WHEY PROTEIN PROFILE FROM HEIFERS AND MULTIPAROUS JERSEY’S COWS DURING THE EARLY LACTATION

Raquel Fraga e Silva Raimondo1, Fabio Celidonio Pogliani1, Daniela Becker Birgel1, João Paulo Elsen Saut2, Eduardo Harry Birgel Junior3

1Department of Clinical Science, College of Veterinary Medicine, University of São Paulo, São Paulo, 2College of Veterinary Medicine - Federal University of Uberlandia, Uberlandia, 3Animal Sciences, Faculty of Animal Sciences and Food Engineering, University of São Paulo, Pirassununga, Brazil

Introduction: In the last 2 weeks of gestation occurs changes in mammary tissue with the primary purpose of producing and storing colostrum higher in protein than mature milk, because the immunoglobulin, responsible for the passive transfer of immunity. Previous research showed lower levels of protein in heifers’ colostrum, resulting in a lower quality.

Objective: Objective of this study was to evaluate the whey protein profile from heifers and multiparous cows during the early lactation.

Material and methods: We used 50 samples from 28 heifers and 67 of 32 multiparous cattle from São Paulo state. The samples were collected before milking, after the routine procedures to prepare animals. Initially 3ml of secretion were collected from sterile manner for the microbiological examination, and then 50ml for the proteinogram. The 117 samples negative by microbiological examination were divided into 3 groups according to the number and hours of lactation: 0—24; 24—48 and 48—72h. The whey obtained by coagulation by rennin was centrifuged at 16,000g for 20 minutes. The whey protein was determined by the biuret method and fractioned by SDS-PAGE Gel Electrophoresis.

Results and discussion: There was a decrease of protein regardless of the number of lactations during the first 3 days, and maximum levels were observed on the first day (heifers: 3833.0±680.0 and multiparous: 7262.0±553.0 mg/dL). The average values in protein content during the 48h were higher in multiparous: lactoferrin (multiparous: 544.4±341.8 mg/dL and 152.1±86.0 mg/dL; heifers: 291.7±282.0 and 101.3±42.0 mg/dL), serum albumin (heifers: 260.0±190.0 mg/dL and 80.0±20.0 mg/dL; multiparous: 552.4±252.6 mg/dL and 130.0±58.8 mg/dL). The β-lactoglobulin was higher during the period studied (multiparous: 1024.0±451.6 and 419.5±121.4 mg/dL; heifers: 600.6±391.7 and 281.3±58.1 mg/dL). α-lactalbumin in multiparous decreases gradually and remains constant in heifers. The immunoglobulin heavy chain (heifers: 620.0±432.2 mg/dL; multiparous: 1222.0±446.7 mg/dL) and light chain (heifers: 884.0±842.5 mg/dL; multiparous: 1590.0±762.1 mg/dL) gradually diminished after the first 24h of lactation. In colostrum phase the immunoglobulin concentrations of both chains were lower in heifers, demonstrating the difference in the quality of immune colostrum.

Conclusion: It was concluded that there is a smaller amount of whey proteins in Jersey’s heifers causing a lower quality.

Keywords: Colostrum, cows, whey protein, SDS-PAGE