Popular Article

Scientific Feeding Management of High Yielding Animals

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Introduction

Cattle and buffaloes yielding more than 20 kg/day and 15 kg per day, respectively, are considered as high yielding animals. Due to high milk production during first six weeks of lactation, secretion of nutrients into the milk exceeds the rate of nutrient intake. Thus, high nutrient requirement for milk production and low dry matter intake results in negative energy balance or energy deficit. In high yielding animals severe negative energy balance increases the incidence of metabolic disorders like fatty liver and ketosis. The negative energy causes diversion of nutrients from the body reserves (body fat and protein) resulting in loss of weight. On the other hand, the appetite of the animal during the early lactation (upto 8 weeks) is reduced by 2 to 3 kg per day. Therefore, it is difficult to meet the nutrient requirements, particularly the energy requirement of high yielding cattle and buffaloes through conventional feeding practices. High energy diets are to be formulated and challenge feeding has to be adopted. Adequate fibre (36% NDF in the total ration) is critical for maintenance of normal milk fat. Thus, scientifically five feeding phases are classified for optimum production, reproduction and health of dairy cows:

1. Early lactation - 0 to 70 days (10 weeks, peak milk production) after calving (postpartum).
2. Peak DM intake - 70 to 140 days (20 weeks, declining milk production) postpartum.
3. Mid- and late lactation - 140 to 305 days (42 weeks, declining milk production) postpartum.
4. Dry period - 60 to 14 days before the next lactation.
5. Transition or close-up period - 14 days before to parturition.

Phase 1. Early Lactation: 0 to 70 days (10 weeks) postpartum

Milk production increases rapidly during this period, attains peak milk yield at 6 to 8 weeks after calving. While, feed intake does not increase correspondingly as per the nutrient requirement for milk production, especially for energy, and body tissue (fat reserves) will be mobilized to fulfill energy requirements for milk production.

Increasing feeding of concentrate @ 500 g per day after calving will increase nutrient intake while minimizing incidence

of acidosis. Excessive levels of concentrate (over 60 percent of the total DM) may cause acidosis and a low milk fat percentage. Inclusion of Fiber in the total ration should not be less than 18 percent. Protein is also a critical nutrient during early lactation. Feeding higher protein level of protein as per requirement during this period stimulates the feed intake and allows efficient use of mobilized body tissue for milk production. Rations may contain 19 percent or more crude protein to meet requirements during this period. Low peak production results in low lactation production. Thus, to improve the production of the animal following feeding practices should be adopted:

1. Feed should contain adequate amounts of CP, RDP and UDP.
2. During this phase feed should be top quality forage.
3. Increase intake at a constant rate after calving.
4. Supplement fat to diets of high yielding animals.
5. Reduce stress to the animals.

Phase 2. Peak DM intake 70 to 140 days (20 weeks) postpartum

All feeing practices should be focused to maintain the animal at peak production as long as possible. During this phase feed intake is maximum and can supply nutrient as per the requirement. Animal should no longer be losing body weight, and are either maintaining weight or slightly gaining weight. High quality concentrate and forage should be given to the animal. Feeding of forage should be 1.5 percent of the cow's body weight (on DM basis) to maintain rumen function. Improper feeding management during this period include a rapid decline in milk production, low fat, silent heat (no observed heat), and ketosis.

Phase 3. Mid to late lactation: 140 to 305 days postpartum

During this milk production is declining, the cow is pregnant, and nutrient intake will easily meet or exceed requirements. Concentrate feeding should be at a level to meet milk production requirements and begin to regain body weight lost during early lactation. NPN compounds can be a good source of supplemental protein.

Phase 4. Dry period: 60 to 14 days before parturition

The dry period is a critical phase of the lactation cycle. Dry matter intake will be approximately 2 percent of the cow's body weight. Forage intake should be a minimum of 1 percent of body weight or 50 percent of the dietary DM, while, grain feeding should be according to needs, not exceeding 1 percent of body weight. Supplementation of calcium and phosphorus should be as per the requirements. Calcium intakes of 60 to 80 grams and phosphorus intakes of 30 to 40 grams are sufficient for most cows. In addition provide adequate amounts of vitamin A, D, and E in rations to improve calf survival and lower retained placenta and milk fever problems. Trace minerals must be supplemented in dry cow diets.

Phase 5. Transition period: 14 days before to parturition

The transition or close-up dry cow feeding program is critical for coming lactation and preventing metabolic disorders. Concentrate feeding, if not previously fed, must be started two weeks before parturition. Increase protein in the ration to 14-15 percent of the ration DM. Feeding protein in the form of undegradable protein may be beneficial in supplying amino acids for fetal growth. Limit fat in the ration. High level feeding fat will reduces DM intake. Supplementation of niacin (to control ketosis) and/or anionic salts (to help prevent milk fever) should be included in the ration during this period.

Nutrient Requirements of High Yielding Dairy Cattle during Different Phases of Lactation

a) Water requirements: Lactating dairy cows need 60-70 litres of water per day for maintenance, plus an extra 4-5 litre for each litre of milk produced. Water requirements increase with the increase in environmental temperatures. Lactating cows will drink 150 to 200 litres of water per day in the summer seasons.

b) Crude protein requirements: The requirement of crude protein (CP) during early, mid, late lactation and dry period should be 16-18%, 14-16%, 12-14% and 10-12%, respectively. Undegradable or bypass protein (UIP) should be 35 to 40 percent of the CP in early lactation and 30 to 35 percent of CP in late lactation.

(c) Roughages: Complete feed of high yielding animal must be not less than 21% ADF or 28% NDF. The recommended roughage to concentrate ratio for high producing animal should be 50:50, 60:40 and 75:25 in early, mid and late lactation

(d) Fat: As per BIS feeding specifications for dairy animals fat should be 3.0 % and 2.5% in type I and type II concentrate mixture, respectively. Fat plays important role in performance of lactating animals. Whereas NRC feeding standard have recommended 3.0 % fat, in the complete feed for dairy cattle.

(e) Salt: Salt should be supplemented @ 0.5 percent of the ration DM or 1 percent of the concentrate mixture.