



Energy



Energy is required for every single biological reaction in the body. Without adequate energy intake, vital organs do not operate properly; cells do not multiply, bones and muscle tissue do not grow, the mammary gland does not produce milk, and reproduction is halted. Energy is essential for **maintenance, growth, health, lactation, reproduction, and gestation.**

Maintenances are the metabolic processes, such as heartbeat, brain activity, respiration, and other vital functions. Physical activity is also classified as maintenance. Maintenance requirements for energy are defined as the amount of energy intake that will result in no loss or gain of body weight.



Cattle **growth** depends on the multiplication and enlargement of cells within the bone, muscle, fat, and organ tissues. Energy is directly required to fuel every single cell function, including multiplication. Energy is also required for the synthesis of hormones that stimulate cell and tissue growth.

The immune system, as well as any other body process, require energy to work properly. Animals that do not consume enough energy are highly susceptible to diseases. Energy is required for synthesis and function of cells and substances associated with cattle **health**, including antibody



production. Energy status also helps determine the success of vaccination programs; cattle should be in adequate energy status for optimal vaccine response.

The cells within the mammary gland require significant amount of energy to produce milk. Energy is also fundamental for the synthesis of milk fat, protein, and lactose. However, a cow can mobilize energy reserves to support **lactation** if energy intake is deficient, although excessive mobilization of reserves is detrimental to reproduction and health.

Energy is the primary nutritional consideration for optimal **reproduction** performance of cattle. Energy modulates the synthesis of hormones that control reproduction, such as GnRH, LH, and progesterone. In addition, energy modulates the communication between the fetus and the dam during the initial phases of gestation so the pregnancy can be established and maintained.

Throughout **gestation**, particularly during the last trimester, the energy requirements of cows increase significantly because of development of the placenta and fetal growth. During this period, the cow has to consume enough energy to meet her own maintenance requirements and also to support the development of pregnancy (fetus, uterine membranes and fluids). The demand for energy further increases immediately prior to calving because of milk/colostrum production. Even if a gestating cow does not consume enough energy, she is still able to provide adequate amounts of energy to the placenta/fetus by mobilizing her own energy reserves. However, a cow mobilizing substantial amounts of energy reserves during late gestation may experience calving complications, greater postpartum interval, and health problems.

How do we feed the cow energy? Energy sources for dairy cattle can be broken down into starch, sugar, and fat. Sugars are readily available to the rumen microorganisms. Simple sugars include glucose, fructose, and sucrose. To increase the amount of sugar in the ration, ingredients such as liquid molasses or citrus pulp can be fed. Fats come from both plant and animal sources. They are very energy dense compared to carbohydrates and protein. Unsaturated fat is highly digestible but may reduce fiber digestibility in the rumen compared to saturated fat that has less impact on fiber digestion. Starch is the primary source of energy in dairy diets. The source and processing method of starch will determine how it will be digested in the rumen. Cereal grains such as corn provide most of the starch in dairy cattle diets. Of the energy, improper starch feeding, such as type and amount can have the greatest negative effect on rumen function. Common energy feeds available to cattle are based in high-starch grains (corn, sorghum, barley, wheat), fibrous by-products (soybean hulls, wheat middlings, and beet pulp), or fat sources (oilseeds, animal and vegetable oils).



Corn



Sorghum



Barley



Wheat

Product of The Week

“O” Special 1512



“O” Special 1512 is a complete mineral and vitamin package designed specifically to meet the nutritional needs of dairy cows.

- Provides calcium phosphorus (1:5 ratio), including highly available phosphorus from monosodium phosphate and mono/dicalcium phosphate.
- Contains sulfate forms of trace minerals.
- Meets daily vitamin needs, including Vitamin A, D3, and E.