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**BUREAU OF INDIAN STANDARDS**

**MINUTES**

| Name of the Committee | No. of Meeting | Date & Time | Venue |
|---|---|---|---|
| Animal Feeds and Nutrition Sectional Committee, FAD 5 | **24th** | **28 October 2022 Wed @ 1030 hrs** | BIS Hqrs |

**CHAIRMAN:**

**Dr. R.K. Singh**
**(Chairman, FAD 5)**
Former Director,
ICAR-Indian Veterinary Research Institute (IVRI),
Izzatnagar, Bareilly

**MEMBER SECRETARY:**

**Nitasha Doger**
**(Member Secretary, FAD 5)**
Scientist-D
Food & Agriculture Department,
Bureau of Indian Standards, New Delhi

**ATTENDANCE** – Please see **Annex-A**

## Item 0 GENERAL

### 0.1 Welcome

Ms. Suneeti Toteja, Scientist-E & Head, Food & Agriculture Department, BIS extended a warm welcome to the Chairperson and members, to the 24th meeting of Animal Feeds and Nutrition Sectional Committee, FAD 5 and thanked them for sparing their valuable time for supporting BIS, the National Standards Body of India in its pursuit of standardization. Ms. Suneeti Toteja, appreciated the work done by the committee in the recent past and emphasized the need for revision of Pre-2000 standards under the scope of the committee on priority.

Ms. Nitasha Doger, Scientist-D, Member Secretary, FAD 5, Food and Agriculture Dept., BIS apprised the members about the work done by the committee since its last meeting and expressed gratitude towards Chairman and members of the committee for their contribution and support in committee's work.

### 0.2 Opening Remarks by the Chairman, FAD 5

Dr R. K. Singh, Former Director, ICAR-Indian Veterinary Research Institute (IVRI), Izatnagar, Bareilly and Chairman, FAD 5 extended a warm welcome to the members of the Committee to its 24th meeting. Dr Singh appreciated the work done by the Committee since its last meeting. He encouraged the members for fruitful discussions on the issues raised in the agenda.

## ITEM 1 CONFIRMATION OF THE MINUTES OF THE LAST MEETING

The Committee confirmed the Minutes of the last (23rd) meeting of Animal Husbandry, Feeds and Equipment Sectional Committee, FAD 5 held on 22 March 2022 as circulated vide email dated 28 March 2022.

## Item 2 SCOPE, ACTIVITIES & COMPOSITION OF THE SECTIONAL COMMITTEE

### 2.1 SCOPE & PROGRAM OF WORK OF THE COMMITTEE

**2.1.1** The Committee noted the information given in Agenda Item 2.1.1 regarding the revised scope & activities of the Committee, FAD 5 as approved by FADC at its 26th meeting held on 30 March 2022 considering committee's recommendation for splitting of earlier Animal Husbandry, Feeds and Equipment Sectional Committee, FAD 5 into two committees i.e., Animal Feeds and Nutrition Sectional Committee, FAD 5 and Animal Husbandry and Equipment Sectional Committee, FAD 32.

**2.1.2** The Committee noted the information given in Agenda Item 2.1.2 regarding approval of FADC for transfer IS 10449: 1983 Code for Transport of Live Fish Seeds for Inland Pisciculture Purposes & IS 10450:1983 Code for Transport of Fresh Water Aquarium Fish from FAD 5 to FAD 12 of BIS and withdrawal of IS 13427:1992/ ISO 6651: 1987 for Animal feeds and feeding stuffs - Determination of aflatoxin B – 1 and IS 13433: Part 2: 1992 Animal feeds and feeding stuffs - Determination of calcium -Part 2 Atomic Absorption Spectrometric Method.

**2.1.3** The committee deliberated upon the programme of work of FAD 5 as provided under item **2.1.3** of the agenda and decided to recommend to FADC for transfer of following Indian standards to Animal Husbandry and Equipment Sectional Committee, FAD 32 considering their relevance to the scope of FAD 32:

| Sl. No | IS Number | Title |
|---|---|---|
| **1.** | IS 5255 : 1986 | Specification for poultry feeders<br>*(first revision)* |
| **2.** | IS 6228 : 1971 | Specification for poultry egg fertility tester |

### 2.2 COMPOSITION OF THE SECTIONAL COMMITTEE

**2.2.1** The Committee reviewed the updated composition of FAD 5 along with the attendance record of last three meetings. The Committee observed lack of participation from CSIR - Central Drug Research Institute (CDRI), Lucknow in the last three meetings. The Committee recommended to retain membership of CDRI, Lucknow in FAD 5 considering their relevance and significance in Committee's work. The Committee accordingly requested BIS Secretariat to follow up with them for participation in the Committee.

**2.2.2** The Committee noted the information given under item **2.2.2** of the agenda regarding approval of FADC for co-option of Dr. A. B. Mandal, Former Director, ICAR-Central Avian Research Institute, Izatnagar in FAD 5 in personal capacity .

**2.2.3** The Committee reviewed the **c**omposition of Expert Panels that come under the purview of FAD 5. The Committee considered that there is a need to have an Expert panel exclusive to deal with test method standards under the scope of the committee. The Committee decided that the scope of the Expert Panel constituted for prescribing suitable test method for testing NPN in Animal Feeding Stuffs may be widened as Expert Panel on test methods standards under FAD 5.

**2.3.3.1** The Committee considered that Quality Management for laboratory animals would now be covered under the scope of Animal Husbandry and Equipment Sectional Committee, FAD 32 and accordingly decided to revise the scope of Expert Panel on Standards Related to Laboratory Animals and Its Quality Management (FAD 5/Panel 12) to Expert Panel on Standards Related to Feeds for Laboratory Animal (FAD 5/Panel 12). The Committee updated the composition of the Expert Panels under FAD 5. The updated information on scope and composition of Expert Panels as agreed by the Committee is given as **Annex B**.

**2.3.3.2** The Committee further decided that the review of following Indian standards where the subject is not falling under scope of any group/ Expert Panel, to be assigned to the members of the committee from respective organizations having necessary expertise on the subject:

| **Sl. No.** | **Indian Standard** | **Review is assigned to** |
|---|---|---|
| 1. | IS 7472 : 1986 Specification for pig feeds (*first revision*) | Dr. Keshab Barman , ICAR-National Research Centre on Pig, Guwahati |
| 2. | IS 10672 : 1983 Specification for mineral mixtures for supplementing sheep and goat feeds | Dr. Randhir Singh Bhatt, ICAR-Central Sheep and Wool Research Institute, Avikanagar |
| 3. | IS 11968 : 2019 Pet food for dogs and cats -Specification First Revision | Dr Akanksha Singh, Association of Indian Pet Food Manufacturers, New Delhi |

**2.3.3.3** The Committee considered that a number of Indian standards are due for review under Pre-2000 category. The Committee requested the respective Expert Panels/ Nominated members to whom the review is assigned to give due priority to this task and complete the same in next 3 months' time. The Committee authorized Convenors of the Panel to rope in additional experts, if needed. The Committee decided that the draft revision prepared by the Panels would be issued into wide circulation for 60 days.

**ITEM 3 INDIAN STANDARDS PUBLISHED/ UNDER PRINT**

The Committee noted the information given under item **3.1** of the agenda regarding the publication status of standards finalized for publication in 23rd meeting of FAD 5.

**ITEM 4 DRAFT INDIAN STANDARDS COMPLETED WIDE CIRCULATION**

**4.1 Doc. No. FAD 05 (19089) C Draft Indian Standard - Animal feeding stuffs — Determination of crude ash (*first revision* of IS 14827 (Adoption of ISO/FDIS 5984:2022)**

**4.1.1** The Committee deliberated upon comments received from NDDB CALF Lab on Doc. No. FAD 05 (19089): Animal feeding stuffs — Determination of crude ash (*first revision* of IS 14827 (Adoption of ISO/FDIS 5984:2022) and decided as follows:

| **Sl. No.** | **Clause/Subclause/ para/ table/fig. no. commented** | **Proposed change** | **Decision of the Commitee** |
|---|---|---|---|
| 1 | 4.5 Incineration dish | Platinum + gold dish are very expensive, and to the best of our knowledge no commercial lab is using them.<br>Quartz dish or porcelain dish may be included. These dish can withstand temperature up to 1000 °C, easy to clean and cost effective. | The committee noted that the comment is on existing version of the standard and is already addressed in the draft revision document. |
| 2. | 6.3 Duplicate determination | Duplicate determination may not be necessary as it is a very simple test and does not include complex steps in the determination.<br>Single determination test would be cost effective for customers. Analyst may run a sample in duplicate in a batch as a quality control measure. | The committee noted that the comment is on existing version of the standard and is not applicable for the draft revision document. |

**4.1.2** The Committee also noted that ISO/FDIS 5984:2022 has now been finalized and published as ISO 5984: 2022 Animal feeding stuffs — Determination of crude ash and accordingly finalized Doc. No. FAD 05 (19089): Animal feeding stuffs — Determination of crude ash (first revision of IS 14827) for printing as identical adoption of ISO 5984:2022.

**4.2 Doc. No. FAD 05 (19434) C Draft Indian Standard - Compounded feeds for cattle — Specification (*fifth revision* of IS 2052)**

**4.2.1** The Committee deliberated upon comments received on the draft during WC period and decided as follows:

| Sl. No. | Clause/Subclause/para/ table/fig. no. commented | Commentator /Organization / Abbreviation | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1. | Foreword, 2nd para | NDDB | General | For better understanding | …separate type of feed meant for low to medium and high producing animals | Agreed by the Committee for better understanding of the text |
| 2. | Ingredients 4.2.2 | CALF, NDDB | Technical | EN 15621 is an ICP OES based multi-element method that can test sulphur in feed sample. It is being recommended to test calcium and phosphorus also. | …. for testing of sulphur, the method given in Annex B of IS 1664 / EN 15621 shall be used. | Agreed by the Committee as the same method is also being referred as an alternate method of determination for determination of other elements in the draft |
| 3. | Ingredients 4.2.2<br><br>Table 1 (x) Requirements for Compounded Feeds for Cattle | ALLTECH | Technical | Indian and international guidelines recommend a higher maximum limit of urea in compounded feeds/concentrates that is still considered safe for the animal:<br>• According to the Nutrient Requirements of Cattle and Buffalo (2013) issued by the Indian Council of | Increase the maximum limit of urea to not exceed 1.5 percent by mass in compounded feeds for cattle. When urea limit is increased, the mass of easily digestible carbohydrates like molasses, cereal grains, potato starch, tapioca starch, etc. in compounded cattle feed should be increased | Not Agreed<br><br>The Committee was of the view that urea is used as an alternate and cheaper source of nitrogen to meet the specified requirement of crude protein in finished product. Further, the standard does not differentiate Compounded feeds from complete feed for cattle. |

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| | | | | Agricultural Research [ICAR]: The maximum safe limit of urea is 136 g/adult animal/day which is equivalent to 1.89% urea in concentrate/compounded feed when considering a cow producing 10-12 litres of milk, consuming 12 kg of DMI (dry mater intake or complete diet on dry matter basis) and being fed the maximum recommended amount of concentrate/compounded feed (60% of total diet).<br>• According to the Merck Veterinary Manual (2021): Urea should not be fed at a rate exceeding 2%–3% of the concentrate or grain portion of ruminant diets and should be limited to ≤1% of the total diet.<br>Examples of international guidelines recommending a 1% maximum limit of urea in 'complete feed'/total diet include: | proportionally in line with the appropriate ratio of urea to easily digestible carbohydrates. In India, farmers typically feed concentrate twice a day with high amount of straw which is high in fiber. To digest this high fibre content, the rumen must have a healthy population of fibrolytic bacteria, which can only be attained if the rumen is having sufficient ammonia.<br>4.2.2:<br>The proportion of urea when incorporated shall not exceed 1.5 percent by mass.<br>Table 1: (x) Urea, percent by mass, Max: 1.5 (Type I) 1.5 (Type II)<br><br>Apply the 1.0 percent maximum limit of urea to 'complete feed' instead of 'compounded feed'. Urea can be supplied up to 1.5% by mass in 'compounded feeds' for cattle when these 'compounded feeds' are | Increase in maximum limit of urea may not be justified in view of the following considerations:<br><br>(i) Milk producers may provide 10-12 Kg compound cattle feed/day to high yielding dairy animals that would be equivalent to the daily consumption of 100-120 g urea, which is below the recommended level (136 g/day) of toxicity (ICAR, 2013).<br><br>(ii) In crop residue-based diet of dairy animals in India, generally the availability of fermentable sugar remains deficient. If limits are increased, urea toxicity may occur in cases where the diet is deficient in soluble sugars. Thus, the maximum limit of urea @ 1.0% in BIS specification of cattle feed seems reasonable.<br><br>(ii)Nowadays dairy animals are also fed with silages and grasses that contains NPN content, increasing the urea limit will further increase its level. Hence, Urea limit in compound cattle feed needs to be kept as such. |

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| | | | | • **European Food Safety Authority (2012**): "Urea supplementation of feed for ruminants at doses up to 1% of complete feed DM (corresponding to 0.3 g/kg bw/day) is considered safe when given to animals with a well-adapted ruminal microbiota and fed diets rich in easily digestible carbohydrates." (EFSA. Scientific Opinion on the Safety and Efficacy of Urea for Ruminants. EFSA J. 2012, 10, 2624)<br>• **Merck Veterinary Manual (2021):** Urea should not be fed at a rate exceeding 2%–3% of the concentrate or grain portion of ruminant diets and should be limited to≤1% of the total diet. | combined with other feed ingredients to make 'complete feed'. Where the complete feed contains urea-supplemented compounded feeds, the complete feed must not have a total urea content exceeding 1%. | In light of the above, the Committee was of the view that the present limit for urea is 1.0% in IS 2052 is justified and may be retained as such. |
| 4. | Ingredients 4.2.2 | Cargill (received vide e-mail dated 27 Sep 2022) | Technical | - | Sulphur & Nitrogen ratio should be Max 12:1 | Proposed change was not agreed by the Committee as the proposal was not substantiated with any technical justification/ reference data/study. |

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| 5. | 5.1<br>Packing | Cargill<br>(received vide e-mail dated 27 Sep 2022) | Technical | Poly Propylene is the more stable packaging due to high melting point, chemical resistance, and light weight in nature. It is commonly used in the food/feed industry | Compounded cattle feeds shall be packed in clean and sound plain or polyethylene lined jute or laminated paper bags or HDPE or polypropylene bags. The mouth of each bag shall be machine stitched. | Agreed by the Committee considering that Poly Propylene is commonly used as suitable packaging material for feeds and also provides effective protection from moisture. |
| 6. | 5.2<br>Marking | Cargill<br>(received vide e-mail dated 27 Sep 2022) | Technical | Month and year will not capture the complete range of short shelf life. eg 45 days. Hence it can mislead consumer. | Existing method of declaring best before date is aligned with the industry and is recommended not to be changed. | The Committee considered the proposal and decided to amend the best before date format from 'Month and year format' to 'Day, month and year' format. |
| 7. | Table 1<br>Sr. no. (ii) to (xv)<br>Requirements for compounded feeds for cattle | Cargill<br>(received vide e-mail dated 27 Sep 2022) | Technical | NIR is widely used in Feed industry, it's good equipment with respect to continue monitoring and accuracy. And feed industry is bulk industry so real time testing and monitoring help us to avoid any major rework at manufacturing sites thereby improving ease of doing business | 1. The values specified for requirements at SI No. (ii) to (xv) are on moisture-free basis.<br>2. In case of dispute, the test methods given above and wherever indicated by '*' shall be the referee method.<br>3. For crude fibre, the manual method given in IS/ISO 6865 shall be the referee method.<br>4. For routine analysis, the characteristics at SI. No. (ii) to (v) may be tested by near infrared analyser | The Committee agreed that for routine analysis validated NIR may be used by the manufacturer for requirements at SI. No. (ii) to (v) of Table 1. This may suitably be incorporated in the bottom notes under Table 1 of the draft revision document as use of NIR for routine analysis is also permitted in the present version of the standard i.e. IS 2052:2009. |

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| 8. | Table 1, Sr. No. (i), column 5 Moisture | CALF, NDDB | Editorial | For uniformity | 4 (should not be bold) | Not agreed as the same is not in accordance with IS 12: 2005 Guide for drafting and presentation of Indian Standards |
| 9. | Table 1 Sr. no. (ii) Crude protein | Cargill (received vide e-mail dated 27 Sep 2022) | Technical | b. Dumas method is very accurate, Cost effective and analyst friendly, Retard the intervention of hazardous acids | To consider following additional methods:<br><br>a. ISO '16634-1: 2008' Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content.<br>b. AOAC Method 990.03 Protein (crude) in animal feed - Combustion method. | The Committee considered the proposal and agreed to prescribe Dumas Method as an alternate method for testing of Crude Protein. The Committee decided to refer ISO '16634-1 for the same. |
| 10. | Table 1 Sr. no. (v) Acid insoluble ash | Cargill (received vide e-mail dated 27 Sep 2022) | Technical | | IS 1712 refer to the "Cottonseed Oilcake as Livestock Feed Ingredient" and there is no Annex A referring to the AIA procedure. Please amend accordingly as per correct procedure required. | The Committee noted that IS 1712 has recently been revised and Annex A of IS 1712: 2022 prescribes test method for Acid Insoluble Ash. |
| 11. | Table 1, Sr. No. (vi), column 5 | CALF, NDDB | Technical | EN 15621 is an ICP OES based multi-element method that can test | Clause 4 of IS 7874 (Part 2) or EN 15621 | Not Agreed<br><br>The Committee deliberated that |

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| | Salt (as NaCl based on Na or Cl) | | | sodium in feed sample.<br>It is being recommended to test calcium and phosphorus also. | | ICP-OES based multi-element test method is for determination of Sodium as an element and not for salt determination as such. Sodium from other sources like sodium bicarbonate would also add to sodium content present as sodium chloride. The Committee also noted that the method presently prescribed in IS 2052 i.e Clause No. 4 of IS 7874 (Part 2) is for Titrimetric method for chloride. |
| 12. | Table 1,<br>Sr. No. (ix), column 5<br>Available phosphorus | CALF, NDDB | Technical | Annex F of IS 1374 is a cumbersome and erroneous method. | CALF has developed and shared to BIS in-house method for available phosphorus. This method can be considered after validation. | The Committee noted that the proposal is coming up as a separate agenda item for deliberation. (*Please see item 8.2* ) |
| 13. | Table 1<br>Sr. no. (x)<br>Urea | Cargill (received vide e-mail dated 27 Sep 2022) | Technical | In Table 2 of IS 2052:2009, SI. No (V) Urea, percent by mass, Max is mentioned. However, in the reference method in IS: 7874 (Part-1) 1975- Clause No 6 Determination the Urea Nitrogen % is mentioned | Please clarify if only Urea need to be tested or Urea nitrogen | The Committee clarified that the standard specifies requirement for Urea, percent by mass. The value obtained for urea nitrogen needs to be converted into Urea, percent by mass using suitable conversion factor. |

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| 14. | Table 1<br>Sr. no. (xii)<br>Vitamin $D_3$ | Cargill (received vide e-mail dated 27 Sep 2022) | Editorial | Don't Found Annex C in IS 2052 found in Annex E | Change it to :Annex C of IS2052 | Agreed |
| 15. | Table 1<br>Sr. no. (xiv)<br>Alfatoxin $B_1$ | Cargill (received vide e-mail dated 27 Sep 2022) | Technical | Suggested validated method (AOAC 1997 16th edition) is less costly, more efficient with good recovery | AOAC 1997 16$^{th}$ edition method to be considered additionally | Not agreed as the standard already prescribe a number of alternate methods including AOAC method for determination of Aflatoxin $B_{1.}$ There is no reasonable justification to consider an additional alternate test method i.e. earlier version of AOAC. |
| 16. | Annex B<br>B-1.6<br>Waste Materials and Industrial By-products | ALLTECH | General | • SRU provides a safer, controlled release of non-protein nitrogen (NPN) to the cattle rumen over time, when compared to urea. A study conducted by the National Institute of Animal Nutrition and Physiology (NIANP) in India confirmed the slow rate of nitrogen release from an SRU when compared to free urea and concluded SRU can be used at higher levels and has a higher safety margin than free urea.<br>• SRU has demonstrated | Addition of slow-release urea (SRU) as a separate ingredient category from urea/free urea. We propose addition of SRU as a separate entry to the Annex B list<br>B-1.6 Ingredients for Compounded Cattle Feeds. We propose SRU should be registered/approved with BIS as a separate category of raw material for inclusion in compounded cattle feed. In Indian feeding conditions where farmers generally feed their cattle twice a day, it is not difficult to imagine that | The Committee considered that Slow Release Urea (SRU)is also Non-Protein Nitrogen and there is no need to mention SRU separately in the standard as an ingredient. The requirement specified for Urea covers SRU. |

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| | | | | safety in target species (dairy cows) when incorporated at high doses in feed. A study conducted by the Japan Scientific Feed Association (2013) showed intake of up to 2.9% SRU in a complete ration by dairy cows had no negative impact on their performance (milk yield) or health (blood ammonia nitrogen and urea nitrogen). This study demonstrates that SRU can be safe for dairy cows when supplemented above 1% and even up to 2.9% of complete rations.<br>• SRU has demonstrated efficacy in target species and environmental sustainability. According to a meta-analysis evaluating 17 experiments/trials with 44 dietary comparisons, replacing vegetable protein sources with SRU | ammonia levels in rumen will peak immediately after the concentrate feeding and will go down as the time passes.<br>SRU will provide and maintain constant level of ammonia in rumen and will help in better fiber digestion.<br>B-1.6 Ingredients for Compounded Cattle Feeds:<br>o) Slow-release urea | |

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| | | | | improved feed efficiency and nitrogen use efficiency. Milk yield and feed efficiency increased in response to increasing levels of SRU inclusion and dietary CP. The inclusion of SRU in dairy diets reduced the carbon footprint of feed use for milk production, decreased manure nitrogen excretion, and decreased nitrogen excretion intensity.<br>(Salami SA et al. [2021] Meta-analysis and sustainability of feeding slow-release urea in dairy production. PLoS ONE 16[2]: e0246922.).<br>• SRU included at 2% in concentrate mixture to replace cottonseed meal in lactating buffalo diets demonstrated advantageous effects for efficacy and environmental benefits of dairy production. SRU | | |

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| | | | | included at 2% in concentrate mixture increased rumen pH, ammonia nitrogen, volatile fatty acids, and microbial nitrogen yield. These SRU diets reduced manure methane and nitrous oxide emission and were assessed to have a water sparing effect and low carbon footprint per unit milk production. (**Reddy PRK et al. [2019**] Environmental sustainability assessment of tropical dairy buffalo farming vis-a-vis sustainable feed replacement strategy.<br>• Labelling:<br>SRU product labelling is recommended to have directions for use and precautions that ensure safe use when incorporated into compounded feed and complete feed.<br>•Provisions/precautions | | |

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| | | | | recommended for SRU product labels include:<br>The permitted maximum content of urea in compounded feed (1.5%) and/or complete feed (1%).<br>If feeding SRU in combination with free urea/another non-protein nitrogen source, do not feed more than 1% total non-protein nitrogen in the complete feed.<br>Ensure sufficient ruminally fermentable carbohydrates and sugar in the ration in line with the appropriate ratio of urea to easily digestible carbohydrates. | | |

**4.2.2** The Committee finalized the Doc. No. FAD 05 (19434) C Draft Indian Standard - Compounded feeds for cattle — Specification (*fifth revision* of IS 2052) for printing with modifications as agreed above.

**4.3** The Committee noted that the Doc: FAD 05 (18514) Animal feeding stuffs — Vocabulary (Adoption of ISO 20588:2019) was finalized by the Committee for publication in its 23rd meeting with the recommendation for withdrawal of IS 9703:1980 Glossary of terms for Animal feeds and feeding stuffs with the publication of this document. The Committee deliberated upon the observation of BIS secretariat that ISO 20588:2019 does not cover all the terms provided in IS 9703 which may be significant in Indian perspective. The Committee considered and concurred with this observation of BIS Secretariat. The Committee accordingly decided to drop Doc: FAD 05 (18514) Animal feeding stuffs — Vocabulary (Adoption of ISO 20588:2019). The Committee further decided to take up review of IS 9703:1980 Glossary of terms for Animal feeds and feeding stuffs taking assistance from ISO 20588:2019 as some of the content from ISO 20588 may be relevant and useful in revising the IS 9703: 1980. The Committee assigned this responsibility to Expert Panel on Cattle Feed and Feed Ingredients (FAD 5/ Panel 11).

**ITEM 5 DRAFT INDIAN STANDARDS UNDER WIDE CIRCULATION**

**5.1** The Committee noted the information given under item 5 regarding wide circulation of following 8 draft Indian standards identically adopting corresponding ISO standards :

| Sl. No. | Doc. No | Title |
|---|---|---|
| 1. | FAD 05 (20368) | Animal feeding stuffs —Determination of available lysine (Adoption of ISO 5510:1984) |
| 2. | FAD 05 (20369) | Animal feeding stuffs — Determination of starch content — Polarimetric method (Adoption of ISO 6493:2000) |
| 3. | FAD 05 (20370) | Animal feeding stuffs — Determination of soluble nitrogen content after treatment with pepsin in dilute hydrochloric acid (Adoption of ISO 6655:1997) |
| 4. | FAD 05 (20371) | Animal feeding stuffs — Qualitative determination of zearalenone (Adoption of ISO 6870:2002) |
| 5. | FAD 05 (20374) | Animal feeding stuffs, cereals and milled cereal products — Guidelines for the application of near infrared spectrometry (Adoption of ISO 12099 : 2017) |
| 6. | FAD 05 (20377) | Animal feeding stuffs — Determination of lysine, methionine and threonine in commercial amino acid products and premixtures (Adoption of ISO 17180 : 2013) |
| 7. | FAD 05 (20378) | Animal feeding stuffs — Determination of zearalenone by immunoaffinity column chromatography and high performance liquid chromatography (Adoption of ISO 17372 : 2008) |
| 8. | FAD 05 (20379) | Animal feeding stuffs — Determination of aflatoxin B1 (Adoption of ISO 17375 : 2006) |

**5.2** The committee noted that the drafts were sent into wide circulation with 60 days commenting period with last date of comments on 31 Oct 2022 and no comments were received on the drafts till 28 Oct 2022. The Committee decided that in case, no comments

are received on these drafts till 31 Oct 2022, these may be considered as finalized and may be processed for publication with the approval of Chairman FAD 5.

**ITEM 6 APPROVAL OF DRAFT STANDARDS FOR WIDE CIRCULATION**

**6.1** The Committee deliberated upon identical adoption of following ISO standards which are yet to be sent into wide circulation:

| Sl. No. | Doc. No | Title |
|---|---|---|
| 1. | ISO 7485 : 2000 | Animal feeding stuffs — Determination of potassium and sodium contents — Methods using flame-emission spectrometry |
| 2. | ISO 14183 : 2005 | Animal feeding stuffs — Determination of monensin, narasin and salinomycin contents — Liquid chromatographic method using post-column derivatization |
| 3. | ISO 14939 : 2001 | Animal feeding stuffs — Determination of carbadox content — Method using high-performance liquid chromatography |

**6.1.1** The Committee noted that in these three ISO standards, reference appears to 'ISO 6498: 1998 Animal feeding stuffs — Preparation of test samples' which has been revised as ISO 6498 : 2012 Animal Feeding Stuffs — Guidelines for Sample Preparation and is also adopted as IS 14831: 2021/ISO 6498:2012. The Committee decided to refer Indian Standard IS 14831: 2021/ISO 6498:2012 in the draft adoptions of above ISO standards in place of ISO 6498: 1998 indicating its degree of equivalence with ISO 6498: 2012. The Committee decided to send these drafts into wide circulation for 60 days. It was further decided that in case no comments are received on the WC drafts, these would be considered as finalized and processed for printing with the approval of Chairperson FAD 5.

**6.1.2** The Committee further decided that during Systematic review of above mentioned ISO standards, comments may be made during balloting to refer ISO 6498: 2012 Animal Feeding Stuffs — Guidelines for Sample Preparation in place of ISO 6498: 1998 Animal feeding stuffs — Preparation of test samples.

**6.2 Draft Revision of IS 1374: 2007 Poultry Feeds — Specification (*first revision* of IS 1374)**

The Committee noted that Expert Panel FAD 5/Panel 10 has taken up revision of IS 1374 after taking into cognizance the implementation issues addressed through Amendment no 1 to IS 1374:2007 in line with the decision of the Committee in its 23rd meeting held on 22nd March 2022. The Committee endorsed the recommendation of the panel as provided under item 6.2 of the agenda and decided to send the draft revision document prepared by the Panel into wide circulation for 60 days after incorporation of 'Foreword' in the draft. The Foreword of the draft revision may be prepared by BIS Secretariat in consultation with the Convener of the Panel. The Committee further decided that the comments received during wide circulation period may be referred to the Expert Panel FAD 5/ Panel 10 for consideration and recommendation in the matter.

**6.3 Doc. FAD 05 (16680) Compounded Feeds for Young Stock — Specification (*first revision* of IS 5560)**

The Committee noted that the Doc. FAD 05 (16680) Compounded Feeds for Young Stock — Specification (*first revision* of IS 5560) has completed the P draft stage long back and is due for wide circulation now. The Committee decided to send the draft revision provided under item **6.3** of the agenda into wide circulation for 60 days.

**6.4 Comments Received on Drafts Circulated as P-Drafts on New Subjects for Cattle Feed Ingredients**

The Committee noted the information provided under item **6.4** of the agenda regarding circulation of eight P drafts on new subjects on cattle feed ingredients amongst the committee members with one month commenting period (with last date of comment as 23 July 2022.

**6.4.1** The Committee deliberated upon the comments received on these P drafts during circulation and observed that a common comment on Packing and Marking clause of these P drafts was made by NDDB, Calf Lab to substitute 'Net mass in Kg' with 'Net quantity in Kg'. The Committee deliberated upon the comment and decided to retain the marking as 'Net mass in Kg' considering the *The Legal Metrology (Packaged Commodities) Rules***,** 2011 where the "net quantity", in relation to commodity contained in a package, is defined as the quantity by weight, measure or number of such commodity contained in that package, excluding the packaging or wrapper. It further provides under the provision **12 (2) (a)** regarding the manner in which declaration of quantity shall be given which is as follows **—**

'*Except in the cases of commodities specified in the Fourth Schedule, the declaration of quantity shall be in terms of the unit of mass, if the commodity is solid, semi-solid, viscous or a mixture of solid and liquid'*

In line with this decision and in order to have harmonious approach across standards, the Committee also decided to modify 'Net quantity in Kg' with 'Net mass in Kg' in marking clause of FAD 05 (19434) C Draft Indian Standard - Compounded feeds for cattle — Specification (*fifth revision* of IS 2052) which has been finalized by the committee for publication.

**6.4.2** The committee deliberated upon other comments received on each P drafts and decided as follows:

**i) Doc** : **FAD 5 (19928) Solvent Extracted Mustard and Rapeseed Oilcake Meal as Livestock Feed ingredient — Specification**

| Sl. No. | Clause/ Sub-clause/ Para/ Table/Fig. No. commented | Comm-entator | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1 | Title<br>Para 1 | NDDB | Editorial | Font size is not uniform | Title font size should be uniform | Agreed |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2. | Foreword; Para 2; line 1 | NDDB | Technical | …for mustard and rapeseed oilcake… | …for solvent extracted mustard and rapeseed oilcake (meal)… | Agreed |
| 3. | 2 References | NDDB | Editorial | IS should be deleted from IS 1712 | 1712: 2022 | Agreed |
| 4. | Table 1: Sr. No. v) Castor husk, oil cake and vi) *Mahua* cake | CALF, NDDB | Technical | It is requested to check the performance of suggested method for the detection of Castor husk or cake and *Mahua* cake. We have not tested these parameters at CALF | - | Proposed change is not indicated. |

**The Committee decided to send the draft into wide circulation for 60 days incorporating the agreed modifications**

**ii) Doc : FAD 5 (19929) Solvent Extracted Soybean Oilcake Meal as Livestock Feed Ingredient —Specification**

| Sl. No. | Clause/ Sub-clause/Para/ Table/Fig. No. commented | Comm-entator | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1. | References Para 1 | NDDB | Editorial | IS 1712 | 1712 | Agreed |
| 2. | 2. References | NDDB | Editorial | IS should be deleted from IS 1712 | 1712: 2022 | Agreed |
| 3. | Table 1: Sr. No. v) Castor husk, oil cake and vi) *Mahua* cake | CALF, NDDB | - | It is requested to check the performance of suggested method for the detection of Castor husk or cake and *Mahua* cake. We have not tested these parameters at CALF | - | Proposed change is not indicated. |

**The Committee decided to send the draft into wide circulation for 60 days incorporating the agreed modifications**

**iii) Doc. No.: FAD 5 ( 19930 ) Whole Grain As Livestock Feed Ingredient — Specification**

| Sl. No. | Clause/Subclause/para/table/fig. No. commented | Comm-entator | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1 | 2. References | NDDB | Editorial | IS should be deleted from IS 1712 | 1712: 2022 | Agreed |

**The Committee decided to send the draft into wide circulation for 60 days incorporating the agreed modifications**

**iv) Doc. No.: FAD 5 (19931) Guar Korma as Livestock Feed Ingredient — Specification**

| Sl. No. | Clause/Subclause/para/table/fig. No. commented | Comm-entator | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1. | Table 1: Sr. No. vi) Castor husk, oil cake and vii) *Mahua* cake | CALF, NDDB | - | It is requested to check the performance of suggested method for the detection of Castor husk or cake and *Mahua* cake. We have not tested these parameters at CALF | - | Proposed change is not indicated. |

**The Committee decided to send the draft into wide circulation for 60 days**

**v) Doc. No.: FAD 5 (19932 ) Guar Chuni as Livestock Feed Ingredient — Specification**

| Sl. No. | Clause/Subclause/para/table/fig. No. commented | Comme ntator | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1. | Table 1: Sr. No v) Castor husk, oil cake and vi) *Mahua* cake | CALF, NDDB | - | It is requested to check the performance of suggested method for the detection of Castor husk or cake and *Mahua* cake. We have not tested these parameters at CALF | - | Proposed change is not indicated |

**The Committee decided to send the draft into wide circulation for 60 days**

**vi) Doc. No.: FAD 5 ( 19933 ) Palm Kernel Oilcake (Expeller Pressed) as Livestock Feed Ingredient — Specification**

| Sl. No. | Clause/Subclause/para/ table/fig. No. commented | Comme-ntator | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1. | Table 1: Sr. No. vi) Castor husk, oil cake and vii) *Mahua* cake | CALF, NDDB | - | It is requested to check the performance of suggested method for the detection of Castor husk or cake and *Mahua* cake. We have not tested these parameters at CALF | - | Proposed change is not indicated |

**The Committee decided to send the draft into wide circulation for 60 days**

**vii) Doc : FAD 5 (19935) Calcite Powder CaCO3 - Animal Feed Grade — Specification**

| Sl. No. | Clause/Subclause/para/ table/fig. No. commented | Comme-ntator | Type of Comments (General/ Editorial/ Technical) | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|---|
| 1 | 2 Reference Para 2 | NDDB | Editorial | IS No. should be mentioned | IS No. | Agreed |
| 2 | ANNEX A Determination of Total Ash | NDDB | Editorial | Replace C-1, C-2 with A-1, A-2 | A-1 Procedure A-2 Calculation | Agreed |
| 3 | ANNEX B Determination of Acid Insoluble Ash | NDDB | Editorial | Replace D-1, D-2, D-3 with B-1, B-2, B-3 | B-1 Reagent B-2 Procedure B-3 Calculation | Agreed |
| 4 | ANNEX B Determination of Acid Insoluble Ash D-2 Procedure | NDDB | Editorial | Replace (Annex B) with (Annex A) | Annex A | Agreed |

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. | Table 1: Sr. No. i) Moisture | CALF, NDDB | Technical | Annex A of IS 5470 should be recommended as other method is for cattle feed & feed ingredients. | - | The Comments given at serial no. 5, 6 and 7 are referred back to the Expert Panel FAD 5/ Panel 11 for their consideration and recommendation in the matter . |
| 6. | Table 1: Sr. No. v) Fluorine | CALF, NDDB | Technical | The limit of fluorine is very low for the suggested method. May review the limit and enhance to practical safe levels (0.04%) if found appropriate. | - | |
| 7. | Table 1: Sr. No. viii) Arsenic | CALF, NDDB | Technical | Arsenic may be reported as (As) instead of $As_2O_3$ | - | |

**The Committee decided that the draft after incorporation of agreed changes and the modifications as recommended by the Expert Panel (after considering comments given at serial no. 5, 6 and 7 above) may be processed further for wide circulation for 60 days with the approval of Chairman FAD 5.**

**ITEM 7 COMMENTS ON PUBLISHED STANDARDS**

**7.1 Doc: FAD 5 (IS 1664: 2002) Mineral Mixtures for Supplementing Cattle Feeds - Specification (*Fourth Revision*)**

The Committee deliberated upon the comments received on IS 1664: 2002 and decided as follows:

| Sl. No. | Clause/Sub-clause/Para/Table/Fig. No. commented | Commentator/Organization/Abbreviation | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|
| 1. | Annex A Ingredients for mineral mixtures | CLFMA | At present, mineral mixture formulation under IS 1664:2002 has the provisions of making mineral mixture with only inorganic salts. But now researchers have shown use of chelated minerals while formulating mineral mixture. Under the same standard, another formulation needs to be created in which 50 of inorganic copper, zinc and manganese needs to be replaced with organic minerals mineral chelates. | In addition to that, provisions for incorporation of chromium needs to be created in the mineral mixture formulation | The committee requested CLFMA to provide more information on technical studies/ references/data to substantiate their proposal. |

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| 2. | Annex B Determination of sulphur | Cargill<br><br>(received vide e-mail dated 27 Sep 2022) | Annex B of IS 1664, Clause B-2.3 - Standard Sulphur solution: The standard calibration curve cannot be achieved because final solution concentration is mention as 0.0l mg/ml, however the actual concentration should be 0.1 mg/ml as per weight of solute. | Clause B-2.3 Standard Sulphur Solution dissolve 5.438 g reagent grade potassium sulphate 1 liter water to make a standard stock solution. Dilute 10 ml of the stock solution to 100 ml. This solution contains 0.1 mg sulphur /ml. | The Committee decided that the ambiguity pointed out in the test method prescribed for determination of Sulphur in IS 1664 may be referred to TANUVAS, IVRI and NDDB, CALF Lab for their review and recommendation in the matter. Based on their recommendation, further decision in the matter may be taken. |
| 3. | Table I<br>Sl. No. (xiii) Sulphur<br><br>Annex B Determination of sulphur | Anonymous<br><br>(received through portal) | Clause 6, sub-clause 6.3, Table 1, Sl. No. (xiii), Annex B, B-2.3 Standard Sulphur solution Standard stock solution has 1 g of Sulphur in 1000 ml solution that can be written as 1 mg/ml. Calculation of diluting standard stock solution of Sulphur is wrong. When we dilute 10 ml of standard stock solution to 100 ml, the final concentration would be 0.1 mg Sulphur/ml instead of 0.01 mg Sulphur/ml. | B-2.3 Standard Sulphur Solution Dissolve 5.438 g reagent grade potassium sulphate in 1 litre water to make a standard stock solution. Dilute 10 ml of the stock solution to 100 ml. This solution contain 0.1 mg Sulphur/ml | |
| 4. | Table I<br>Sl. No. (xiii) Sulphur<br><br>Annex B Determination of sulphur | Anonymous<br><br>(received through portal) | Clause 6, sub-clause 6.3, Table 1, Sl. No. (xiii), Annex B, B-4 Formula for calculating Sulphur, percent by mass have some error. Here, formula has written as Sulphur, percent by mass = T x V x 100 ---------- A x W x 1000 | B-4 CALCULATION Sulphur, percent by mass = T x V x 100 ---------- A x W x 10000 where T = mg of Sulphur m test | |

| | | | | | |
|---|---|---|---|---|---|
| | | | When we convert any concentration from mg/litre to % (percent), we must have to divide it by 10,000 | sample, V = Volume of extract made, A = Aliquot taken, and W = Weight of sample, in g | |
| 5. | Table I<br>Sl. No. (xiii) Sulphur<br><br>Annex B Determination of sulphur | Anonymous<br><br>(received through portal) | In clause 6, sub clause 3, Table 1, Sl. No (xiii), ANNEX B, B-4 Calculation: Sulphur, percent by mass = T x V x 100 ---------- A x W x 1000 Here in this formula, unit conversion is not correct. when we convert mg/litre into percent, we must have to divide it by 10,000 as 1% is equal to 10000 mg/litre | sulphur, percent by mass T x V x 100 ---------- A x W x 10000 | |

**7.2 Doc : FAD 5 (IS 5470 : 2002) Di-Calcium Phosphate, Animal Feed Grade — Specification (*First Revision*)**

The Committee deliberated upon comments received on IS 5470: 2002 and decided as follows:

| Sl. No. | Clause/ Subclause/Para /Table/Fig. No. commented | Commentator | Justification | Proposed change | Decision of the Committee |
|---|---|---|---|---|---|
| 1. | Table 1<br>Sl. No. iii) Phosphorus | CLFMA | As we are aware, BIS standards are formulated keeping in view the scientific requirements of animals, production process for a particular compound in question and the availability of raw materials. In case of IS 5470:2002 standard for Dicalcium Phosphate of animal feed grade, minimum Phosphorus requirement has been kept at 17.5. While this | The minimum phosphorus content in DCP standard IS 5470:2002 should be considered at 17.00, in place of 17.5." | The Committee noted that IS 5470: 2002 initially specified min requirement for phosphorous content as 18 % by mass which was reduced to 17.5 % through amendment no 3 to IS 5470: 2002 which was published in 2018.<br><br>For further reduction in the specified requirement of |

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|---|---|---|---|---|---|
| | | | was possible until some time ago as the basic raw material of desired quality, rock phosphate, used for production of DCP was available. Rock phosphate available in India is sufficient to meet less than 10 of the total requirement of the country while the rest of the quantity is imported. Now, the phosphorus content in imported rock phosphate is 28.5 in place of 31.5. In view of this, it is extremely difficult to produce DCP with minimum 17.5 phosphorus. | | Phosphorous content, the Committee requested CLFMA to provide more information and technical justification to substantiate their proposal in order to ensure that further reduction the specified requirement of Phosphorous content would not effect the nutrient quality of the product. |

**ITEM 8 NEW WORK ITEM PROPOSALS FOR STANDARDIZATION**

**8.1 ALGAE BIOMASS (NON-SPECIFIED INGREDIENT) AS ANIMAL FEED INGREDIENT**

The Committee considered the proposal for formulation of Indian Standard on Algal Biomass as feed ingredient. The Committee observed that intended to be used as alternate protein ingredient as a replacement to conventional source of protein ingredients in animal and hence contribute to UN's Sustainable Development Goals (SDGs). The Committee considered that Microalgae are rich sources of protein and are known to have essential amino acid profiles that are comparable to the other reference protein sources. The Committee also noted that the proposal was not accompanied with any initial draft standard.

The Committee decided to take up the subject 'Algal Biomass as feed ingredient' for standard development and assigned the same to Expert Panel FAD 5/ Panel 11 for formulation of Indian Standard taking into account technical information/ data/ scientific references available the subject. The Panel may take further inputs from Reliance Industries Ltd. if required.

**8.2 Testing procedure for Available Phosphorus in Cattle Feed**

The Committee considered the test procedure suggested by NDDB, CALF Lab for determination of Available Phosphorus to address the issue regarding accuracy in the current

method specified for testing Available Phosphorus in IS 2052 for Compounded Feeds. The Committee suggested that for validation of proposed test method, inter-laboratory comparison testing would be necessary. The Committee decided refer the proposed testing protocol to the Expert Panel constituted for test methods for validation of the proposed method suitably.

**8.3 Distiller's Dried Grains with Solubles**

The Committee appreciated the technical data provided by Dr. Natarajan, TANUVAS on DDGS (Distiller's dried grains with solubles). The data represented the observed values on various parameters. The Committee was of the view that in order to decide on the specified values for various parameters further study/inputs would be required. The Committee requested Expert Panel FAD 5/ Panel 11 to take forward the work regarding formulation of Indian standard on DDGS with the support of Dr. Natarajan.

**8.4 Buffalo feed & Pregnancy Feed or Transition Feed**

The Committee noted that Dr. V. Sridhar who was leading the work for preparation of P-draft i) Buffalo feed & ii) Pregnancy feed or transition feed is preoccupied with some other professional commitments and NDDB has nominated Dr. Rajesh Sharma as their Principal member in the Committee in place of Dr. V. Sridhar. The Committee accordingly requested NDDB, Anand to provide drafts on the subject and decided that the drafts may be circulated amongst the Committee members for comments as P- drafts with one month's commenting period.

**8.5 Test Method for Determination of Non- Protein Nitrogen in Animal Feeding Stuffs**

The Committee deliberated upon the recommendation of the Panel as provided under item 8.5 of the agenda. The Committee endorsed the recommendation of the panel and requested the panel to carry forward the work for standardizing the proposed test methods for NPN determination in cattle feeds. The Committee also endorsed the need for developing test method for estimation of melamine as a possible contaminant of feed ingredients and encouraged the members for their suggestions in this regard.

**ITEM 9 REVIEW OF INDIAN STANDARDS**

The Committee deliberated on the Agenda Item 9 and decided to reaffirm following 10 Indian Standards as per the provisions of the BIS rules and regulations that were reaffirmed in 2017, are becoming due for review in 2022:

| Sl. No. | IS No. | Title |
|---|---|---|
| 1. | IS 920 : 1972 | Specification for common salt and cattle licks for animal consumption (*first revision*) |
| 2. | IS 1664 : 2002 | Mineral mixtures for supplementing cattle feeds - Specification (*fourth revision*) |
| 3. | IS 5255 : 1986 | Specification for poultry feeders (*first revision*) |
| 4. | IS 5470 : 2002 | Dicalcium phosphate animal feed grade - Specification (*first revision*) |

| | | |
|---|---|---|
| 5. | IS 9863 : 1992 | Nutrient requirements for poultry First Revision |
| 6. | IS 13398 : 1992 | Alga spirulina feed grade - Specification |
| 7. | IS 13426 : 1992 | Animal feeds and feeding stuffs - Methods of sampling for aflatoxin analysis |
| 8. | IS 13433 (Part 1) : 1992 | Animal feeds and feeding stuffs - Determination of calcium Part 1 Titrimetric Method |
| 9. | IS 13451 : 1992 | Urea molasses block as ruminant feed supplement - Specification |
| 10. | IS 14827 : 2000 ISO 5984 : 1978 | Animal feeding stuff - Determination of crude ash |

**9.2** The Committee further decided that Pre-2000 standards in the above list may simultaneously be taken up for revision expeditiously by the relevant Expert Panels.

**ITEM 10 TIME AND PLACE FOR THE NEXT MEETING**

The Committee decided to hold the next meeting of FAD 5 in consultation with the Chairman of the Committee.

**ITEM 11 ANY OTHER BUSINESS**

There being no other business, the meeting ended with a hearty note of thanks to the Chair & the members.

***Annex A***

**Attendance for the 24th meeting of Animal Feeds and Nutrition Sectional Committee, FAD 5 held on 28th October 2022**

| Sl. No. | Organization | Representative |
|---|---|---|
| 1. | Dr. R. K. Singh<br>Chairman FAD 05 & Former Director ICAR - Indian Veterinary Research Institute (IVRI), Izatnagar | |
| 2. | All India Poultry Breeders Association, New Delhi | Dr. A.K. Rajput |
| 3. | Association of Indian Pet Food Manufacturers, New Delhi | Dr Akanksha Singh<br>Mr. Govind Suryawanshi |
| 4. | Centre for Science and Environment, New Delhi | Shri Amit Khurana |
| 5. | Centre of Analysis and Learning in Livestock and Food, Anand | Dr. Rajeev Chawla |
| 6. | Compound Livestock Feed Manufacturers Association of India, Navi Mumbai | Mr. Suresh Deora |
| 7. | Department of Animal Husbandry and Dairying, Panchkula | Dr. Rajiv Banger |
| 8. | Federation of Indian Animal Protection Organizations, New Delhi | Dr. Dinesh S Mohite |
| 9. | Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana | Dr J.S lamba |
| 10. | ICAR - Directorate of Poultry Research, Hyderabad | Dr. S. V. Rama Rao<br>Dr M.V.L.N. Raju |
| 11. | ICAR - Indian Veterinary Research Institute (IVRI), Izatnagar | Dr. A. K. Verma |
| 12. | ICAR-Central Avian Research Centre, Bareilly | Dr. S.K. Bhanja |
| 13. | ICAR-Central Institute for Research on Buffaloes (CIRB), Hisar | Dr. Avijit Dey |
| 14. | ICAR-Central Sheep and Wool Research Institute, Avikanagar | Dr. Randhir Singh Bhatt |
| 15. | ICAR-National Research Centre on Equines, Hisar | Dr. S. C. Mehta<br>Dr. R. A. Legha |
| 16. | ICAR-National Research Centre on Pig, Guwahati | Dr. Keshab Barman |
| 17. | Indian Council of Agricultural Research, New Delhi | Dr. A. K. Tyagi |
| 18. | Indian Federation of Animal Health Companies, Mumbai | Dr. Tanweer Alam |
| 19. | Department of Animal Husbandry and Dairying, New Delhi | Dr. Ani Bency Jacob |
| 20. | National Dairy Development Board, Anand | Dr. Rajesh Sharma<br>Dr Pankaj Sherasia |
| 21. | National Dairy Research Institute (NDRI), Karnal | Dr. Sachin Kumar |
| 22. | National Egg Coordination Committee, New Delhi | Mr. Ajit Singh |
| 23. | National Institute of Animal Nutrition and Physiology, Bengaluru | Dr. Raghavendra Bhatta |
| 24. | Tamil Nadu Veterinary and Animal Sciences University, Chennai | Dr. A. Natrajan |
| 25. | Uttar Pradesh Pandit Deen Dayal Upadhyaya Pashu | Dr. Vinod Kumar |

| | | |
|---|---|---|
| | Chikitsa Vigyan Vishwavidyalaya Evam Go-Anusandhan Sansthan University (DUVASU), Mathura | |
| 26. | Food & Agriculture Department, BIS New Delhi | Smt. Suneeti Toteja, Scientist E/Director & Head |
| 27. | Food & Agriculture Department, BIS New Delhi | Ms. Nitasha Doger Sc-D & Member Secretary, FAD 14 |
| **Invitees/Also attended (with the permission of Chair):** | | |
| 28. | Reliance Industries Ltd. | Mr. Manish Shukla<br>Ms. Neera Chugh |

***Annex B***

## Updated Composition of Expert Panels under FAD 5

**1. Expert Panel on Cattle Feed and Feed Ingredients (FAD 5/ Panel 11):**

(i) Dr. Rajesh Sharma , Head (Animal Nutrition), NDDB – Convenor
(ii) Dr. Pankaj Sherasia, NDDB
(iii) Dr. R. Rajesh Nair, NDDB CALF
(iv) Mr. Suresh Deora -CLFMA (industry association)
(v) Dr. A K Verma, IVRI, Izatnagar
(vi) Dr. A. Natarajan, TANUVAS, Chennai
(vii) Dr. Nitin Tyagi, NDRI, Karnal
(viii) Dr. Dhananjay Hansda, CDRI, Lucknow
(ix) Dr. Tanveer Alam, INFAH

**2. Expert Panel on Poultry Feed and related standards (FAD 5/ Panel 10):**

(i) Dr. MVLN Raju, DPR– Convenor
(ii) Dr. Tanveer Alam, INFAH
(iii) Dr. A. Natarajan, TANUVAS, Chennai
(iv) Dr. S K Bhanja, CARI
(v) Mr. Amit Khurana, CSE
(vi) CLFMA
(vii) PETA
(viii) Nominated Expert from Vimta Lab, Hyderabad

**3. Expert Panel for preparation of P-draft on Buffalo feed & Pregnancy feed or transition feed:**

i) Dr. V Sridhar (NDDB) - Convenor
ii) Dr Goutam Mondal (NDRI)
iii) Dr Sunil E Jadhav (IVRI)
vi) Dr. Pankaj Sherasia, NDDB

**4. Expert Panel on test methods standards under FAD 5.:**

(i) Dr. Raghavendra Bhatta, NIANP- Convenor
(ii) Dr. A Natarajan, TANUVAS
(iii) Dr. Sachin Kumar, NDRI
(iv) Dr. Pankaj L Sherasia, NDDB
(v) Dr. A. K. Pattanaik, ICAR-IVRI
(vi) Nominated representative from CLFMA
(v) Nominated Expert from Vimta Lab, Hyderabad

**5. Expert Panel on Standards Feeds for Laboratory Animals (FAD 5/Panel 12):**

(i) Dr. Sunil Jadhav, IVRI, Convenor
(ii) Dr. Aditya Konar, IICB, Kolkata
(iii) Dr. A Dhali, NIANP
(iv) CPCSEA (Nominations awaited)
(v) Dr. P.K. Yadav, AIIMS
(vi) Dr. A. K. Pattanaik – In Personal Capacity
(vii) Nominated representative from PETA
(viii) Nominated representative from CLFMA