Lecture Title:
Feed stuffs and methods of sampling:

Subject name: Animal Nutrition

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Feed stuffs and methods of sampling:

Firstly, Feed stuffs: they are considered that any feed can be used for animal feeding. These materials may include any material that a farm animal can digest, absorb, or assimilate either for maintenance or for production. Generally, animal feedstuffs can be divided into two main parts, which are:-

1. Concentrates:

These types of feed contain a high percentage of protein and soluble carbohydrates and a low ratio of crude fiber (less than 18%).

Concentrates include cereals, grains of different origins such as wheat, barley, corn (maize), as well as meals. **Meals** are the residues of oily crops after the extraction of oil from these crops, such as sesame meal, cottonseed meal, sunflower meal, soybean meal, and safflower meal. Concentrates may contain protein of animal origin as well as animal by-products such as blood and bone meal, feather meal. Of plants and vegetative sources, it may include date palm residues, sugar beet residues, wheat bran, molasses, rice husks, and rice residues.

2. Roughages:

It refers to those feeds that contain a high percentage of crude fibers (more than 18%). Its nutritional value is low and is given to the ruminants' rations as bulky material. There are two types of roughages:

A. Green roughages:

It includes grasses of various kinds the clover, alfalfa, as well as silage, which is fermented grass preserved away from air in special siloes. Silage is considered a palatable feed for animals. Yellow corn silage is the most famous silage.
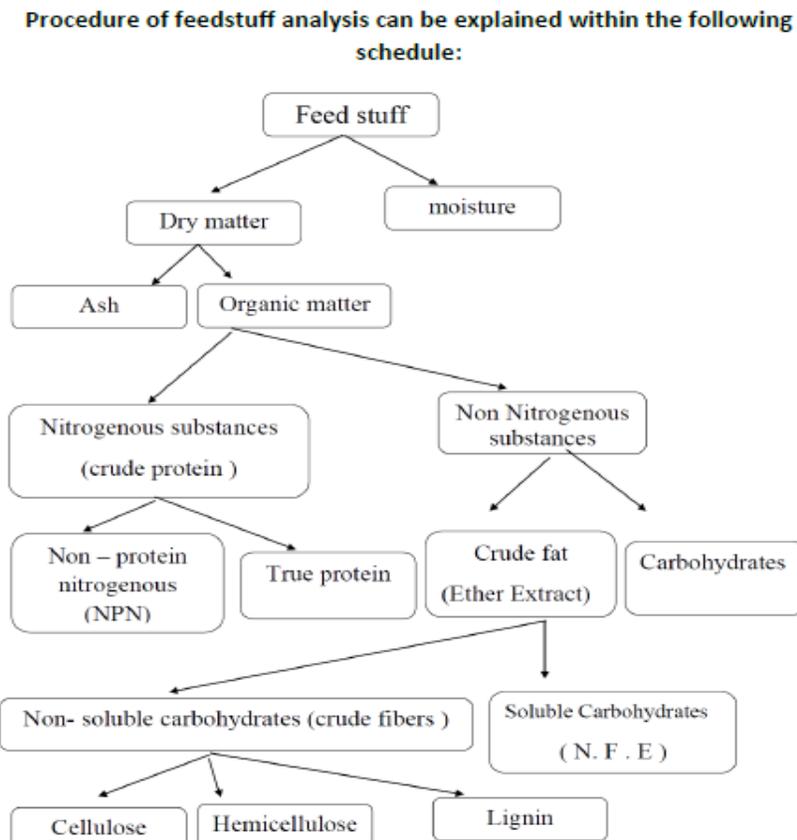
B. Dry roughages:

Straw and plant stems are examples of dry roughages, which are produced after the harvest of field crops. Also, hay is a dry roughage; these materials are dry feed substances. The purpose of drying is to prolong the time of preservation, so it is stored in summer and given to the animals in winter. Examples of hay are alfalfa hay and oat hay.

Secondly: approximate analysis of feedstuffs:

It is regarded as a series of chemical analyses carried out on feedstuff to determine ratios and percentages of essential feed compounds such as protein and fat, and carbohydrates. The purpose of feedstuff analysis is as follows:

1.   To determine the real nutritional value of the ration or feedstuff.

2.   To detect adulteration (cheating) of the feedstuff.

3.   To determine the suitable price of the feedstuff.

The procedure of feedstuff analysis can be explained within the following schedule:

Procedure of feedstuff analysis can be explained within the following schedule:

Feed stuff

moisture

Dry matter

Ash   Organic matter

Nitrogenous substances (crude protein)

Non Nitrogenous substances

Non – protein nitrogenous (NPN)   True protein

Crude fat (Ether Extract)   Carbohydrates

Non- soluble carbohydrates (crude fibers)   Soluble Carbohydrates (N. F . E)

Cellulose   Hemicellulose   Lignin

1.   Moisture:-

It is the free water present in the feedstuff. It can be estimated by drying a feedstuff sample in a drying oven.

2.   Dry Matter:-

It is the residual part of the feedstuff sample after the total exclusion of moisture. The dry matter contains all the portions of the feedstuff sample except the water.

3.   Ash:-

It is the non-organic part of the feedstuff sample, which is the residue after the burning of the sample in a muffle furnace. Ash contains salts, minerals, and silica.

4.   Organic matter:-

It is the non-mineral portion of dry feedstuff involving crude protein, fat, and carbohydrates.

5.   Crude protein:-

It is all the nitrogenous substances present in the feedstuff sample. It includes true protein and non-true protein (non- protein nitrogen) such as urea.

6.   Crude fat:-

It includes all compounds that can be dissolved in organic solvents (such as ether, benzene, hexane, etc.). Fats, oils, waxes, and plant dyes are examples of crude fats.

7.   Carbohydrates:-

It includes all types of saccharides such as monosaccharides, e.g., glucose, and di-disaccharides.

E.g., sucrose, lactose, and maltose.

Carbohydrates can be divided into two main parts:

A- Nitrogen-Free extract (N.F.E) (Soluble carbohydrates).

These are soluble carbohydrates that are capable of dissolving in diluted acids and bases.

Glucose, sucrose, and starch are examples of this type of carbohydrate.

B- Non-soluble carbohydrates (Crude fibers):

These carbohydrates do not dissolve in diluted acids and alkalines, but they dissolve in concentrated acids and alkalines. Cellulose and hemicellulose, and lignin are examples of this type of carbohydrate.