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How climate change affects dairy cow farming in Serbia

Ivan Vujanac[1], Radiša Prodanović[1], Sveta Arsić[1], Sreten Nedić[1], Ljubomir Jovanović[1], Milica Stojić[1], Julijana Trifković[2], Danijela Kirovski[1].

[1]Faculty of Veterinary Medicine University of Belgrade, Belgrade, Serbia; [2]Faculty of Agriculture University of East Sarajevo, East Sarajevo, Bosnia And Herzegovina.

Objective: Due to climate change, for the period 2001 to 2030 temperature in Serbia is projected to rise by about 1°C, compared with 1961-1990. The aim of this study was to evaluate the effects of increased enviromental temperature during summer season in Serbia, which is in the zone of moderate-continental climate, on milk production and milk composition in dairy cows, as well as postnatal adaptive capatibility of neonatal calves.

Material and methods: The trial was carried out on 40 Holstein Friesian cows and their neonatal calves (20 cows in summer and 20 cows in the spring season). Average daily feed consumption was measured for each cow. The cows were housed in a stable which during the summer was not equipped with additional cooling. The temperature-humidity index was recorded hourly. Based on the results calculated for average all-day THI, during the spring season the cows were not exposed to heat stress. During the summer season, the cows were exposed to the effects of moderate to severe heat stress. The cows' colostrum was sampled at 2, 14, and 26 h after calving, before feeding of their calves. Calves' blood samples were taken before the first colostrum intake and on days 1, 2, 3, and 7 of life. Calves' physiological parameters were measured on days 0 and 7. Milk production was measured daily form calving to day 90 of lactation.

Results: The quality of cows' colostrum was significantly reduced during summer season. The ingestion of the low-quality colostrum, combined with the thermal discomfort during summer season, provoked impaired physiological, biochemical, hormonal, and oxidative stress parameters in samples taken from the post-colostral calves. Average daily milk yield in the spring season from day 60 to day 90 of lactation was significantly higher compared to the same lactation period during the summer season, while there was no significant difference in average milk yield from day 30 to day 60 of lactation between spring and summer season. Average daily feed consumption was significantly lower during the summer compared to spring during whole trial period.

Conclusion: Our results indicate that, during summer season, the negative impact of climate changes on milk production, milk composition and post naonatal adaptive capability of cows are strongly expressed. However, negative impact on milk production is not effective until day 60 of lactation, probably due to homeorhetic mechanisms which are important for the rearrangement of metabolism. This study highlights the importance of adequate supporting strategies for the care of the dairy cows and postnatal calves during the summer season.

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Effect of seasonality (spring × winter) on metabolism, health and immunity of dairy cows and their calves

Fernanda Carolina Ramos Dos Santos[1], Bianca Paola Santarosa[2], Felipe Eduardo Dal Más[3], Érica Cristina Bueno Do Prado Guirro[3], Viviani Gomes[1].

[1]School of Veterinary Medicine and Animal Science (FMVZ), University of São Paulo (USP), São Paulo, Brazil; [2]Institute of Agricultural Sciences (ICA), Federal University of Jequitinhonha and Mucuri Valleys (UFVJM), Unaí, Brazil; [3]Federal University of Paraná (UFPR), Palotina, Brazil.

Objectives: The objective of this study was to evaluate the effect of the season (spring and winter) on the metabolism, health, and immunity of neonate Holstein calves.

Materials & Methods: This research was in a dairy farm, in Descalvado, São Paulo, Brazil. It was evaluated 28 healthy multiparous Holstein cows, that calved female neonates, in eutocic delivery, evaluated during winter (July and August, n=15) and spring (September and October, n=13), which the average maximum, minimum, and thermal amplitude temperature were 28.2°C, 29.3°C, 9.2°C; 15.9°C, 21.2°C, and 13.4°C, respectively. Dry cows were housed at indoor compost-barn, with cross-ventilation, 30 days before expected calving date. Immediately after birth, calves were separated in a "cuddle box" to maternal initial contact, and receive colostrum (≥21% BRIX) until 1h . From the 1st to the 14th day, calves stayed in closed-sided individual housing, hay bedding, covered barn, and the 15th to 28th in individual housing system outside the covered barn. At calving, the cow body condition score (BCS) was classified (1-5) and blood collected to analyse. Calves were blood sampled immediately after birth (D1) and on D2-3, D7, D14 and D28 days of life, 2h before the morning milk feeding, when has done a physical examination. Blood samples were collected in vacuum tubes containing fluoride sodium and with no anticoagulant, to obtain plasma and serum, respectively. Fecal and bovine respiratory disease (BRD) scores were assessed based in Calf Heath Scoring Criteria (University of Wisconsin). With serum samples were analyzed cholesterol, triglycerides, iron, total protein and albumin, and with plasma, glucose, non-esterified fatty acids (NEFA) and β-hydroxybutyrate (BHB), through commercial kits in automated biochemical analyzer. Haptoglobin (Hp) was measured by spectrophotometric technique. The IgG levels in calf serum samples were quantified using an in-house sandwich ELISA. Measurement of endogenous and induced reactive oxygen species (ROS) production were conducted in whole blood cultures by using the fluorescent dye dihydrorhodamine 123. The cells were stimulated with inactivated antigens like *Staphylococcus aureus; Escherichia coli; S. hyicus* and Phorbol Myristate Acetate at 10^{-6}M (PMA), and the capacity