

Feeding Standards in Animal Nutrition

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Introduction

Feeding standards are the tables that give the quantities of nutrients to be fed to various classes of livestock for different physiological functions like growth, maintenance, lactation, etc. or in short, feeding standards are the amounts of nutrients required by animals. Feeding standards may be given separately for each function of the animal (*e.g.*, for maintenance or pregnancy) or as overall figures for the combined functions (*e.g.*, for maintenance and pregnancy).

Variations exist between animals and also between feeds. These variations play an important role while calculating the requirement of various nutrients by the animals. The amount of nutrients present in the feed is to be borne in mind when applying feeding standards to formulate rations. A feeding standard should be considered as guides and flexible rules in the computation of rations for individual animals and groups of animals in a farm. Since the beginning of the nineteenth century, scientists from different countries have developed different feeding standards from time to time in the field of nutrition. Main features of the feeding standards are:

- ▶ Serves as best general guide for feeding of livestock.
- ▶ Useful for practical feeding purpose.
- ▶ Give an idea about total feed and nutrient requirements of every species for specific functions.
- ▶ Useful in planning the experiments and interpreting the results depending upon nature and objective of the investigation.
- ▶ Useful for calculations of total requirements of herd and thus helps in planning of feeding schedule for future.
- ▶ Being flexible can be modified as per demand availability and cost of feed stuffs.

Types of feeding standards

The different feeding standards developed can be grouped under

- (1) Comparative type,
- (2) Digestible nutrient type and
- (3) Production value type as shown in the table below

Comparative type	Digestible nutrient type	Productive type
Thaer,s feeding standard	Grouven's feeding standard	Kellner's feeding standard
Scandinavian's feeding standard	Wolf's feeding standard	Armsby's feeding standard
	Wolf	- Agricultural Research Council (ARC)
	Lehmann's feeding standard	
	Hacker's feeding standard	
	Morrison feeding standard	
	National Research council (NRC) feeding standard	
	Japanese feeding standard	
	Indian Feeding Standards	

Comparative type

Hay standard

German scientist Albrecht Thaer in the year 1810 proposed hay equivalent by comparing the nutritional value of different feed and fodder, taking meadow hay as a unit. According to this standard, 100 pounds of meadow hay was equivalent to 91 pounds of clover hay or 200 pounds of potatoes.

Scandinavian feed unit

This system is somewhat similar to that of Thaer's. Here the value of one pound of barley (which is a common grain in Scandinavian countries like Netherland, Finland etc.) is taken as a unit and the value of all other feeds is based on this. One Scandinavian feed unit was required for 150 pounds body weight of the animals. Scandinavian 'feed unit' standard is not applicable to other countries since the common grains in different countries are different.

Digestible nutrient type

Grouven's feeding standard

In 1859, this feeding standard was proposed by Grouven taking the nutrients like crude protein, carbohydrates and fat. However, it was subsequently observed that digestibility of these nutrients would be the correct measure. Hence this system was given up.

Wolff's feeding standard

In 1864, Dr. Emil von Wolff proposed this based on digestible nutrients like DCP, DCHO and DEE contained in a feeding stuff. This standard did not consider the milk produced and hence was not found useful.

Wolff-Lehmann's feeding standard

Dr. G. Lehmann improved on Wolff's standard by considering the milk yield of the cow. As quality of milk was not included, hence this standard also was not an accurate one.

Haecker's feeding standard

Haecker, an American scientist, proposed this feeding standard taking both quantity as well as quality of milk produced by the animals. This feeding standard is based on DCP, DCHO and DEE. Later on total digestible nutrients (TDN) were included in the feeding standard.

Savage feeding standard

Savage, another American scientist, pointed out that Haecker's standard was too low in protein. He also suggested a nutritive ratio of 1:4.5 to 1:6 for an average yielder cow. Further, he suggested that 2/3 of the dry matter should be from concentrates.

Morrison feeding standard

F. B. Morrison published in 1915 a set of standards for each class of livestock which seems to be the best guide available. These were first called modified Wolff and Lehmann standard. Later they were called 'Morrison feeding standard'. This is based on dry matter (DM), Digestible protein (DP) and Total digestible nutrients (TDN)

In 1936, the standards were revised by adding net energy allowances and in 1956 calcium, phosphorus and carotene requirement was included in the feeding standard. The mid Morrison values were accepted for Indian livestock.

National Research council (NRC) standard

The national Research Council recommended a nutrition allowance for dairy cattle in 1945 and its latest revision was carried out in 2001. The requirements are almost similar to those of Morrison standard based on the size of animals, also included Ca, P, carotene and vitamin D requirements. A number of countries are presently following NRC standards for all types of livestock.

Indian standard

India had been mostly adopting the Morrison standard adopting the mid values recommended by Morrison. However, in 1985, the ICAR published the nutrient requirements of Indian livestock and poultry which now form the basis for feeding livestock in our country. The standards have been fixed based on experimental results in our tropical environment.

Production Value Type

Kellner feeding standard

Kellner, a German scientist developed this feeding standard taking starch equivalent of different feed and fodder as a unit of measurement. He took digestibility and losses of various nutrients in the animals. He proposed that a 1,000 pounds animal needs 0.6 pounds of digestible protein and 6.35 pounds of starch equivalent.



Armsby feeding standard

This is a feeding standard based on true protein and net energy values. It considers various losses like faecal, urinary and gaseous losses in animals. It is not as widely used as determining the net energy requirement of animals is very expensive.

Limitations of various feeding standards

- ▶ Cannot give exact needs of individual animals.
- ▶ Unable to indicate whether or not the animals are fed properly.
- ▶ Cannot become complete guide to feeding of animals and cannot be used as a rule.
- ▶ May not be useful under the situations where palatability and physical nature of feed alters its voluntary intake and thus its requirement.
- ▶ Environmental and climatic changes can alter the nutrient metabolism and therefore these cannot be useful in all conditions.
- ▶ It may change according to genetic make-up.
- ▶ No useful measure of food energy is given exactly.
- ▶ Factors such as biological value, amino acid composition, available minerals and vitamins etc. are not taken into account.
- ▶ Modifications are needed according to availability of feeds and also as per economic factors.

Conclusion

Feeding standards provide basic information related to the nutrient requirements of an animal and how to fulfill them by providing various feeds and fodder. A good feeding standard should consider all the losses incurred by an animal in order to utilize the nutrients present in the feed.

References

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