

Popular Article

Metabolic Profiling Of Dairy Cows

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Abstract

Compton metabolic profile test is the metabolic profiling of dairy cows. It is done on a herd or individual basis to rule out pre -partum and post-partum metabolic problems. Metabolic problem during transition phase give arises to periparturient diseases, so metabolic profiling proved as an important preventing tool. Metabolic profiling is a blood test for the detection of metabolites and deficiencies. Some of the important parameters included such as Non-esterified fatty acid (NEFA), beta-hydroxybutyrate(BHB) calcium (Ca), phosphorus (P), potassium (K), magnesium (Mg), blood urea nitrogen, creatinine, total protein, and creatinine, etc. To investigate the management practices and metabolic state, pooled blood samples should be collected during dry period, early, mid and late lactation. Along with metabolic profiling, ration evaluation, stage of lactation, and body condition score should be evaluated for appropriate interpretation.

Introduction

Production and metabolic disease mainly occur during a cow's transition phase. Metabolic profiling of cows is done to analyze the probability of production disease in dairy cows. Production disease occurs as a result of an imbalance between the input of raw materials and output of the final product, when there is a reduction in input raw materials animal body utilize its own body constituent to maintain the supply, and the different metabolites formed in such biochemical procedure, lead to clinical signs of production and metabolic problems. Metabolic profile test in the blood test for assessing the metabolic and nutritional status of the animal body by detection of accumulation of metabolites and deficiency metabolic profile test is done to examine the health disease and metabolically superior herd. Peri-parturient diseases with high incidence are milk fever, downer cow syndrome, abomasal displacement, fatty liver, ketosis and retained placenta etc. Other pertinent information for interpretation of the metabolic profile would include animal age, lactation number, milk production level, milk composition, days in milk, pregnancy status, and body condition score. Metabolic status should be ruled out during the dry period, transition period, early, mid and last lactation of every cow. The metabolic profile test offers analytical testing of various components.

1. Energy metabolism:

It is the most critical parameter during production and lactation as the animal is in an energy deficit state. Non-esterified fatty acid (NEFA), Body condition score (BCS), Glucose, and beta-hydroxybutyrate (BHB) is the most commonly used indicators for assessing the energy status of animals. Serum NEFA is used to determine the adipose tissue breakdown due to negative energy balance. BCS ranges from 1 (thin) to 5 (obese). BHB is mainly used to determine ketone body concentration.

2. Protein metabolism:

Another most important component dealing with metabolic profile test is protein status. Haematocrit, Albumin, γ -globulin, blood urea nitrogen, creatinine, total protein and creatinine kinase are the important parameters. Changes in serum albumin and total protein are usually manifested as protein deficiencies. Creatinine and BUN are used to evaluate the renal function. Creatinine kinase is also a biomarker for muscle injury or damage.

3. Liver function:

Excessive fatty infiltration of the liver during the transition into lactation phase of cow initiates fatty liver condition. Various enzymes such as gamma-glutamyltransferase [GGT], aspartate aminotransferase [AST], sorbitol dehydrogenase [SDH] and total bilirubin concentrations are used as indicators of liver function. As changes in all these enzymes in metabolic profile test does not clearly indicate transitional metabolic dysfunctions as liver dysfunction could also be a reason for it. Estimation of NEFA along with total cholesterol should be done for distinct interpretation.

4. Mineral metabolism:

Evaluation of concentration of minerals like calcium (Ca), phosphorus (P), potassium (K), magnesium (Mg), sodium (Na), chloride (Cl) and sulfur (S) in serum 4 weeks pre-partum and postpartum is very crucial in metabolic profiling. Downer cow, and post-parturient haemaglobinuria are important metabolic conditions attributed to decrease or increase in mineral metabolism. Status of some of these minerals is completely reliable on dietary intake.

Conclusion

Metabolic profiling of every individual and herd should be done for screening metabolic disease occurrence. It is a very important tool for the prevention of peri-parturient diseases and good forage or feeding management. Body condition score and ration evaluation should also be considered before interpretation.

References

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