Vitamins & Minerals

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Vitamin Facts

- Vitamins are essential organic nutrients, required in small amounts.
- They cannot be synthesized by the body. Must be obtained by outside sources like diet, rumen bacteria & sun.
- Required for growth, maintenance, reproduction and lactation.

Classes of Vitamins

1- Fat Soluble Vitamins: *stored in tissues*

Examples:

A

D

E

K

2- Water Soluble Vitamins: *not stored in tissues, must have constant supply*

Examples:

B, B1, B2, B6 & B12

Niacin

Folic Acid

C

Vitamin A :

- **Vitamin A:** The vitamin is a pale **yellow crystalline solid, insoluble water** but **soluble in fat.** It is destroyed by oxidation on exposure to air and light. Originally found in **fish.**
- The **role** of Vit A in the regulation in the **cellular differentiation,** also is involved in the formation and protection of **epithelial** and **mucous** membranes. As well as, is important in the **resistance to disease** and promotion of healing though its effect on the **immune system** and **epithelial integrity**.

Function, Deficiency Signs & Sources

- **Function:** development healthy **skin** and **nerve tissue.** Aids in building up resistance to **infection**. Functions in **eyesight** and **bone formation**. All animals require a source of Vitamin A. It is important in the ration of **pregnant females.**
- **Sources:** **liver, egg yolk, whole milk, carotene, animal body oils** (cod fish and tuna), **legume** forages and can be synthetically produced.

- **Deficiency signs:** retarded growth in the young, the development of a peculiar condition around the eyes known as **Xerophthalmia,** night **blindness** and **reproductive disorders**. In cattle cusses **roughened hair** and **scaly skin**. In breeding animals my leads to **infertility,** and in pregnant animals deficiency lead to **failure** of embryo growth, **disrupted organ** development, **abortion,** short gestation, retained **placenta** or the production of **dead, weak or blind** calves.

Vitamin E

- **Function:** normal reproduction.
- **Deficiency signs:** poor growth, Muscular Dystrophy, "white muscle" disease in ruminants and swine and "stiff lamb" disease (affects the nerves and muscles).
- **Sources:** synthetic for poultry and swine, cereal grains and wheat germ oil, green forages, protein concentrates, oil seeds (peanut and soybean oil).

Vitamin E rapidly destroyed in rancid or spoiled fats. That is why these may cause white muscle disease. Utilization of Vitamin E is dependent on adequate selenium.

Vitamin D

A number of forms of vitamin are known, although not all of these are naturally occurring compounds. The two most important forms are **ergocalciferol (D2)** and **cholecalciferol (D3).** The D vitamins are insoluble in **water** but soluble in **fats** and fat solvents. The sulphate derivative of vitamin D present in milk is a water-soluble form of the vitamin. Both **D2** and **D3** are more resistant to oxidation than **vitamin A, D3** being more stable than **D2**.

Vitamin D

- **Function:** is essential for the proper utilization of calcium and phosphorus to produce normal, healthy bones.
- **Deficiency signs:** retarded growth, misshapen bones (rickets), lameness and osteoporosis.
- **Sources:** Whole milk (colostrum, egg yolk, sun-cured hays, forage crops, fish liver oils, irradiated yeast.

Vitamin K

- **Function:** necessary for the maintenance of normal blood coagulation.
- **Deficiency signs:** blood loses its power to clot or the time needed for clotting is longer and serious hemorrhages (خوێنبەربوون) can result from slight wounds or bruises.
- **Sources:** green leafy forages, fish meal, liver, soybeans, rumen and intestinal synthesis, and the synthetic compounds.

Vitamin C (Ascorbic acid)

- **Function:** has an effect on the metabolism of calcium in the body (Not required in rations of farm animals).
- **Deficiency signs:** none demonstrated in livestock. Human deficiency: scurvy (swollen and painful joints and bleeding gums) and brittleness of bones(ئێسکە لاوازەکان).
- **Sources:** citrus fruits, tomatoes, leafy vegetables and potatoes.

Vitamin B_1 (Thiamin)

- **Function:** required for the normal metabolism of carbohydrates.
- **Deficiency signs:** loss of appetite, muscular weakness, severe nervous disorders, general weakness and wasting (BeriBeri).
- **Sources**: raw, whole grains and especially their seed coats and embryos; fresh green forage; and yeast, milk and rumen synthesis.

Vitamin B_2 (Riboflavin)

- **Function:** necessary for normal embryo development, important in the metabolism of amino acids and carbohydrates.
- **Deficiency signs:** poor reproduction characterized by small litters and deformed young (cleft palate and club-footedness) curly toe paralysis in chicks, digestive disturbances, general weakness and eye abnormalities.
- **Sources:** milk and dairy by-products, yeast, green forages, well cured hay (especially alfalfa), whole grains, wheat bran and synthetic riboflavin rumen synthesis.

Mineral Facts

- Essential inorganic nutrients, required in small amounts.
- As many as 20 minerals may be required!
- Required for growth, maintenance, reproduction and lactation.

Who is Cap. KS NaclMg?

The Macro-minerals:

- Calcium Ca
- Phosphorous P
- Potassium K
- Sulfur S
- Sodium Na
- Chlorine Cl
- Magnesium Mg

Calcium (Ca)

- **Function:** major component of bones and teeth and essential in blood coagulation, nerve and muscle function and milk and egg production.
- **Deficiency signs:** retarded growth, deformed bones in young animals (rickets), and soft shelled eggs and osteoporosis in older animals.
- **Sources:** milk, oyster shells and limestone.

Sodium chloride

Considered together because of a close biochemical relationship and are provided as common salt (NaCl)

- **Function:** required for the formation and retention, concentration and pH of body fluids, such as protoplasm, blood. Important in the formation of digestive juices and functions in nerve and muscle activity.
- **Deficiency signs:** poor condition and depressed appetite. Most farm produced feeds are deficient in these two minerals.
- **Sources:** salt supplements and injectable products.

Phosphorus (P)

- **Function:** essential for the formation of bones, teeth, and body fluids. Required for metabolism, cell respiration and normal reproduction.
- **Deficiency signs:** similar to calcium deficiency, lack of appetite, poor reproduction and unthrifty appearance.
- **Sources:** dicalcium phosphate, bone meal, and low fluorine phosphates.

Potassium (K)

- **Function:** retention and formation of body fluids, pH concentration of body fluid and rumen digestion.
- **Deficiency signs:** nonspecific and unlikely under most conditions but may have decreased feed consumption and efficiency.
- **Sources:** roughages. Grains are less than roughages.

Manganese (Mn)

- **Function:** Fetal development, udder development, milk production and skeleton development.
- **Deficiency signs**: Abortions, reduced fertility, deformed young and poor growth.
- **Sources:** Most use trace mineralized salt.

I Cu Fe Se Mn Mo zn!

What's that supposed to mean?

The Microminerals

Iodine (I)

Copper (Cu)

Iron (Fe)

Selenium (Se)

Manganese (Mn)

Molybedenum (Mo)

Zinc (Zn)

Copper (Cu)

- **Function:** should be present in animal tissues for iron to be properly utilized, hemoglobin formation and synthesis of keratin for fair and wool growth.
- **Deficiency signs:** poor pigmentation of feathers, stringy wool, sway back lambs, lack of muscle coordination and anemia.
- **Sources:** forages and copper salts.

Iron (Fe):

- **Function:** essential for the function of every organ and tissue of the body (Hemoglobin).
- **Deficiency signs:** seldom occurs in older animals, nutritional anemia, labored breathing and pale eyelids, ears and nose.
- **Sources:** forages and copper or trace mineral salts.

Cobalt (Co)

- **Function:** required as a nutrient for the microorganisms in ruminants and thereby aids in rumen synthesis of Vitamin B_{12}. Because swine cannot manufacture B_{12} from cobalt, the diets are supplemental with vitamin B_{12} instead.
- **Deficiency signs:** lack of appetite, loss of weight, rough hair coat, anemia, decreased milk and wool production and death in extreme cases.
- **Sources:** legume forages and salt containing cobalt.

Magnesium (Mg)

Function: similar to calcium and phosphorus.

Deficiency signs: Animals are irritable, their heart beat is irregular and there is severe kidney damage.

Sources: mineral supplements and ordinary feeds.

Which nutrient deficiencies does Cap. KS have?

Night blindness?

A

Bleeding gums & Scurvy?

C

Blood won't clot?

K

Lameness?

D & E

Childless/ reproductive dysfunction?

B_2 & A

Poor posture?

Ca & P

Vocabulary Review

- Nutrients: chemical substances in food that are used by the body to produce energy and tissues.
- Vitamins: essential organic nutrients, required in small amounts, that cannot be synthesized by the body. Required for growth, maintenance, reproduction and lactation.
- Vitamin deficiency: decline in health due to the lack of a vitamin in a ration.

- Fat soluble vitamin: a vitamin that can be stored and accumulated in the liver and other fatty tissues.
- Water soluble vitamin: a vitamin that cannot be stored in the tissues. Must be provided regularly as deficiencies can develop in a short time.
- Minerals: essential inorganic compounds, required in small amounts. Required for growth, maintenance, reproduction and lactation.
- Macrominerals: required in large amounts.
- Microminerals: required in small amounts.


Thank
you