

NUTRITION

Understanding Nutrients and Their Importance

What are the essential nutrients for animal production?

- Good nutrition can increase feed efficiency and the rate of gain for animals.
- Animals must be fed a diet that meets their needs.
- If these needs are not met properly, the animal won't grow, reproduce, or could possibly die.
- Feedstuffs contain nutrients.
- **NUTRIENTS** - substance that is necessary for an organism to live and grow.
- **RATION** - the total amount of feed an animal has in a 24-hour period

Essential Nutrients

- A balanced ration is one that contains all the nutrients that the animal needs in the correct proportions.
 - ▣ Too much of any one nutrient is wasteful and could prove harmful to the animal.
 - ▣ A nutrient deficiency can result in stunted growth and low production.



Essential Nutrients

- Nutrients that are required for proper growth in all animals are called essential nutrients.
- There are six essential nutrients:
 - Water
 - Carbohydrates
 - Lipids or Fats
 - Protein
 - Minerals
 - Vitamins

What is the importance of water as a nutrient?

- **The Most Critical Nutrient!**
 - Water is necessary for survival
 - Functions in transport, chemical reactions, temperature maintenance, lubrication
 - Water deprivation > dehydration > electrolyte imbalance > death
- Requirements vary from one species to another.
 - The amount of water needed by an animal is related to the activity the animal performs, and the stage of life of the animal.
- Water can enter into the body in many different ways.
 - Most of it enters by drinking.
 - Water is also found in the feed that animals consume and may be produced through biochemical reactions.
- Water may be lost from the body through urine, feces, sweat, and vapor from the lungs.



What is the importance of carbohydrates as a nutrient?

- Carbohydrates are feed components that provide energy and are composed of carbon, hydrogen, and oxygen.
 - ▣ Major component of plant tissues.
 - ▣ Should make up about 75 % of an animal's diet

□ Functions

- ▣ Energy source
- ▣ Building block for other nutrients
- ▣ Dietary excess stored as fat

Complex carbohydrates

Complex carbohydrates provide vitamins, minerals, and fiber

Foods such as breads, legumes, rice, pasta, and starchy vegetables contain complex carbohydrates



Two Main Types of Carbohydrates:

- 1. Simple Carbs- Sugars and Starches
 - ▣ Easily digested
 - ▣ Cereal grains- corn, wheat, oats, barley, rye



- 2. Complex Carbs- Fiber (cellulose)
 - ▣ Found in roughages such as hay and grass
 - ▣ Fiber aids digestive system, absorbs water, & provides bulk



What is the importance of lipids as a nutrient?

- Most lipids are fats or oil.

- Fats can come from both animal and vegetable resources.

- Functions

- ▣ Energy

- ▣ Source of heat, insulation, body protection

- ▣ Essential fatty acids



- Sources

- ▣ Oils (soybean oil, corn oil, fish oil)

- ▣ By-product fats (lard)

- provides cheap energy source

- reduces dust in feed manufacturing and animal feeding

- increases feed palatability

What is the importance of protein as a nutrient?

- Proteins - nutrient is needed to grow new tissues & repair old tissues
- Functions -- basic structural unit, needed in metabolism, hormone, antibody and DNA production
- Sources include soybean meal, cottonseed meal, fish meal, and alfalfa hay.
- Protein is the most common nutrient deficiency
 - Symptoms of deficiency = anorexia, slow growth rate, decreased feed efficiency, low birth weight, lower milk production.
 - Need higher protein:
 - Young animals
 - Gestating animals
 - Lactating Animals
- Excess protein is converted to fat

What is the importance of minerals as a nutrient?

- A mineral is an inorganic element
 - ▣ Minerals are essential in skeleton growth and necessary for body systems to function properly.
- There are two groups of minerals.
 - ▣ Macrominerals (lg amounts)
 - Salt (NaCl) - transport molecules
 - Calcium (Ca) - bones
 - ▣ Microminerals (sm amounts)
 - Fluorine (F) – helps Ca absorption
 - Iron (Fe) – blood production



What is the importance of vitamins as a nutrient?

- Vitamin - organic substance needed in small amounts to perform specific functions
 - ▣ Don't provide energy; needed in using energy
 - ▣ Functions:
 - Regulate body functions
 - Keep the body healthy
 - Develop resistance to diseases.
 - ▣ Deficiency can lead to disease or death
- 2 Groups of Vitamins:
 - ▣ **Fat-soluble** vitamins - stored in the fat and released as they are needed by the body.
 - Vitamins A, D, E, & K
 - ▣ **Water-soluble** vitamins - dissolved by water and need to be consumed every day.
 - Vitamins C & B

Review / Summary

- What are the essential nutrients for animal production?
- What is the importance of water as a nutrient?
- What is the importance of carbohydrates as a nutrient?
- What is the importance of lipids as a nutrient?
- What is the importance of protein as a nutrient?
- What is the importance of minerals as a nutrient?
- What is the importance of vitamins as a nutrient?

Terms

- Balanced ration
- Carbohydrates
- Complex carbohydrates
- Essential nutrients
- Fat
- Simple carbohydrates
- Vitamin
- Water-soluble vitamins
- Fat-soluble vitamins
- Fiber
- Lipid
- Macrominerals
- Microminerals
- Mineral
- Nutrient
- Proteins
- Ration

Pictures Credit

- Food Pyramid- www.mypyramid.gov
- Corn- <http://ewaldfarms.com/cornframe.htm>
- Oats-
http://www.cals.uidaho.edu/scseidaho/variety_descriptions/vardesc_index.htm
- Sorghum- http://www.plantsci.missouri.edu/cropsys/Grain_Sorghum/
- Alfalfa hay- <http://www.idahohaynow.com/grassalfalfa.html>
- Olive oil- <http://www.oliveoilexperience.com>
- Muscles- <http://www.runningbarefootisbad.com>
- Mineral Block- http://www.fleetfarm.com/catalog/product_detail/farm-livestock/animal-health/supplements/sprout-40-lb-cattle-mineral-block