Meeting 2014, Copenhagen, Denmark in good order.

Abstract no.: 19247
Abstract title: Stage of lactation affects the fatty acid profile of Chios sheep milk
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Preferred presentation: Poster
Preferred session: 33: Free communications
Abstract text:

The present study examined possible variation in fatty acid (FA) composition of milk, in association with stage of lactation in the Chios sheep breed. Fifteen second parity Chios ewes were used from the start until week 20 of lactation. Animals were housed indoors and group fed the same diet to meet 1.1 X maintenance energy (0.401 MJ/kg weight$^{0.73}$) and milk production requirements. From each ewe, milk samples collected during the morning milking (weeks 1, 4, 8, 12, 16 and 20 of lactation), were analysed for fat, protein, lactose and solids non-fat using established ISO methods, and for FA content, by applying a modified GC-MS method. The effect of the stage of lactation on milk constituents was tested using a general linear model for repeated measurements. Results showed that stage of lactation significantly affected the FA composition of milk ($p<0.001$). De novo synthesized FA, particularly C4:0 to C12:0, were significantly affected showing a similar trend, with an increase during early lactation (peak at week 4) and a decrease thereafter. Stage of lactation also affected most of the saturated and unsaturated long chain FA (≥16 carbons). Expressed in g/100g of fat, the content of long saturated FA (sum of C16 to C24) was low during early lactation (36.1 and 31.8 in weeks 1 and 4, respectively) and increased thereafter (41.9 and 42.8 in weeks 16 and 20, respectively). Poly-unsaturated FA (PUFA) content was higher in early lactation (4.6 and 5.1 in weeks 1 and 4, respectively), and decreased over time (3.4 and 2.9 in weeks 16 and 20, respectively). Conjugated linoleic acid (CLA) showed a similar trend to other PUFA with high content at the start of lactation (0.61, 0.77 in weeks 1 and 4 respectively) and decreasing thereafter (0.41, 0.24 in weeks 16 and 20, respectively). Depending on FA type, stage of lactation differentially affected the milk FA content of Chios ewes on a standard diet.