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Factors affecting nutrient digestibility in animals

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Abstract

An animal requires green and dry fodder as well as concentrate to maintain their health and production. Different feedstuffs are available for the feeding of animals, but their digestibility is different in different animals. The cost of production is mainly dependent on the cost of animal feeding. Therefore, digestibilities of all feedstuffs also affect the cost of feeding as well as cost of production. Different factors affecting the digestibility of feedstuffs that are species of animal, age of animal, composition of feedstuff, stage of harvesting, level and frequency of feeding, processing of feedstuffs, animal health condition, stage of maturity of fodder, individuality of animals, exercise etc. These all factors individually or collectively affect the nutrient utilization in animal body and therefore affecting health and performance of animals. Hence, it is concluded that to get better performance digestibility of feedstuff should be better.

Keywords: Animals, Digestibility, Factors, Nutrient

Introduction

Digestibility of feedstuff means the amount of feedstuff remains in the animal body from the total amount of feedstuff in ingested by the animal. Depending upon the digestibility of different ingredients, the ingredients or feedstuffs are to be selected for formulation of

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balanced ration for the animals. Feedstuff digestibility plays important role in nutrient utilization in animal body and thereby influences animal health and performance. Therefore, it is necessary to know about the different factors affecting digestibility of feedstuffs in animals.

Factors affecting digestibility of feedstuffs

1. Species of animal
2. Age of animal
3. Composition of feed
4. Stage of maturity of fodder
5. Level of feeding
6. Frequency of feeding
7. Processing of feed
8. Illness of animal
9. Work
10. Individuality
11. Harvesting of plants

1. Species of animal

- The digestibility of feed differs greatly from species to species.
- Ruminants have higher digestibility for roughages than non-ruminants.

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- Amongst the ruminants cattle and buffaloes shows different digestibility values than sheep & goat.

- In simple stomach animals the digestibility of fodder is low due to absence of rumen microbial organisms; though few micro-organisms are present in caecum.

2. Age of animal

Same feedstuff may show different digestibility values at different age. In case of newborn ruminant animals during pre-ruminant stage rumen is not fully developed & functional. As a result it works as simple stomach animals therefore during pre-ruminant stage crude fibre digestibility is negligible or low. Whereas when rumen is fully developed the crude fibre digestibility is improved due to presence of microbial organisms in the rumen. In older animals the digestibility values are low as compared to growing & adult animal.

3. Composition of feed

- The feedstuff rich in fibrous material i.e. crude fibre has low digestibility as compared to feedstuff containing higher amount of other organic nutrients like protein, fats and soluble carbohydrates.
- Protein is the organic component having higher digestibility and therefore feedstuff containing higher amount of crude protein has higher digestibility.
- The carbohydrate fraction is form the major component of livestock feed. The crude fibre fraction has the lower digestibility whereas NFE has higher digestibility.
- The presence of higher amount soluble carbohydrate like molasses and even the fat increases the overall digestibility value of feed but cellulose digestibility is lowered down.

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- Lignin is completely indigestible and therefore the level of lignifications of feedstuff also affects the digestibility value. More the level of lignifications lower will be the digestibility.

4. Stage of maturity

- As the plant matures the crude fibre contain increases leading to reduced digestibility and therefore plants cut at pre-flowering stage has higher digestibility than fully matured plant.
- Even the cell wall contains more rigid with the maturity.
- The components of cell wall like cellulose and hemicellulose becomes more resistance for microbial and enzymatic action.

5. Level of feeding

- The level of feeding i.e. the amount of feed offered to the animal at one time also decides the digestibility of that feed.
- If feeding is done at higher level than normal the digestibility is reduced as the microbial and enzymatic action cannot be sufficient for proper digestion of the ingesta and therefore more amount of feed nutrients passes undigested.

6. Frequency of feeding

- The frequency of feeding also affects the digestibility. The daily allowance of feed if given at more frequency in divided amount shows higher digestibility. It is due to the appropriate action of microbial organisms and enzymes.
- It is observed that when frequency of feeding is increased the digestibility value increases than when the feeding frequency is reduced.

7. Processing of feedstuff

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- The different methods of feed processing have definite influence on digestibility of feed nutrients. The processing methods like grinding, chaffing, soaking, alkali treatment increase the digestibility.
- The grinding makes the more surface area for efficient microbial and enzymatic digestion.
- In ruminants the coarsely grinded feedstuff shows better digestibility than whole grains whereas fine grinding of grains reduces digestibility due to rapid passage of ingesta.
- Similarly the alkali treatment of straw improves the digestibility however grinding of straw reduces digestibility due to rapid passage.
- Soaking of oilseed cakes, pelleting of compounded feed and heat treatment increases the comparative digestibility of feedstuff than original form

8. Illness of animal

When animal suffers from any disease or metabolic disorder, there is always a interference in the normal process of digestion due to change in the microbial population and even the quantity of enzymes secreted.

9. Work

- Light exercise seems to improve digestibility of feeds while heavy exercise depress it**.**

10. Individuality

- Animals have been shown to differ in their digestion of the same kind of feed as much as 25%.

11. Harvesting of plants

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- Loss of leaves, fermentation, bleaching and leaching all contribute to lower value of hay

12. When several feeds are fed in a ration, one feed may influence the digestibility of other or gives "associative effect".

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