Identify anti-nutritional factors in animal feed

Anti-nutritional factors (ANFs), also referred to as antinutrients, antinutritive factors, secondary substances or plant secondary metabolites, are constituents which may be used either by themselves or through their metabolic products. They interfere with animal feed utilisation and affect the health and production of animals.

Anti-nutritional factors may produce several adverse effects: reduce nutrient intake, digestibility, nutrient absorption etc.. Low level of anti-nutritional factors in any animal feeds are recommended and high levels of this factors are forbidden.

Identified problems

The main challenges in animal production, especially for ruminants, are: reduce feed costs, improve products quality and increase production. In order to achieve this, farmers are encouraged to exploit the use of unconventional feedstuff, browse foliages and shrubs. However the problem of feeding such materials is the fact that they contain different anti-nutritional factors with different concentrations that cause detrimental effects to animals.
Understanding anti-nutritional factors in animal feed

Why do plants feedstuffs contain anti-nutritional factors?

Anti-nutritional factors serve as defense mechanisms in plants.

Plants also produce and use antinutritional factors for plant to plant interaction, to fight their enemies and to interact with the external environment. **Plants produce and use antinutrients as natural pesticides:** to protect themselves against moulds, bacteria’s, birds and other insects that plays on them. Just to cite some examples: bitter taste, unattractive colours, poisonous, bad odor and immune suppressants.

Detrimental and beneficial effects of Antinutrients

Anti-nutritional factors can cause unpredictable effects on animals when used in animal feed. Such effects can either be **POSITIVE**:

- reduce parasite burden
- reduce protein degradation in the rumen
- reduce methane emission
- reduce bloating in animals

or **NEGATIVE**:

- reduce feed intake,
- lower feed conversion
- bind to protein and other important nutrients needed by animals in the feed
- can also cause death in some cases.
Depending on the level of concentration of antinutrients in a particular animal feed. They interfere with the use of dietary nutrients in different ways, including:

1. Reducing nutrient digestibility by binding them.
2. Damage the animal digestive tract.
3. Reduce the digestive efficiency.
5. Affect animal health and performance.

Most common anti-nutritional factors in plant feedstuffs

The following deleterious Anti-nutritional factors are often tested through laboratory analysis of animal feedstuffs and forages used in feeding livestock. However the list can be endless depending on the interest of individual as feed safety is concerned in many countries.

The common antinutritional factors in animal feedstuff and forages are:

- Saponins
- Tannins
- Protease inhibitors
- Alkaloids
- Non protein amino acids (*mimosine*)
- Lectins (*phytohaemagglutinins*)

- Trypsin inhibitors
- Phytic acid
- Oxalates
- Amylase inhibitors
Understanding anti-nutritional factors in animal feed

- Cyanogenic glycosides
- Aflatoxins and Gossypol.

**Methods to counteract and reduce anti-nutritional factors in animal feed.**

Applying appropriate techniques or effective processes or combinations of techniques could help to reduce or eliminate adverse effects of Anti-nutritional factors in animal feed. Common and cheap techniques aimed at counteracting or reducing Anti-nutritional factors in feedstuff include: the use of polyethylene glycol (PEG), drying of feedstuff, the use of wood ash, solid state fermentation technique and the use of activated charcoal (Biochar), etc. However every technique has its own consequences or implications such as cost, labour and effects on important nutrients in the feed needed by animals in the feed.

A better understanding and management of Anti-nutritional factors in animal feed is necessary to let farmers be able to apply more appropriate techniques to reduce antinutrients deleterious effects while enhancing their benefits and hence enabling the use of vast reservoirs of animal feedstuff.

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