of digestion and fermentation is higher with fibre. Fat has lower heat increment than carbohydrate or protein. The energy absorption from gut could be improved by processing of feed ingredient like reducing particle size and optimizing passage rate of digesta. But care should be taken not to reduce the particle size of roughages shorter than 1 cm in length. At optimum protein intake ruminants tend to have lower blood concentration of urea, lower urinary urea excretion and increased transfer of urea to gastrointestinal tract. By increasing fermentable carbohydrate fraction of feed, urea recycling to the rumen increases. So, the extra energy loss on heat increment could be reduced by feeding optimum fat, reducing excess fiber, avoiding excess protein intake and feeding a balanced diet (synchronized energy and protein). Balanced diet improves efficiency of microbial protein synthesis. Minerals and vitamin must be supplemented to the

diet for improving efficiency of nutrient metabolism. In personalized feeding practices animals with improved performance with low intake could be recognized and selected.

The need of limiting amino acid like methionine, lysine or tryptophan could be effectively met by feeding them in protected form rather than increasing the CP content of diet beyond optimum level. Phase feeding is another choice to optimize feed utilization by animal. Practice of using feed additive could be adopted at different stages of animal feeding to improve efficiency of feed utilization and absorption. Feeding negative DCAD diet to dry cows 2-3 weeks before calving stimulate bone mobilization of calcium and calcium absorption from the small intestine during enhanced necessity later in lactation. In many cases, simply using feedstuffs with lower concentrations of K and Na will lower DCAD enough to improve transition cow performance. When it is not possible to reduce dietary K and Na enough, supplementation with anions (chloride and sulfate) will reduce DCAD. A target DCAD of -5 to -10 meq/100g DM may improve transition cow health and performance. Around transition phase the appetite decreases. During one week prepartum and postpartum animal can be drenched with propylene glycol which becomes precursor for blood glucose, stimulate an insulin response, and reduces fat mobilization thus reducing chances of ketosis in high yielders. Ca propionate also can be fed in the above duration to increase blood glucose and Ca levels. Along with maximum feed utilization for production Precision feeding paves way towards clean environment as well. When energy and protein are utilized with higher efficacy there is less excretion of N in urine and methane to environment.

Precision feeding can be adopted by using fast analytical techniques like NIRS and animal nutrition models like Cornell net carbohydrate and protein system etc. NIRS analysis is more cost effective than wet analysis methods. CNCPS method seems to be most precise method of evaluation that characterizes the carbohydrates and proteins of feeds and forage into different fractions as per their degradability in rumen and thus availability to the animal.

The Future of Animal Feed Sector in India

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Introduction

As per 2019 Alltech Global Feed Survey, International feed production has increased by 3% to 1.103 billion tons in 2018. They surveyed around 30,000 feed mills in 144 countries. The feed industry has grown by 14.6% in last five years. China maintains its hold as the global feed producer. India, Pakistan, Myanmar and Laos demonstrated higher growth in feed production.

Global broiler feed production increased by 3% in 2018. Layer feed production grew in South Korea, India and Indonesia in Asia Pacific region. Vietnam, India and Indonesia grew in aquaculture feed as well in Asia Pacific region. India's total feed production was around 38.7 MMT (34% share came from broiler feeds).

Future of Animal Feed Production in India

Feed business is not a rocket science, it's much complicated than that! It is expected that by 2025-26, compound cattle feed production will be around 15-20 million tons. In 2025-26, it is estimated that requirement of broiler feeds will be 26 million tons and 13 million tons of layer feeds. It is estimated that by 2025-26, at least 5-6 million tons of fish feed will be sold in India. It is expected that by 2025-26, shrimp feed production will be around 8-10 lakh tons.

What are Key Challenges?

I interacted with more than 50 key animal feed producers and their consultants in India and got the list of following challenges. Few challenges are common to all animal feeds and few are species specific.

1. Farmers should get right price for his final produce i.e. eggs, poultry meat, milk and milk products, fish and shrimp, mutton, etc. When farmers gets price below production cost, he reduces use of compound animal feeds and switch to feed ingredients which further reduces productivity. There will be competition from imported

products. Brazil has just sent first container of chicken to India. Processing of chicken should increase in India which will help to stabilize the prices and supply. FSSAI will become stricter in selling of animal origin products.

2. There is growing demand for A2 milk and milk products and productivity of desi cows and buffaloes can be improved by improving feeding and breeding management. Compound cattle feed should be fed as per the requirements.
3. Calf rearing is not done in scientific way in India. Milk replacer, calf starter, grower and heifer feed will help in profitable calf rearing and will help to get maximum number of lactations per animal.
4. Still there is low awareness among farmers about use of balanced compound feeds. They use feed ingredients directly. Government officials, ICAR and veterinary colleges will play important role in promotion of compound feeds.
5. Availability of good quality feed ingredients and their prices are major challenges for manufacturing of good quality compound feeds. Due to less rains, maize prices have skyrocketed this year. Few years back, soybean meal prices were quite high almost for five years. Maize and SBM prices acts as benchmarks for prices of other feed ingredients. Lot of research took place about unconventional feed ingredients. But due to various factors like availability, price and anti-nutritional factors, their use is not more than 5% in total feed production. Although BT cotton is grown in India, there is ban on other GM crops. Therefore both farmers and feed millers are at loss. In scarcity we can't import GM maize and SBM. We have to look for non-GM sources. Our solvent extraction industries exports significant amount of oil meals every year. Production of animal protein is still not up to the mark as it is in hands of

unorganized players. Adulteration of feed ingredients is major issue. There are not enough QC labs to test it. Use of NIR should increase for QC. Use of Future trading and hedging is less. Still feed ingredients are bought and sold through traditional channels. Increase in MSP of major crops has affected prices of all feed ingredients.

6. There is growing concern among consumers about residues of antibiotics, pesticides, heavy metals, mycotoxins, etc. in final products. So feed millers are not allowed to use antibiotics as preventive source. Feed millers use toxin binders to reduce impact of mycotoxins present in feeds.
7. Coordination between state animal husbandry departments, ICAR/State veterinary Universities and industry needs to be improved for better penetration of good quality compound feeds. There is shortage of good quality manpower including vets to run animal feed sector.
8. Media is spreading negative and wrong news about livestock sector and farmers. There is only one daily newspaper in Marathi for farmers. Many startup companies have started apps giving lot of information and services to farmers, but how many farmers they reach is big question mark.
9. There is need to change crop patterns due to climatic change. So role of agriculture scientists is very important.
10. Cattle feeds will not perform well if animals are not getting good quality green fodder and dry fodder in right quantities. Many farmers have started using silage technology, but still volumes are very less.
11. The aquaculture industry in India is suddenly thriving with a higher demand in the shrimp

market which is leading to a sudden shooting up of growth in the aqua feed industry. There is also an increase in the demand for fish from India both domestically and internationally which requires more effort from the aqua feed market to maintain the demand for high quality fish available in India. The only major concern currently is that majority of aquaculture practitioners in India still depend on traditional feed due to its low price and easy availability. This is responsible for a slow transition towards commercial feed in our country. Hence, this is the opportune moment for international aqua feed industries or even new domestic players to come and establish themselves in the market.

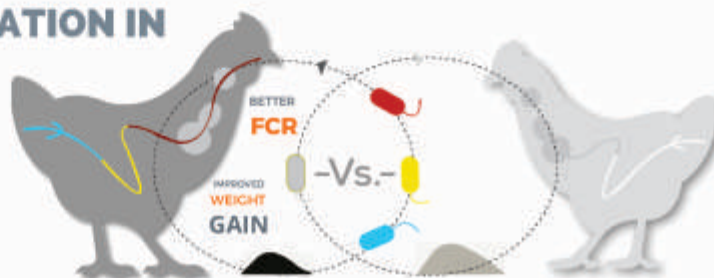
12. Many animal feed additives are used in animal feed production now a days - supplied by MNCs and Indian companies. There seems to be oversupply and few customers. Commoditization has happened. Feed millers are buying only on price and credit period is prolonged.
13. Disease challenges like bird flu - is big threat for profitable animal production in India and it impacts animal feed consumption also.
14. Prominent feed players have started building new feed mills with 10 to 40 TPH plants, but small feed millers need to upgrade their feed milling technology.
15. CLFMA of India has started process to update feed standards. Although BIS has standards for feed ingredients and complete feeds, they are voluntary. There are many feed companies which are selling substandard quality feeds as farmers buy feed mainly on price. Farmers should focus on lowering cost of production instead of buying low cost feeds.



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Green Forages and silage toxicity in livestock: A real concern

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Forages are a major source of nutrients for livestock nutrition and health. Forage toxicity in livestock is caused by the consumption of biomass high in specific compounds found in different forages such as grazing crops, hay, silage or weeds. The possibility of toxicity in livestock depends upon the consumption of plants in the form of hay, silage and forage represents a serious risk to livestock and other animals. There are several factors which contribute to an animal poisoning and leads to death. While there are many indications for plant poisonings, the most obvious cases involve sudden onset of disease in a group of animals. A toxicosis is also suggested when the animal dies suddenly, because many plant toxins result in an acute poisoning. Timely and rapidly diagnosing a plant poisoning is often extremely difficult and in many cases, initial clinical signs are non-specific (such as diarrhea) and post-mortem lesions may be absent. The best way to support a diagnosis of a plant poisoning is to confirm the presence of a toxic plant in the animal's environment, to confirm that the plant has been ingested and to correlate clinical findings, when possible with those known to be associated with the suspect plant.

Effects of increment factor present in forage on animal health depend upon consuming or contacting potentially toxic plants can range from none to death. Potential deleterious effects include tainted milk, liver or kidney damage, cardiovascular, nervous system, musculoskeletal, or gastrointestinal problems, photosensitization or allergic reactions, birth defects or reproductive failure or sudden death to the animals. The toxic potential of a plant species depends upon several factors, including the species of animal exposed and the dose or amount of toxin consumed or contacted. The age, size, health, sex and reproductive status also determine the toxicity of forage to the animals. Toxin levels can fluctuate with certain environmental conditions (like clover during high rainfall, high humidity), during certain seasons of the year (spring fructan toxicity with ryegrass species, oats), or when a combination of factors

occurs. In some species like poisoning of hemlock, the toxic principle or compound remains in preserved forage (hay or silage). Some tree leaves are more toxic after they have wilted (red maple, wild cherry). Toxic compounds associated with forages are termed as anti-quality compounds or anti-nutritional factors. Many forage related disorders result from toxins released by fungi (fungal endophytes) growing in association with the living host forage plant (tall fescue toxicosis, ryegrass staggers, red clover slobbers), fungi in moldy hay, silage or clippings (botulism, sweet clover poisoning) or undesirable bacteria in improperly ensiled forage (listeriosis).

Objectives:

- As a nutritionist one should, not only know how nutrients provide nutrition to animal's body but we also must know how toxins affect animal's health and production.
- To know severity of toxins effect in the animal's body in its different concentrations.
- To know the importance of detoxification.
- By knowing the concentration of toxins in feed and toxic dosage to animal, we can formulate feed ration below the toxic level.

Some important poisoning in animals which occurs due to consumption of forage and silages are mentioned here.

1. Nitrate poisoning

Nitrates in forages do not themselves cause the poisoning to farm animals. Occasionally forages accumulate nitrates in quantities that are toxic to some farm animals. Nitrates (NO_3) converted to nitrites in the rumen of animal and nitrites (NO_2) are toxic in nature. In cows and sheep this conversion takes place in the rumen (paunch), in horses in the caecum. Microbes in the rumen generally convert nitrate to nitrite and then reduce to ammonia. The ammonia is used to make

protein. Nitrate poisoning occurs when the nitrate concentration in the rumen is higher than the capacity of the microbes to convert nitrite to ammonia. The nitrites get into the blood stream and cause a change in hemoglobin, converting it to methemoglobin. This reduces the oxygen-carrying capacity of the blood. When a large part of the hemoglobin has been converted, the blood can no longer supply the tissues with oxygen and the animal actually suffers from a type of asphyxiation. Grazing animals often are at less risk than those consuming dry or ensiled forages because they eat less dry matter per unit of time and may have less buildup of nitrite in the rumen and consequently the blood stream. Relaxation of vascular smooth muscle & consequent vasodilatation. This vasodilatation is due to nitrites results in systemic arterial hypotension and decreased cardiac output. Nitrate poisoning symptoms could manifest 5 to 7 days after feeding high nitrate forage rations. Death can occur 2 to 24 hours after the manifestation of symptoms.

Symptoms:

- Rapid acceleration of pulse rate
- Quickened respiration followed by labored breathing
- Trembling of certain muscles
- Weakness, staggering gait and sometimes apparent blindness
- Animal may sink to the ground, fall on its side, and lie with its mouth open.
- Tongue and whites of the eyes turn blue
- Death usually takes place with little or no struggling
- Pregnant animals which are affected but do not die may abort later

Sources:

Immature green oats or its hay, straw, or pasture is one of the most commonly involved feeds. Commonly affected plants include small grains (oats, wheat, and barley), warm-season annual grasses (sorghum, pearl millet and corn), and broadleaf weeds (pigweed, thistles, goldenrod). However, perennial forages do not accumulate toxic levels of nitrate. Unless the soils in which they grow are relatively high in nitrates, the plants do not accumulate them. Drought, hail or frost damage to the plant, causing a stunting or cessation of growth, are often involved. Nitrate content of the soil and drought seem to be the most important in causing high levels of nitrates in plants. A fairly high level of nitrate must be

present in the soil or plants will not accumulate it. One reason for this is that dry weather usually strikes at a time when nitrogen is being rapidly absorbed by the plant and the drought appears to cause a reduction in the conversion of nitrates to protein. If it rains following a dry period and the plants resume growth the risk of nitrate poisoning is reduced.

Nitrates in Silage

When crops are put as silage, they usually lose some of their nitrate. The amount they lose will vary from an insignificant amount to a large percentage of that present. Most of the loss occurs during the first few weeks of storage. The unpredictability of the disappearance of nitrate from stored silage makes the estimation of its nitrate content from an analysis of the fresh, green material unreliable, unless the green material was of low nitrate content in the first place. Therefore, where there is a reason to suspect that the ensiled material was toxic, an analysis for nitrates just prior to the time when it will be fed is recommended. When high nitrate material is ensiled under certain conditions not well understood, there will on occasion be a rapid reaction which results in the discharge of nitrate from the silage as a mixture of nitrogen oxide gases. These are often visible as yellow-red fumes. While this may significantly reduce the nitrate content, the gases are toxic to man and to livestock. These gases cause "silofiller disease" in worker. Therefore, proper precautions should be taken during filling the silo and for some weeks thereafter to prevent poisoning of persons or livestock by gases. These precautions consist of providing proper ventilation whenever anyone is in the silo, and preventing the gases (which are heavier than air) from settling in closed barns to which silos are attached. The gases formed from nitrates also destroy carotene (vitamin A). Therefore, high nitrate material may contain but little carotene after silage has formed. It is easy, however, to include another source of vitamin A in the ration to take care of the needs of livestock. It is not possible to determine the toxic level of nitrates with any great degree of accuracy. The level varies with environmental conditions, the kind of animal concerned, and for unknown reasons. Forages containing over 0.45% of nitrate nitrogen are potentially very toxic. Feeding practices which limit the nitrate content of the total daily ration to 0.15% or less, should allow for use of the feeds containing up to 0.45%. At 0.15% nitrate nitrogen forages are considered safe to feed without restrictions.

The treatment of nitrate poisoning is not generally highly effective because it is usually applied too late. Generally a 4% solution of methylene blue injected intravenously for treatment purpose.

2. Sweet Clover Poisoning

Sweet clover poisoning is a problem of varying frequency and intensity in livestock wherever sweet clover grows. A substance referred to as coumarin is present in varying amounts in all sweet clover and is responsible for the characteristic odor associated with sweet clover. In sweet clover that is spoiled or damaged, the coumarin is converted to a toxic substance called dicoumarin. This dicoumarin interferes with the metabolism and synthesis of vitamin K. Vitamin K is essential to liver for synthesis of four components (prothrombin and factors VII, IX, X of blood clotting system) necessary to the prevention of seepage of blood from the circulatory system and to establish the clotting of blood expelled by injury or surgery. Toxic levels of dicoumarin in sweet clover forage may remain for 3 to 4 years of storage. Sweet clover toxicosis is usually a problem in the ruminant animal. The mature animal has a greater resistance to sweet clover toxicosis than the young animal. One method of avoiding toxicity is by planting only the low coumarin content sweet clovers. Avoid contamination of pastures or hayfields with yellow or white sweet clover that contain substantial levels of coumarin. Other preventive measures include stacking or baling sweet clover only when it is well-cured and dry, and avoiding the use of large, tightly-bound bales. Sweet clover should not be fed for at least two weeks before or during the calving period. Animals exhibiting the symptoms of sweet clover poisoning may be saved by direct blood transfusion from disease-free animals that have not consumed toxic sweet-clover. Intramuscular administration of vitamin K used in counteracting the effects of poisoning.

3. Prussic Acid (HCN)

Prussic acid toxicity generally considered as most common plant poisoning among animals. Prussic acid is also known as hydrocyanic acid or hydrogen cyanide (HCN). It is caused by cyanide production in several forages under certain growing conditions. Grain sorghums, sorghum-sudan hybrids, sudan grass, Johnson grass, pearl millet and hybrid foxtail millet are the most commonly associated forages with prussic acid toxicity. Cattle, sheep and goats appear to be the most susceptible livestock to HCN toxicity. Prussic acid is not usually a problem in horses, but sorghum type forages including johnson grass and sorghum-sudan hybrids have been associated with causing urinary tract infections in horses (crystitis syndrome). The symptoms are similar to colic, but include blood in the urine, urine dribbling and abortion in pregnant mares. The condition can be fatal and it

is recommended not allowing horse to graze on these plants.

Environmental conditions such as drought or frost are usually associated with high levels of HCN in forages. Concentrations of HCN are usually at the highest level in younger plants versus more mature plants and on regrowth following haying or grazing. Toxic levels are higher in fresh forage than in cured forage. The HCN concentration in the leaves is higher than the stems with the upper leaves containing higher concentration than the lower leaves. HCN concentration decreases as the plants become taller and more mature. Forage plants have a higher potential for HCN formation when soil is high in nitrogen and deficient in phosphorous and potassium. Usually plants higher than 18 inches are less likely to have high HCN. HCN is a potent and rapidly acting toxic compound. Animals feeding on forages high in prussic acid will develop symptoms within few hours after consuming to toxic forage. Animals are often found dead.

Symptoms: Under field conditions poisonings are of acute in nature.

Acute cases:

- Excitement, staggering, muscle tremors, dyspnoea
- Hyperaesthesia, lacrimation
- Bright red mucosa due to hyper oxygenation
- Nystagmus, terminal convulsion, finally death (if untreated)

Peracute cases:

- Animal die within 10-25 minutes without showing clinical symptoms dyspnoea, muscle tremor, convulsions, which shows just before death

Chronic cases:

- Generally very rare in animals
- Urinary incontinence is very important symptom

In the early onset of toxicity, treat the animal with molasses that has been diluted with water. Feeding small or moderate amounts of grain prior to grazing on summer annual forages will help prevent possible toxicity. Starch from the grain is broken into glucose in the digestive tract preventing the rate of release of HCN from the glycoside by the enzyme emulsin. Livestock affected by prussic acid could be treated with a combined intravenous dose of sodium nitrite and sodium thiosulfate.

4. Mimosine Toxicity

Mimosine is a non-protein amino acid which is toxic to animals. Subabul (*Leucaena leucocephala*, L) is vigorous, rapidly growing, drought tolerant, palatable protein rich foliage. In spite of excellent source of nutrients L. *leucocephala* forage as well as seed contains a number of toxic constituents which may severely limit its utilization in livestock. The poor nutritive value of *Leucaena* arises principally from its toxic amino acid mimosine and its immediate degradation products, 3-hydroxy-4 (1H) pyridone. The mimosine content varied in different parts of a plant and also depending on seasons and maturity. Seeds contain 4 to 5% mimosine on a dry-weight basis. The mimosine contents of different parts of the shoot vary from 1 to 12% old stems contain the smallest and growing tips contain the largest amounts. *Leucaena* root also contains 1 to 1.5% mimosine.

Mechanism of Toxicity:

- By blocking the metabolic pathway of aromatic amino acids like phenylalanine, tyrosine, tryptophan, proline.
- Due to its structural resemblance to L-tyrosine, it probably acts as a tyrosine analogue or antagonist that inhibits the protein synthesis with low serum tyrosine level
- The metal chelating ability disturbs the action of metal containing enzymes especially those containing iron cations and cause inhibition of some biological reactions
- Acts as a vitamin B6 antagonist, inhibiting the activities of a number of enzymes that require pyridoxal phosphate, such as cystathionine synthetase and cystathionase from liver. Inhibition of the system that forms cysteine from methionine
- The protein in hairs contains an unusually large amount of cysteine which converted to methionine results in hair fall (Alopecia)
- DNA, RNA and protein synthesis are inhibited
- Adverse effect on biosynthesis of collagen in embryonic cartilage from chick embryos, due to inhibition of the synthesis of hydroxylproline. The reduction in collagen content in embryonic cartilage

Symptoms:

- Growth retardation due to inhibition of protein synthesis
- Low serum thyroxine level results in reduced Basal Metabolic Rate (BMR) and goiter
- Severe hair falls (alopecia) all over the body with hyperkeratosis
- Cataract, decreased fertility
- Due to the neurotoxin effect which develops paralysis of the hind limbs
- Calves like young animals death also reported due to severe mimosine toxicity

5. Bracken fern

Ingestion of bracken fern (*Pteridium* species) is the main cause of poisoning in ruminants. The most well known is seen in cattle and rarely sheep and is due to marrow failure. Young bracken ferns are the most toxic and the disease usually affects calves after 3 weeks of grazing them.

Symptoms:

- Haemorrhagic disease due to a profound thrombocytopaenia
- Haemorrhagic nasal discharge, blood in faeces and haemorrhages in mucous membranes
- Anaemia and leucopaenia

Clinical cases are almost always fatal and new cases may continue for 6 weeks after removal from the source. Long-term consumption of bracken by cattle is also associated with an enzootic haematuria. This is the result of dysplastic or neoplastic transformation of the urinary bladder mucosa and bleeding from these sites. There has also been an association reported between the prolonged consumption of bracken and the development of alimentary tract carcinoma.

6. Nutritional haemo-globinuria

Brassica family contains the amino acid S-methyl cysteine sulphoxide (SMCO) which is converted within the rumen to the oxidant dimethyl disulphide. When absorbed, this product denatures haemoglobin to form Heinz bodies with subsequent anaemia. The SMCO content in all plant parts increases progressively with age and is particularly high after flowering. Animals are therefore, most at risk when their diet consists predominantly of this type of brassica growth.

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Outbreaks occur when animals have been grazing the crop for at least 1 and upto 3 weeks. In severe cases animals may be found dead. On close inspection some will be noticed to have red urine, weak and dejected. There is pallor of the mucous membranes and moderate jaundice. Other causes of haemolytic disease in ruminants need to be considered in the differential diagnosis. These include post-parturient haemoglobinuria, leptospirosis, bacillary haemo-globinuria, onion toxicity, chronic copper poisoning. The history of access to brassicas will give a presumptive diagnosis which can be confirmed by demonstrating a Heinz body haemolytic anaemia in some affected animals. In addition, a sample of the brassicas can be analyzed for SMC0 and concentrations of 0.5-2.0% are diagnostic.

7. Pyrrolizidine alkaloid poisoning

Ragwort (*Senecio jacobaea*) a common weed in pasture, contains a pyrrolizidine alkaloid which is hepatotoxic. This is generally unpalatable to stock but its palatability is greatly increased when cured in hay or wilted or sprayed with herbicides. Stock will also eat the green plant if forced to by the lack of other food and it has been suggested that some animals develop a partiality for it. Its toxicity is not reduced by drying, whereas levels do fall with ensiling. Cattle and deer are the most susceptible whereas sheep and goats appear able to eat it almost with impunity. In fact sheep are often used to control ragwort on infested properties and they find it moderately palatable.

Pyrrolizidine alkaloids are relatively nontoxic but the hepatic mixed function oxidases convert them to highly reactive pyrroles which then react with cellular constituents causing hepatocellular injuries. The signs of ragwort toxicity may appear to be acute but the natural disease is quite chronic. Acute toxicity with clinical signs occurring a short time after ingestion does occur experimentally but animals at pasture seldom consume enough toxic plant over a short time interval to cause acute signs and rapid death. In the natural disease clinical signs do not appear until weeks to months after the onset of plant consumption. Upto 17th months has been recorded as the latent period in experimental well controlled diet. This makes the diagnosis challenging especially if the animals have been moved in the interim.

Symptoms:

- By the time clinical signs are seen the animal is in terminal liver failure and dies within a few days
- In range situations the animal is often found dead

- Condition loss, dullness, severe diarrhoea with straining
- Staggering and partial blindness
- Abdominal pain & straining may be sufficiently severe to cause rectal prolapsed
- Some animals are also quite excitable and may charge moving objects

In the live animal, confirming a diagnosis requires histopathological examination of a liver biopsy. This is diagnostic as ragwort causes a diffuse hepatopathy.

8. Oestrogenic compounds

There are three natural oestrogenic compounds that may affect ruminants. *Trifolium subterraneum* (subterranean clover) and *T. pratense* (red clover) may contain isoflavones of which formononetin is the most well known. Coumestans are found in *Medicago* species (lucerne) and zearalenone is an oestrogenic mycotoxin produced by *fusarium* fungi that grow in the litter at the base of a pasture sward. The main effects appear to be in ewes grazing red clover or lucerne during mating. The lambing percentage may be decreased and lambing spread increased. White clover contains very low levels of phyto-oestrogens except when the plants have a heavy fungal infection. This stimulates the plant tissue to produce coumestrol. Fungal infection also significantly increases the phyto-oestrogen content of red clover and lucerne. Oestrogenic crops do not become safe when made into hay or silage.

9. Photosensitivity

Mycotoxin and Sporidesmin are produces facial eczema, which is most common cause of photosensitivity in pasture grazing ruminants. There are a number of plant species that, either by containing a photodynamic agent or by causing liver damage are capable of inducing photosensitivity. *Panicum* species (*P. mileaceum* and *P. dickotomiflorum*) are possibly the most common pasture plants to cause hepatogenous photosensitivity.

Ruminants with access to ponds and lakes are also at risk of ingesting toxic blue-green algae. These algae grow prolifically during the summer when water temperatures are high and ponds are shallow. Two syndromes are recognized and relate to the quantity of toxin ingested. Animals may die acutely if large quantities of toxin are absorbed in a short time. In the more chronic form there is jaundice and photosensitivity due to liver damage.

10. Tannin Toxicity

Tannins are polyphenolic compounds with molecular weight more than 500 daltons. Tannins are classified into 2 types, Hydrolysable tannin and Condensed tannin. Hydrolysable tannin yield gallotannins and ellagitannins when hydrolysed by water, acids or bases. Whereas condensed tannins are polymers of flavonol. When tannins are compounded at less than 4% in feed ration it is used to produce bypass protein.

Source: Sorghum, salseed meal, mango seed kernel, mustard oilcake and lucerne meal.

Toxicity:

Both hydrolysable and condensed tannins having both beneficial and adverse effects in animals biological system based on their concentration and nature besides other factors such as animal species, physiological state of animal and composition of diet. When tannins inclusion in feed exceeds 4% it causes different deleterious effect in animal biological system based on their concentration.

Mechanism of Toxicity:

- Tannins particularly condensed tannins inhibit several enzymes namely pectinases, cellulases, amylases, proteases, beta galactosidases, lipases and other which are involved in microbial fermentation of cereal grains in ruminants, glutamate dehydrogenases, alanine amino transferases
- Reduce the level of adrenocorticotrophic (ACTH) hormone
- Growth hormone concentration increases and tri-iodothyronine decreases with increase concentration of tannin in diet
- Reduced absorption of vitamin A and vit-B12
- Interacts with thiamin and make it unavailable to the animal
- Tannin reduces the bioavailability of iron by complex formation with iron
- Tannin has astringent property. It binds and precipitate salivary mucoprotein which causes loss of lubricating property of saliva that lead to dryness of oral cavity
- Tannin may affect the palatability by binding to taste receptors lead to reduce the intake

- Cellulose and protein degradation was reduced by gallotannic acid
- Tannins also having the DNA or RNA breaking activity
- Tannin has high affinity with protein than carbohydrate due to its stronger hydrogen bonding affinity to carboxyl oxygen of the peptide group. So that reduces the protein digestibility

Symptoms:

- Due to the reduced protein digestibility animal becomes emaciation, in case of young animal growth retardation will be there
- Production ability of the animal also reduced
- In case of poultry leg abnormalities due to impaired formation of bone matrix and outward bowing of leg with swelling of hock joint
- Olive green discoloration of egg yolk at 2% tannin level in diet
- Renal failure, proteinuria, haematuria, glucosuria and increased blood urea nitrogen and creatin level
- In goat feeding of tannin @ 1.1g per kg body weight showed renal, pancreatic, skin necrosis, but these lesions not seen in sheep even they provide with 8g of tannin per kg body weight

11. Oxalate Poisoning:

Toxicity due to absorption of soluble oxalates such as sodium and potassium oxalate. Calcium oxalate is non-toxic in nature.

Source:

- Rice straw-oxalic acid 1.6% (in that 1.35% soluble-more toxic)
- Hyacinth meal, Beta vulgaris (beet), spinach

Mechanism of Toxicity:

- Soluble oxalates converted to carbonates, bicarbonates result in alkalosis
- Forms complex with calcium and make it unavailable for absorption and most of the calcium excreted as calcium oxalate through faeces
- Produce hypocalcaemia, hypomagnesemia result in death. Due to interrupted calcium metabolism milk production is decreased

- In kidney oxalate crystals interfere in the tubular function. Kidney damage is due to chronic ingestion of oxalates
- Oxalate inhibits various respiratory enzymes activated by calcium or magnesium.
- 30g leads to death to sheep

Symptoms:

- Initially shows dullness and anorexia
- In acute toxicity vagus nerve may be affected leading to stoppage of ruminal motility and even may cause suppression of microbial activity in rumen thereby lowering cellulose digestion
- Due to calcium deficiency bones more prone to fracture

- Kidney or bladder calculi may formed
- Increase in blood clotting time due to calcium deficiency
- High yielding cows and buffaloes may be prone to a syndrome milk fever caused by condition of fall in level of blood calcium
- In chronic condition result in kidney damage leading to uremia

Conclusion

Toxic substances in forages and weed consumed by livestock could affect animal performance and health by reducing productivity, causing symptoms of illness and in some cases death also occurs. Forage testing becomes a very important part of determining nitrate and prussic acid toxicity in animals.

ADVERTISERS INDEX

AB Vista South Asia	69
Allanasons Private Limited	75
Anmol Feeds Pvt. Ltd.	76
Avanti Feeds Ltd.	40
Avitech Nutrition Pvt. Ltd.	4
Berg + Schmidt (India) Pvt. Ltd.	7
Biomim India	52
BlueLine Foods (India) Pvt. Ltd.	37
Ceva Polchem Pvt. Ltd.	25
Delacon.....	3
DSM Nutritional Products India Pvt. Ltd.....	8
Evonik Industries	65
Godrej Agrovet Limited	2
Huvepharma	74
India Trading Bureau Pvt. Ltd.	73

Japfa Comfeed India Pvt. Ltd.	14
Kemin Industries.....	31
Nanda Group.....	20
Neospark.....	45
Noble Vetscience LLP, India	70
Novus.....	63
Organo Fertilizers (India) Pvt. Ltd.....	46
Perfect Feedchem Pvt. Ltd.	58
Phileo.....	26
Provimi Animal Nutritional India Pvt. Ltd.	38-39
Suguna Foods.....	51
The Waterbase Ltd.	13
Volschendorf.....	32
Zoetis India Limited	19
Zydus Animal Health	57

Feeding bypass nutrients to high yielders for better performance

Sukhjinderjit Singh, Parvinder Singh
Krishi Vigyan Kendra, Amritsar

From the past few years, cross-breeding programmes and schemes for up-gradation of livestock has infused the low yielding indigenous animals with high yielding capabilities and this has led to rearing of cross bred cows on commercial scale. Farmers have shown interest in rearing these high yielding cross-bred animals which is reflected through establishment of more and more modern dairy farms in our state. These high genetic potential animals are not able to express fully without proper nutrition, proper management practices and proper sheds to combat the heat stress. In these animals which are high producers, energy and protein become limiting factor in early lactation because of low feed intake. Feed intake lags behind peak milk production by about 5 weeks which results in negative energy balance in high producers. Negative energy balance has direct impact on milk production and fertility of the animal. Energy and protein available from body reserves can supply only a limited amount of animal's requirements. Thus these improved animals need high quality, nutrient dense feed that can bypass the rumen to protect the nutrients from rumen microbial degradation into microbial products of lower value. This is more applicable for cows producing more than 15 kg of milk per day because they need continuous supply of bypass nutrients to produce maximum to their genetic potential. These bypass nutrients include bypass protein and bypass fat which supplement the protein and energy requirements of the animals (especially in early lactation when physiological needs are high and feed intake is depressed).

Bypass protein refers to the protein present in feed which is protected from being degraded in the rumen by the microbes and digested in lower part of the digestive tract. Bypass fat refers to fat or fatty acids that are protected from degradation and bio-hydrogenation by rumen microbes in the rumen. A best bypass nutrients source is cotton seed which are rich in bypass fat and bypass protein. Ground nut cake is a poor source of bypass nutrients.

Rumen microbes inhabiting rumen break dietary protein and non protein materials into ammonia, amino acids, peptides which are incorporated in microbial protein with medium biological value. Dietary fats are broken into fatty acids and glycerol. Unsaturated fatty acids get bio-hydrogenated to saturated fatty acids which are used by microbes for their growth and multiplication. Thus the unsaturated fatty acids are not available to the animal. However when bypass fat is fed, it ensures absorption of degraded products (Unsaturated fatty acids) in the lower tract leading to fulfillment of essential fatty acids requirement of the animal. Moreover microbial fermentation in the rumen is not suppressed by addition of bypass fat in the diet and fatty acids absorbed in the intestine supplies more energy for more milk synthesis and more unsaturated fatty acids are liberated in the milk.

Demand for energy and protein are high for high yielders and during early lactation supply of these nutrients is not commensurate with demand due for physiological stage which affects the potential of the animal. Fats have high energy density and with same intake level, energy intake increases. To meet energy requirements of high yielding animals, fats are added in diet to meet the energy deficit, over and above the energy supplied by the cereals. High cereal proportion in diet decrease pH of the rumen and depresses fibre digestion. So protected fat becomes the other important energy nutrient to supplement the energy needs of high yielders.

Protein is the second limiting factor in the diets of high yielding cows. Before calving if the animal is provided high nutrient ration (lead ration) it can store fat and metabolizable protein as reserves in body tissue which after calving mobilizes from body reserves to sustain the production. The animal loses weight in mobilizing body reserves and each Kg weight loss contributes energy for 6-7 Kg of milk and protein for 3.5 Kg milk so the deficit of protein for 3-3.5 Kg is met through increase in protein content of diet to 16-17% and

REPORTS FROM IPPE

AB Vista: NIR tools can reduce losses linked to feed ingredient variability

By Aerin Einstein-Curtis, 14-Feb-2017

Related topics: Manufacturers, Markets, Grains, Protein & amino acids, Analytical equipment

NIR technology is moving beyond analysis of traditional components such as fibre and protein to include measurements of phytate, energy and reactive lysine, says AB Vista.

The company works with near infrared (NIR) technology as way to help customers format their feeds more precisely and avoid wasting essential nutrients, said Glison Gomes, global technical manager, AB Vista.

We caught up with him at the International Processing and Packaging Expo (IPPE) in Atlanta to hear more about how the technology can be used for precision feeding, and what new uses may be available in the future.

"This [NIR analysis] service allows the customer to better understand the key ingredient that is the cereal, and therefore utilize it wisely," he said. "We don't want our customers to have to put in an extra safety margin, we want them to be precise [and] to have better profitability."

NIR analysis can be used to screen amino acids now, he said.

"In the past it was not possible to analyze amino acids, and then with better technology, better computational software we're able to measure tiny things in the feed or in the feedstuffs," he added.

"In the beginning everyone was skeptical about NIR; it is only recently that everyone has been keener to use and understand it," he said. "Also computational technology has evolved a lot – you are now able to carry out data transformation to increase the precision of this technique."

Energy capture

One goal of using NIR tools in feed formulation is to ensure that nutritional elements in a feed are not wasted, said Gomes. For example, if a producer knew that two loads of corn being used to make a feed offered different energy levels, they could select the one required for optimal animal performance, he said.

The energy value of different cereals can vary by 360 kcal/kg, said AB Vista, while phytate levels vary not just between feedstuffs but also within a single raw material.

The technology also allows producers to evaluate feed ingredients coming from different locations, said Gomes. It also allows them to both specify and verify that feed ingredients contain certain elements.

"We have a big database of raw materials coming from different countries and for instance some companies import corn from the US, from Argentina, and from Brazil and then you can see the differences," he said. "I can pay a little bit more for supplier a, b or c because the quality of their feedstuff is a little bit better, or there is more protein or more energy."

Mixed feed analysis

One recent advancement in NIR technology has been to allow for the analysis of mixed feeds rather than single feed ingredients, said Gomes. However, it is still a common misconception that ingredients have to be examined individually.

"There is still misunderstanding about NIR," he said. "The technology picks up the vibration of molecules, so organic molecules vibrate and this happens regardless of if they are alone or if they are in a mixture. So in reality, if you have a very good database and a very good calibration, you will be able to pick up differences or vibrations even in complete feed."

Although NIR technology to track potential anti-nutrients, such as mycotoxins, is not available yet, that is being explored, said Gomes.

Eventually the ability to analyze the nutritional elements or qualities of a feed ingredient could allow feed mills the chance to channel ingredients by grade, said Gomes. But facilities would likely need to significantly increase the number of silos or storage options to make use of that process, he added.

He said improved computer processing speeds would enable feed mill mixing systems to both evaluate feed ingredients as they are brought into a facility and to modify feed formulations as needed: *"We don't have fast enough computers and*

systems to make all of this happen, but people are using these technologies in milk [analysis] – so you have this sort of inline stuff going on with more simple models and that I do believe this will happen soon in the feed industry."

AB Vista: "Currently used for basic raw material and feed quality control, new advances in NIR software and hardware are set to deliver commercially viable systems capable of in-line and real-time monitoring of feedstuff and feed nutrient content and physical characteristics. Losses associated with feed ingredient variability can be reduced, feed formulations can be amended and the quality of completed diets continuously monitored."



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adding bypass protein. Dietary protein in the rumen degraded into peptides, amino acids and ammonia that get incorporated into the microbes. So the supplied protein is transformed into microbial protein in the rumen making many of essential amino acids unavailable. Thus irrespective of the quality of protein in the ration, the dietary protein is converted into medium quality microbial protein as microbes require ammonia for their growth and multiplication. Low quality protein in diet gets upgraded in rumen as microbial protein whereas high value dietary protein is converted into lower quality microbial protein of medium biological value. The bypass protein ensures absorption of amino acids directly into blood circulation fulfilling the essential amino acids requirement and resulting in better production. The proportion of degradable protein and undegradable protein (bypass protein) in the ration should be 55-65% and 35-45% of the total CP content of the diet. Bypass protein even up to 55% of CP of diet produced desired effect on milk with increased yield. Protein degradability in the rumen is related to its solubility. It is assumed that the solubility of protein in buffer solution indicates the degradability of the protein of a meal in the rumen. The chemical form of protein, the presence of disulphide bond and phenolics have major influence on degradability of protein in the rumen. Feeding of less soluble protein increases the amount of protein available for digestion and absorption in the lower part of tract. The increase in bypass activity is associated with changes in protein fraction due to heat application or formaldehyde treatment. The surface area of protein that is accessible to microbial proteases is supposed to be reduced by formation of fibrous protein by treatment with formaldehyde and by lipids or other water insoluble substances used to encapsulate the protein.

Bypass nutrients occur naturally in some feed ingredients and can be made artificially.

Bypass effect in proteins can be induced by following methods:

- (a) Heat treatment of oilseeds like soybean or soybean meal at 150°C temperature for 30 minutes.
- (b) Formaldehyde treatment of oilcakes and oilseeds @ 1.0-1.2 gm/100 gm of feed protein.
- (c) Pelleting of oilseed cakes can also induce bypass effect in proteins.

These protein protection methods not only improve palatability but also destroy anti nutritional factors present.

Bypass effect in fats can be induced by following methods.

- (a) Calcium salts of long chain fatty acids are not attacked by rumen microbes provides fatty acids and calcium in lower tract upon digestion.
- (b) Encapsulation of fats and fatty acids by insoluble rumen stable substances and by protected proteins or treating the oilseed cakes with formaldehyde.

Bypass fat supplementation does not interfere with ruminal fibre degradation as Bypass fats are not readily available to rumen microbes.

Bypass nutrients has promising results for growth, milk production, reproduction performance and health of the animals. Increase in milk is directly correlated with decrease in ruminal degradation of dietary protein and feeding of bypass protein to crossbred cows results in significant increase in milk. This increase is due to availability of amino acids in the intestine and increased supply of precursors of milk. Milk yield and total solids increases with addition of bypass fat in dairy ration. Bypass fat inclusion in animals diet make it feasible to alter not only the milk composition but also the body fat for desired fat quality. Higher proportion of long chain fatty acids like oleic, linoleic, and linolenic acid with decreased level of intermediate and short chain fatty acids is found in milk fat of animals fed bypass fat which contributes to softer butter. Supplementation of bypass protein and fat before calving can save the animal from detrimental effects of negative energy and nitrogen balance which in turn increases lactation yield and improves fertility level as well as metabolic performance. Feeding bypass fat increases blood cholesterol concentration which effect plasma progesterone concentration and help improving fertility. Improved energy balance results in an earlier return to postpartum ovarian cyclicity.

Thus by feeding bypass nutrients to high yielding animals, farmers can improve their animals on production and reproduction fronts to have more number of lactations and more milk per lactation. Supplementation of bypass nutrients is thus advocated in ration of high producing dairy animals to meet their energy and protein requirements in order to exploit maximum to their genetic potential.

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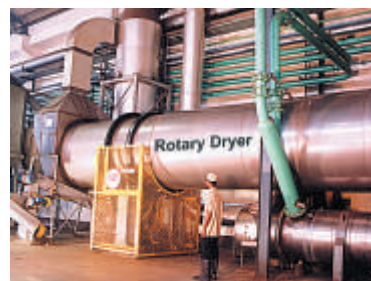


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