

BIHAR ANIMAL SCIENCES UNIVERSITY
BIHAR VETERINARY COLLEGE, PATNA
Department of Animal Nutrition

ANN-603

Lecture on

**Feed processing technologies for improving
nutrients utilization in farm animals
(Lecture-2)**

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Grain processing methods

Different feed processing methods of grain can be classified depending on the condition of treatment and kind of treatments applied

Classification on the basis of moisture

Dry processing methods: Decortications/ dehulling; crackling/dry rolling crimping, micronization, crumbling, grinding, pelleting, popping and roasting

Wet processing methods: Water soaking, steam rolling; steam flaking, Extrusion, gelatinization, pressure cooking, steam pelleting reconstitution and exploding.

Classification on the basis of thermal treatments

Hot process: Steam flaking, Steam rolling, Pressure Cooking, Exploding, Gelatinization, Pelleting, Roasting and Micronization.

Cold process: Cracking/dry rolling Crimping, Crumbling, Extrusion Water soaking, Reconstitution, Decortication

Classification on the basis of treatment

- **Physical treatment**
- **Chemical treatment**
- **Biological treatment**

Cracking or dry rolling: The process of disintegration of kernels into particles with the application of pressure by moving rollers is known as dry rolling or cracking. It is done by a combination of breaking and crushing of the grains. The rollers are adjustable for getting the rolled products of desired particles size. However, there is generally considerable variation in the particle size if fine particles are not removed by screening.

Crimping: The process of rolling of feed ingredients with the use of corrugated rollers is called crimping. The process may include conditioning cooling of the processed feed.

Crumbles: The feed of granular particle size produced from the grinding of pelleted feeds is called crumbles. Such processing is mostly done for the feeding pigs and poultry.

Roasting: The treatment of grains with direct flame or application of hot sand is called roasting. It causes expansion in volume due to heating and generally increases digestibility.

Grinding

Grinding is a process of particle size reduction with the application of pressure and shearing. The purposes of feed grinding are as follows:

- It reduces particle size, breakage of cell wall resulting into release of nutrients and their availability
- Increases compactness and reduces space requirement for storage.
- Facilitate uniform mixing of feed ingredient
- Pelleting more efficient
- Swelling efficiency of feed ingredients increases.
- Reduced scope for sorting of less palatable feed
- Improves digestibility of fat containing material resulting in improved energy availability.

Baking:-The cooking of moistened grains or feeds in an oven or hearth is known as baking. The pans containing feed may be either open or covered. A wide range of heating like slow (120- 175°C), moderate (175-200), hot (200-230) and very hot (230-260) are used.

Steam rolling:-The treatment of grains with hot steam for a short period of 3-5 minutes in the tower followed by rolling is known as steam rolling. This only softens the grains without any significant change in starch granules. The only advantage of steam rolling is the production of larger particles with little fines. Physical texture of feed is considerably improved by steam rolling.

Steam flaking:-In this process the grains are steam treated for longer duration of 15-30 minutes due to which moisture content in the grains rises to 18-20%. After rolling of such grains, flattened grains or flakes are produced .This process ruptures the starch granules and improves physical textures, nutrient utilization and performance of the animals in most of the cases.

Reconstitution

- Reconstitution is a process of conditioning the grains to raise its moisture content to 25-30% and storing in anaerobic condition for approximately 21 days. It results in disruption of the protein matrix the grain and release of enzyme (amylase and protease).
- Result in breakdown of cellular carbohydrates and/or alteration in the structure of intracellular starch. The only disadvantage with reconstitution of grains is high cost of drying wet material.
- Improvement in nutritive value of barley on reconstitution which was attributed to reduced glucan content through activation of endogenous enzymes.
- Reconstitution can raise the sorghum digestibility to near that of maize. Rolling and grinding of reconstituted grains results in complete breakdown of the endosperm of the grain.

Soaking and germination

- Soaking of barley in water hydrolyzed 35-59% phytate phosphorus and improved broiler performance significantly.
- Soaking or germination in barley decreased soluble or total beta- glucan content.
- In another study soaking of rye reduced the viscosity of the diet and excreta and increased fat retention further weight gain was increased by 7% and responses were similar to cellulase supplementation, however soaking in NaOH decreased its nutritive value (Pawlik *et al.* , 1990).
- Germinated wheat at 9% level in the broiler ration could not improve broiler performance.

Discussion.....

Thank you