METABOLIC PROFILE TESTS IN DAIRY CATTLE

K. Padmaja, K. Usha sree*, K.Lakshmi
Department of Veterinary Medicine,
College of Veterinary Science,
Rajendranagar, Hyderabad-500030
Corresponding author e-mail: *Ushasree70@gmail.com*
DOI: https://doi.org/10.5281/zenodo.15700105

ABSTRACT

Metabolic profile tests are conducted to assess the nutritional status, animal production and prediction of any clinical abnormalities, Compton metabolic profile test is used for the assessment of the herd status, whereas the mini metabolic profile test is used for the individual assessment of the animal status.

KEYWORDS: Compton Metabolic profile test, Mini Metabolic profile test, herd status.

INTRODUCTION

Metabolic profile is based on the concept that the laboratory measurement of certain compounds of body fluid will reflect the nutritional status of the animal with or without the presence of clinical abnormalities. Metabolic profiles provide herd-based diagnostics relative to disease risks and nutritional status based on appropriate animal selection and testing parameters. Use of metabolic profiling is best utilized to address animal performance, health, or reproductive issues associated with metabolic changes occurring during the transition period.

OBJECTIVES OF METABOLIC PROFILE TEST

Metabolic profile tests are conducted to monitor the health status of the herd, to assess input, output and throughout relationship or to detect the qualitative and quantitative adequacy of the diet in a farm, to diagnose nutritional imbalances and metabolic production diseases in early stage.

Metabolic profile tests should be conducted when there is change in diet, at the end of winter, summer or any change in season, preferably once in a month.

PROPERTIES OF THE BIOCHEMICAL PARAMETER FOR MPT

- The metabolite should be stable in the blood for a considerable period after collection
- It must be possible to analyse the metabolite accuracy, and the amount of laboratory error must be minimum.
- The metabolite should be constituently related to the nutritional status.
- Factors such as age, sex, genotype and environmental stress should not have significant influence on the metabolite.

COMPTON METABOLIC PROFILE TEST

Compton metabolic profile test is based on the concept that the laboratory measurement of certain components of plasma or serum will reflect the nutritional status of the entire herd, with or without the presence of clinical abnormalities. The test is used only as an aid in the diagnosis of nutritional imbalance and production diseases. Metabolic profiles have also been suggested as an aid in the selection of superior individuals.

There are 5 main areas of interest for metabolic profile testing:

1. Energy balance
2. Protein evaluation
3. Liver function
4. Macro mineral evaluation
5. Urine evaluation

ENERGY BALANCE

This should focus on measuring NEFA concentrations in the last week prepartum and plasma /serum BHB and urine acetoacetate concentration in the first and second weeks postpartum. High plasma NEFA concentrations

indicate negative energy balance, high plasma BHB concentrations are associated with reduced milk production, increased incidence of clinical ketosis, LDA and reduced fertility. Decreased plasma glucose act as an indicator for the increased incidence of ketosis.

PROTEIN EVALUATION

Plasma urea nitrogen and Blood urea nitrogen are the useful indicators of the protein status of the animal, greater values of milk urea nitrogen indicates the sufficient protein intake whereas the low values indicate the insufficient protein intake in the feed.

LIVER FUNCTION AND INJURY

The presence of the injury can be evaluated by measuring plasma/serum Aspartate amino transferase(AST), Sorbitol dehydrogenase (SDH), Alkaline phosphatase, Gamma glutamyl transferase (GGT).

MACROMINERAL EVALUATION

Abnormalities of the blood levels of the four macrominerals like Calcium, Phosphorous, Magnesium and Potassium

CALCIUM

Serum Calcium measurement can be effective for the control of periparturient hypocalcemia.

PHOSPHORUS

Serum inorganic phosphate concentrations are decreased due to the decrease in the dietary intake.

Magnesium

Serum Magnesium concentrations are required to monitor the health condition of the cattle and to prevent hypomagnesemic tetany .

PROCEDURE OF COMPTON METABOLIC PROFILE TEST

Three groups of animals of dry, medium and high with seven cows in each group, samples at least three times a year summer, autumn, and winter or when the nutritional imbalance is suspected , the parameters analysed are blood glucose (BG), Packed cell volume(PCV), Haemoglobin(Hb), Blood urea nitrogen(BUN), Serum inorganic phosphorous (SIP), Magnesium, Calcium, Potassium and Sodium, Serum Total Protein and Albumin in some cases Copper(Cu),Iron(Fe), Plasma non esterified free fatty acids.

Kronfled suggested the testing of 12 metabolites they are Hb, Ca, Mg, BG, TP, A, FFA and LDH, in addition to the above parameters.

MINI METABOLIC PROFILE TEST(MMPT)

At 4-10 weeks after calving, individual cows may be assessed, adequacy of energy and protein is estimated by analysing BG, BUN, and Albumin.

INTERPRETATION OF RESULTS

In dairy cattle the major objective of MPT is to demonstrate the interrelation between the components of blood, nutrition, productivity and fertility. The results are difficult to interpret without a careful assessment of the nutritional status and reproductive performance of the animal and herd. other supplementary data like details of individual animal age, stage of lactation and milk yield, feed intake analysis of forage, feed etc , has to be considered while making interpretation.

The other additions of the Metabolic profile test are done by Sommer (1975), the parameters are SGOT, Total cholesterol, Blood glucose.

Zepgi (1976) added SGOT, Total Cholestorol, Blood glucose.

Gnanaprakasam (1988) added the parameters AST, Total cholesterol, Blood Glucose and Rumen liquor.

REFERENCES

A Textbook of the diseases of cattle,horses, sheep, pigs and goats, 11th edition ,
MSD Veterinary manual .www.msdvetmanual.com.
Rebhuns diseases of dairy cattle , 3rd edition , Simon F Peek et al., 2018.

Cite this article:
K. Padmaja, K. Usha sree*, K.Lakshmi. (2025). Metabolic profile tests in dairy cattle. Vet Farm Frontier, 02(05), 29–30. https://doi.org/10.5281/zenodo.15700105