

ENZYME ACTIVITIES IN COW PLASMA DEPEND ON GEOGRAPHICAL LOCATION AND SEASON

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Abstract

This research is significant because it investigates how geographic location and seasonal variations affect enzyme activities in dairy cows, which are crucial indicators of liver health and metabolic status. Understanding these variations is vital for accurately interpreting metabolic profile tests (MPTs) used to monitor cow health, diagnose diseases, and optimize herd management practices. By highlighting the influence of environmental and physiological factors on enzyme levels, this study can help improve dairy farming practices, enhance animal welfare, and ultimately contribute to better productivity and health outcomes in dairy herds. This study aimed to investigate the enzymatic activities of alanine aminotransferase (ALT), aspartate aminotransferase (AST), lactate dehydrogenase (LDH), and alkaline phosphatase (ALP) in Holstein-Friesian cows, with a focus on variations due to geographical location and seasonal changes.

The study involved 480 Holstein-Friesian cows aged between 2 and 9 years, with most being between 3 and 5 years old. The research was conducted in two distinct geographical areas in Bosnia and Herzegovina: the northern region (Farm T) and the southern region (Farm V). Blood samples were collected via puncture of the coccygeal vein during two periods: summer (June-August) and winter (December-February). Samples were stored in 5 mL vacuum blood containers and transported in portable refrigerators at 4 °C to the Veterinary Faculty in Sarajevo. The blood samples were centrifuged (LC 320, 3000 rpm/10 min) to separate the plasma. Enzyme activities were determined using a spectrophotometer (Beckmann DU-64 UV/VIS). Commercial kits from "Human" (Max-Planck-Ring 21, D-65205 Wiesbaden, Germany) were used to measure the enzyme activities in the plasma. Data analysis was performed using SPSS 10.00 software. Mean values of the examined parameters between different animal groups, based on the sampling season, were compared using the t-test. Differences were considered statistically significant at a $P < 0.05$ significance level.

Significant differences were observed between locations and seasons. Elevated enzyme levels were particularly noted during the winter, suggesting heightened metabolic demands and potential liver stress. The results underscore the impact of environmental factors, such as climate and altitude, on metabolic processes and liver function in dairy cows.

These findings highlight the importance of considering geographical and seasonal factors in the management of dairy herds to optimize health and productivity. Further research is recommended to explore the underlying mechanisms driving these enzymatic variations, which could inform more targeted interventions in dairy farming practices.

Key words: *Enzyme Activities, Dairy Cows, Geographic Location, Seasonal Variations.*