Impact of somatic cell score on milk composition, curd firming, and cheese-making traits of Manchega sheep

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The aim of this research was to assess the impact of somatic cell score (SCS) on different phenotypes related to production, composition, milk colour, traditional milk coagulation properties (rennet coagulation time – RCT – curd-firming rate as the time to a curd firmness – CF – of 20 mm, and CF at 30 and 60 min of analysis) and new curd firming and syneresis traits (modeled RCT, potential asymptotical CF at an infinite time, curd firming and syneresis instant rate constants, maximum CF value and achievement time); cheese yield traits as the weights of total fresh curd, dry matter, water in the curd and nutrient recovery traits. The study included individual milk samples from 791 Manchega ewes reared in 5 flocks. All these phenotypes were analysed using a mixed model that considered, in addition to the standard nuisances, the effect of SCS discretized into 7 classes of half standard deviation. A significant effect of SCS was observed on almost all traits. In addition to the expected results on standard traits, findings related to milk colour, curd firmness, and cheese characteristics were particularly interesting. Specifically, as SCS increased, milk lightness decreased and a* values approached red. SCS also had a negative effect on coagulation, delaying milk gelation and reducing CF. Furthermore, curd moisture increased with SCS and there was lower recovery of protein in the curd. This research is part of Project PID2020-118031RR-C21/AEI/10.13039/501100011033.

Mammary gland modulation on metabolic and immune status of dairy goats and their offspring

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Neonatal mortality has become an important challenge for the dairy goat industry. Newborn ruminants are highly dependent on good quality colostrum intake right after birth to obtain energy and an appropriate immunization. Colostrum quality is mainly determined by IgG concentration, however other less abundant molecules such as lactoferrin or oligosaccharides are crucial for the immunization of the newborn goat kid. Several factors, such as dam nutrition or udder health during late gestation play a relevant role on colostrogenesis and therefore on colostrum quality. Dam metabolism can be affected by high starch diets during prepartum which induce changes in blood metabolites (i.e., glucose, BHB and FFA) and colostrum bioactive compounds (i.e., insulin). In addition, several studies have assessed the effects of mastitis on physiological responses within the mammary gland. For instance, the intramammary administration (IA) of immunomodulatory molecules such as lipopolysaccharides (LPS) from Escherichia coli (O55:B5) at parturition has shown not only to increase colostrum quality (i.e., increased IgG and IgM concentrations) without having negative effects on dairy goats but has also enhanced the immunization of those newborns receiving colostrum from LPS challenged goats. These results suggest that dam metabolism and mammary gland physiology can be modulated by prepartum diets and the application of molecules such as LPS. However, further studies are necessary to determine the suitability of these strategies to improve colostrum quality in practical conditions.