

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-1)**

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Processing

- To Make a profit
 - Reduces cost by improving feed efficiency
 - Improve production from better utilization
 - Increase intake
- To alter particle size
 - Easier to consume – pelleting, cubing
 - Range feeding, reduce fines, reduce selection, improve handling efficiency.
 - More digestible

Type of feed

- Concentrates
- Roughages: Green & Dry
- **Feed represents the major cost in animal production.**
- **Effective utilization of feeds are the matters of great concern for animal nutritionist.**

- **Feeds may be processed to alter the physical form or particle size, to preserve, to isolate specific parts, to improve palatability or digestibility, to alter nutrient composition or to detoxify the anti-nutritional factors.**

Purpose of Processing

- To Change moisture content
 - To make is safe for storage, improve palatability, more digestible, to prepare for other processes. (steaming, rolling,flaking)
 - Two ways to remove moisture
 - Aeration with heat
 - Aeration without heat
 - For safe storage
 - Hay (loose) 25 %
 - Baled 20-22 %
 - Chopped 18-20 %
 - Cubes 16-17 %

Purpose of Processing - Moisture

- Addition of water to ensile grains
 - Best at 30 % moisture
- Addition of water to rations to improve palatability and improve mixture uniformity.
- Improve intake
 - High ambient temperature.

Purpose of Processing

- To change density (weight per unit of volume)
 - Reduce transportation charges
 - Bulky to control intake
 - Increase density to increase amount consumed.
 - Dairy cows increased energy and protein needs in transition period but reduced intake.
 - Flaking reduces density but improves surface area of the grain for improved digestibility.

Purpose of Processing

- To change Palatability (acceptability) hence feed intake.
 - Adding to improve: molasses, flavors, fats
 - Adds nutrient content while improving intakes
 - Adding to limit consumption: salt
 - Palatable in limited quantities but in excess very limiting.
 - Animals on pasture or range need limiting factor on free choice of minerals and some feeds

Purpose of Processing

- To change nutrient content
 - Adding Iron
 - Milk fed over an extended period of time
 - Adding vitamins
 - Antibiotics
 - Fats
 - Protein
 - Sugar coating cereal

Purpose of Processing

- To increase nutrient availability and digestibility.
 - Milo, rolled, dry ground or not processed has close to the same nutrient content of Corn.
 - Less available - starches represent 70-80% of the total dry matter appears to less available in milo than other grains.
 - By hydration or rupturing of the starch molecules more of the starch appears to be digestible giving better results in digestion trials.
 - Processing increases surface area for microbes and digestive enzymes. Improves utilization.

Purpose of Processing

- To detoxify or remove undesirable ingredients.
 - Cottonseed – Gossypol
 - Adding iron salts: rupturing of pigment gland
 - Soybean meal
 - Heat – deactivates trypsin inhibitor
 - Linseed meal
 - Water -Crystalline water soluble substance
 - ? Sweet Clover – spoiled or moldy
 - Dicoumarol – anticoagulant, causes internal bleeding
 - Manufactured form called Dicumarol

Purpose of Processing

- To improve mechanization
 - Baling
 - Chopping
 - Cubing
 - Ensiling
 - Round baling
 - Transportation
 - Storage
 - Self feeding
 - Push button feeding

Purpose of Processing

- To lessen molds, salmonella and other harmful substances.
 - Aflatoxins
 - Mycotoxins – carcinogens result of molds growing in grains
 - Ammoniated feeds – Cottonseed
 - Ammonia added to hay stacks.
 - Propionic and acetic acids reduce or inhibit mold growth.
 - Added at harvest

Purpose of Processing

- To enhance rumen function (chemical, buffers, by-pass)
 - Heat or pressure treated
 - Protected or escape protein
 - Treatment with tannins
 - Formaldehyde or other aldehydes
 - Lipids
 - Complexing with bentonite clay
 - Use of AA analogs (proteins)
 - Adding ionophore- Monensin (Rumensin)
 - Changes rumen fermentation patterns
 - Shifting of VFA and methane production
 - Changes passage rate of particulate matter
 - Slow release NPN
 - Buffers – passage rate versus rumen pH

Objectives of feed processing:

- **To prepare balanced feeds needed for growth and production**
- **To improve performance through improved availability and efficient utilization of feed.**
- **Economical and cost effective production of animal products**
- **To eliminate or inactivate the anti-nutritional factors (ANF) in feed ingredients**
- **To increase keeping quality and duration of storage**
- **To ensure balanced intake of nutrients by reducing the scope of feed shorting**
- **To keep susceptible feeds free from the harmful pathogenic organisms like bacteria, fungi and parasites etc.**

Discussion.....

Thank you