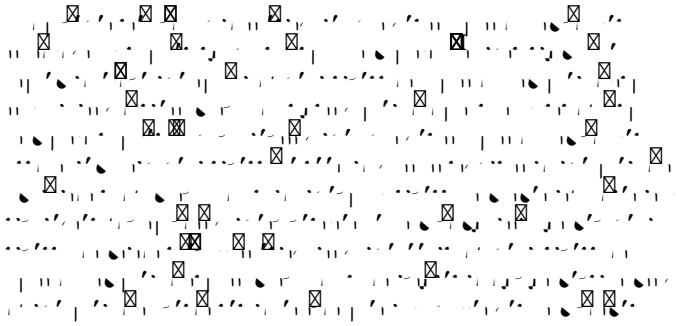
Heat Stress Alters Amino Acid Metabolism in Dairy Cows: Plasma and Milk Metabolomics

Ruiz González*

Abstract

Heat stress poses a signiýcant challenge to dairy cattle, a ecting their overall health and productivity. This study investigates the impact of heat stress on amino acid metabolism in Holstein dairy cows using plasma and milk metabolomics. Twelve lactating Holstein cows were subjected to heat stress conditions, and plasma and milk samples were collected before and during heat stress exposure. Metabolomic analysis revealed signiýcant alterations in amino acid proýles in both plasma and milk samples under heat stress conditions. Several essential and non-essential amino acids exhibited changes in concentration, indicating disruptions in amino acid metabolism pathways. Speciýcally, increased levels of certain amino acids, such as glutamate and aspartate, were observed in plasma and milk samples during heat stress, suggesting enhanced protein catabolism and gluconeogenesis. These ýndings provide valuable insights into the metabolic response of dairy cows to heat stress and highlight the importance of amino acid metabolism in maintaining metabolic homeostasis during thermal stress. Understanding the mechanisms underlying these metabolic alterations may inform strategies for mitigating the negative e ects of heat stress on dairy cow health and productivity.

: Heat stress; Dairy cows; Amino acid metabolism; Metabolomics; Plasma; Milk



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Received: 01-Feb-2024, Manuscript No. jomb-24-127844; **Editor assigned:** 03-Feb-2024, Pre QC No. jomb-24-127844 (PQ); **Reviewed:** 17-Feb-2024, QC No. jomb-24-127844, **Revised:** 23-Feb-2024, Manuscript No. jomb-24-127844 (R); **Published:** 29-Feb-2024, DOI: 10.4172/jomb.1000201

Citation: Gonz§lez R (2024) Heat Stress Alters Amino Acid Metabolism in Dairy Cows: Plasma and Milk Metabolomics. J Obes Metab 7: 201.

signi cance threshold (e.g., $p < 0.05$). Discuss measures taken to ensure

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