**Feed preparation and processing**

Animal feed is a formulated mixture the dieticians of the animal feed world that is to provide the animal with the necessary balanced nutrients for proper growth, development and maintenance. Animal nutrition is focus on the dietary needs of animals and work to formulate a balanced diet.

**Food Ingredients**

There are **agricultural ingredients** and **co-products** used to create animal food diets. **Ingredients** include barley, corn, grain, forage, fruits, minerals, sorghum, vegetables, vitamins and wheat. **Co-products** are the outputs from a manufacturing process. Many animal source and vegetation co-products are used in the formulation of feed. These ingredients include animal protein, bakery co-products, blood meal, yeast, citrus pulp, grain, molasses, soybean meal and salt.

**Diet Formulation Based on Available Nutrients**

Animals can use only those nutrients available to them,it should be expressing therequirements and formulating diets on the available nutrient basis. Available Nutrients contributes to the efficiency and economics of animalproduction and it’s a positive impact on the environment.

**Processing of feed ingredients**

Purposes of processing is the physical form or particle size, prevent spoilage, improvepalatability, increase surface area, obtain a uniform mixture of various ingredients, avoidsorting by animals, increase digestibility by subjecting to pre-digestion. Feed processing includes mechanical, chemical, andthermal methods, and alsomicrobial fermentation.As the level of production and feeding increases: Feed processing method become more important.

**Common Processing Methods for Grains1-Cold processing:**

1. **Grinding - Hammer mills :**

Gridding is the most common method, and the cheapest and simplest way. The size can be controlled by changing a screen size.For non-ruminants- Fine, medium andlarge, medium is the best, depending the grain .For ruminants, prefer large ground grains because they don't likefinely ground meals, especially, dusty meals.

1. **Rolling/cracking**

Produce smaller particles by compressing it between two corrugated rolls and less dusty feed compare to a hammer mill, and the physical texture is acceptable to many animal species.

1. **Soaking**:

Soaking for 12 to 24 hrs.can soften the grainand make a palatable product. But have some problems for example storage space, fermentation and cannot make at a large amount.

1. **Reconstitution**

Similar to soaking, and add water to dry grain to increase the moisture content to 25 to 30% and store the wet grain in an oxygen-limiting silo for 14 to 21 day to feeding. Improve performance in beef cattle, but the storage is the main problem. A good storage or chemical treatment (e.g., 1 to 1.5% of organic acid/mixture) is must to avoid heat and mold if weather is hot.

**2-Hot processing methods**

**A- Steam-rolling**

Steam-rolling - Grains are subjected to steam for a short period (3 to 5 min to soften the seed, but no change of the starch granule before rolling that is to improve animal performance.

**B-Pelleting:**

By grinding feed and then forcing it through a thick, spinning die with the use ofrollers, which compress the feed into holes in the pellet die. It can be made in different diameters, length, and hardness, and all domestic.

**C-Extruding:**

By passing the feed through a machine with a curved screw that forces the feedthrough a tapered head.Feed is ground, heated, and extended, producing a ribbonlike product. Heating is to destroy anti-nutritional factors in soybean and others.

1. **micronizing, and roasting:**

Micronizing is except heat provided in the formof infrared energy. Roasting - By passing the grain through a flame, resulting in heating and some growing of the grain.

**Common Processing Methods for Roughage**

1. **Bailing**- Still one of the most common methods of handling roughage, and large bales are becoming more common.
2. **Chopping or grinding**- Provide more uniform product and can reduce feed refusal and wastage. But, additional expense of grinding and loss of dust .
3. **Pelleting**- Usually consumed readily by ruminants, horses, and rabbits, and improve animal performance more with "low-quality" roughage. Some must be ground first, and the cost of processing is bigger.
4. **Cubing**- Hay is forced through dies that produce a square product (about 3 cm in size) of varying lengths and hardness. Often used for dairy cattle.

**5-Dried**:e.g., alfalfa . Thecost is relatively high, used in limited amounts in poultry diets as a source ofcarotene, vitamins, etc.