Effects of condensed tannins from sainfoin in ewe milk production and suckling lamb growth

C. Baila, S. Lobón, M. Blanco, I. Casasús, J.R. Bertolín and M. Joy
Ctr Invest y Tecnol Agroal Aragon (CITA), IA2 (CITA-Universidad de Zaragoza), Animal Production, Avda. Montañana, 930, 50059 Zaragoza, Spain; cbaila@cita-aragon.es

There is an increased interest in using sainfoin (*Onobrychis viciifolia*) due to the presence of condensed tannins (CT), however their effects are not well known. The aim of the study was to evaluate the effect CT from fresh sainfoin on productive performance during 4 weeks of lactation. For that, 20 lactating ewes and their lambs were individually fed fresh sainfoin *ad libitum* plus 200 g/d of barley. Randomly, half of the ewes were daily orally-dosed 100 g of PEG 4000 /200 ml water per ewe as tannin-binding agent (SF+PEG) and the other half received no PEG (SF). Sucking lambs were permanently with their dams and fed maternal milk until they reached the target slaughter weight of 10-12 kg. The intake of sainfoin was recorded daily and its chemical composition was analysed. The body weight (BW) of ewes and lambs, body condition score (BCS) of ewes and the milk yield were recorded weekly. Milk was analysed for chemical composition, polyphenol content (Folin-Ciocalteu method) and antioxidant capacity (ABTS method). The presence of CT did not affect the intake of dry matter, protein, fibre and energy ($P>0.05$). The BW and BCS of dams and BW of lambs were similar between the groups ($P>0.05$). Milk yield was affected by the interaction between treatment and the week of lactation ($P<0.001$), SF ewes peaked at 2 week, whereas the SF+PEG ewes peaked at the 4th week. Milk protein and fat contents were similar between treatments ($P>0.05$) but urea tended to decrease ($P<0.1$) in SF group. The content of polyphenols was affected by both presence of CT ($P<0.001$) and week of lactation ($P<0.05$), with greater content in SF+PEG than SF ewes, and higher values on the first week of lactation. However, this greater content was not reflected in the antioxidant capacity of milk ($P>0.05$). In conclusion, the CT from sainfoin did not affect the intake and BW of animals but varied the pattern of evolution of milk yield and decreased the polyphenols and urea content in milk.

Quantifying and genotyping protein fractions in milk of different goat breeds by RP-HPLC

G. Secchi[1], N. Amalfitano[1], S. Pegolo[1], A. Cecchinato[1], M.L. Dettori[2], M. Pazzola[2], G.M. Vacca[2] and G. Bittante[1]
[1]University of Padova, DAFNAE, Viale dell'Università 16, 35020 Legnaro (PD), Italy, [2]University of Sassari, Department of Veterinary Medicine, Via Vienna 2, 07100 Sassari (SS), Italy; giorgia.secchi@phd.unip.it

The knowledge of detailed composition of milk protein fractions is important for dairy goat industry because of its impact on technological properties of milk and the nutritional value of milk and dairy products. The caseins (α_{s1}-, α_{s2}-, β- e κ-casein) and whey proteins (α-lactalbumin, β -lactoglobulin) are the same as in bovine milk but their genetic variants are different because of different polymorphisms at these loci. The aim of this study was to quantify the protein fractions and concurrently to identify their genetic variants developing a method based on Reverse-Phase High Performance Liquid Chromatography (RP-HPLC). This project involved 1,272 goats from 6 different breeds reared in 35 farms located in Sardinia (Italy). Individual milk samples were analysed for milk composition, coagulation, curd firming and syneresis, cheese yield and milk nutrients recovery in curd. To quantify the content of protein fractions of different genetic variants, freeze-dried protein samples of milk previously genotyped for genetic variants were used for calibration of HPLC since commercial standards are not available for goat milk. Five variants of α_{s1}-casein (A, B, E, F and null; *CSN1S1* gene; 11 genotypes), 2 variants of α_{s2}-casein (A/F and C; *CSN1S2* gene; 3 genotypes), 3 variants for β-casein (A, C, and null; *CSN2* gene; 4 genotypes) and 5 variants for κ-casein (A, B, C, D, and null; *CSN3* gene; 8 genotypes) were identified and quantified by HPLC. The statistical analysis of preliminary data revealed that polymorphisms in goat milk proteins have strong effects on the concentration of different caseins and on milk coagulation, curd firming, cheese yield and nutrient recovery traits. Moreover, we confirmed that different goat breeds are characterised by different genotypes frequencies, which are associated to different amounts and proportions of caseins in milk. These results provided useful information for defining the value of dairy goat industry and for breeding programs aimed at improving goat milk quality and technological characteristics.

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