Introduction and importance of nutrition of farm animals

Composition of Animal Body

Food is any material which after ingestion by animals is capable of been digested, absorbed and utilized for physiological processes. Food can be described as an edible material that nourishes. However, not all components of ingested materials are digested. For example, grasses and hay are described as food but they contain indigestible components. The components of food which are capable of been utilized by animals are described as **NUTRIENTS**. The feed an animal consumes may vary from very simple compounds such as salt (Nacl) or sugar ($C_6H_{12}O_6$) to extremely complex mixtures provided by some plants and most animal tissues. Not all components will be usable nutrient, although some food of animal origin such as fish meal, meat meal, milk etc. are utilized in limited amount hence animals will have to depend heavily on plant products and their by-products. The study of plant nutrition is important because animals depends on them for survival. Plants are capable to synthesize complex food materials using simple substances such as CO_2 from the air and water and inorganic elements from the soil by means of photosynthesis. The greatest part of the energy is called chemical energy within the plant cells and it is this energy that the animals use for the maintenance of life and synthesis of its own tissues. Plants and animals contains similar type pf chemical substances. These substances can be grouped according to their constitution, properties and function. The main component of food are water and dry matter. Dry matter also has a component of organic and inorganic components of food.

Food Types and Feeding Mechanisms

Most animals are opportunistic feeders. Animals fit into one of three dietary categories.

1- Herbivores, such as gorillas, cows, hares, and many snails, eat mainly autotrophs (plants, algae).

2- Carnivores, such as sharks, hawks, spiders, and snakes, eat other animals.

3- Omnivores, such as cockroaches, bears, raccoons, and humans, consume animal and plant or algal matter.

Animal Nutrition is a science of nourishment of animals. It means (all the processes whereby food and oxygen are presented to and utilized by living cells, and waste products are eliminated).

The great French chemist Antoine Lavoisier (1743-1794) is frequently referred to as the founder of the science of nutrition. He was the father of nutrition. He established the chemical basis of nutrition in his famous respiration experiment carried our before the French Revolution. Thereafter, chemistry became an important tool in nutrition studies.

Why is Nutrition important?

The utilization of unusable feed stuffs and convert them to desirable products such as meat, milk and eggs.

Nutrition Steps:

Ingestion, Digestion, Absorption, Assimilation, Metabolic functions and resulting metabolites, Excretion

Nutrients: The chemical substances found in the feed materials are necessary for the maintenance, production and health of animals. The chief classes of nutrients include- 25 carbohydrates, 15 fatty acids, 20 amino acids, 15 essential and 10 probably essential minerals, 20 vitamins and water or any chemical compound having specific functions in the nutritive support of animal life.

The Six basic nutrients:

a) Water - Often overlooked and not considered as a nutrient when formulating diets for animals, but extremely important.

b) Carbohydrates - Hydrates of carbon formed by combining CO_2 & H_2O (photosynthesis). The primary component found in animal feeds.

c) Proteins - Found in the highest concentration of any nutrient (except water) in all living organisms and animals. All cells synthesize proteins, and life could not exist without protein synthesis.

d) Lipids - Organic compounds that are characterized by the fact that they are insoluble in water, but soluble in organic solvent (benzene, ether, etc.)

e) Minerals - Inorganic, solid, crystalline chemical elements that cannot be decomposed or synthesized by chemical reactions.

f) Vitamins - Organic substances that are required by animal tissues in very small amounts. The last group of dietary essentials to be recognized.

Indispensable nutrients: Those cannot be synthesized in the body from other substances, or those cannot be synthesized fast enough to meet its needs. Thus, must be supplied from the diet.

Dispensable nutrients: Those can be synthesized from other substances in sufficient quantity to meet its needs. But, still very important.

Use of the term, Essential or Non-Essential Nutrient for amino acids, minerals, and vitamins.

Role of nutrition in animal production and health

The factors responsible for efficient animal production are:

1. Genetic potentiality of animal.
2. Nutritional status of animal.
3. Management factor.

Nutrition plays an important role in the animal production and health by following ways:

1. It exploits the genetic potentiality of the animal. For example, if a cow has capacity to produce 30 liter of milk per day (by its genetic makeup) but it cannot be possible if the cattle is under feed.

2. It makes the animal production cheap and economical. Because cost of feeding and feeds accounts for 70-80% of total animal production cost. So it is the major means by which production system can be made economical.

3. It also minimizes the competition between human and animal for food by introducing non-conventional feed ingredients for animal feeding.

4. It also manipulates feed ingredients for effective utilization of nutrients. In this way nutrition play an important role in animal production and health.

Some terms related to nutrition

Nutritious: Substances that promote growth and participate in repairing tissues of the body.

Nourish: To feed an animal with substance necessary for life and growth.

Feed (Feed stuff): Food of animals comprising any naturally occurring ingredient or material feed to animals for the purpose of sustaining growth and development.

Diet: A regulated selection of a feed ingredient or mixture of ingredients including water, which is consumed by animals on a prescribed schedule.

Additives: An ingredient or a combination of ingredients added to the basic feed mixture for specific purposes like to increase feed ingestion or to alter metabolism.

Ration: A fixed amount of feed for one animal, feed for a definite period, usually for a 24hour period.

Balanced ration: The ration which provide an animal with the proper amount, proportion and variety of all the required nutrients to keep the animal in its form to perform best in respect of production and health.

Complete ration: A single feed mixture, which has all of the dietary essentials except water for a given class of livestock.