Tropentag, September 14-16, 2010, Zurich

"World Food System —
A Contribution from Europe"

Effect of Supplementation with Agro-industrial By-products on Milk Fatty Acids in Awassi Sheep

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Abstract

Resource-poor dairy sheep farmers in Middle Eastern countries face high and increasing feeding costs in particular during the milk production period. The conventional supplementary feeds used by farmers (control) are based on barley grain, wheat bran and barley straw and are often unbalanced in energy and protein contents. It has already been demonstrated that locally available feeds like cotton seed cake (CSC), molasses, sugar beet pulp (SBP) and urea-treated wheat straw (UTS) can be utilised to design balanced cost optimised diets (COD). However, the changed feeding regimes may affect product quality. This paper examines the effects of CODs on milk fatty acid profiles that are important for product quality.

Six CODs were compared with a control at the International Center for Agricultural Research in the Dry Areas (ICARDA) in Syria. Fifty-six Awassi ewes were randomly assigned to the seven groups. Animals in all COD treatments were kept on grazing as a basal diet, supplemented with the same level of crude protein ($229\,g\,d^{-1}$) and energy ($18\,MJ,d^{-1}$), only one group of the CODs was based on molasses and on vetch grazing. The control group received less protein (190 g/d) and similar energy levels as the COD groups. Milk samples were collected on weekly basis in April.

In three out of six COD, saturated fatty acids (SFA) decreased by 0.5–5 %, while they increased by 11 % in the vetch-COD ($p < 0.01$). The vetch-COD resulted in remarkable increases in C6:0, C8:0, C10:0, C12:0 and C14:0 and decreases in C18:0 and C20:0 ($p < 0.01$). An increase in C6:0, C8:0 and C10:0 was also observed in the Molasses and SBP-CODs. Monounsaturated fatty acids (MUFA) increased by 1–14 % with 3 out of 6 COD, whereas MUFA decreased 32 % in the vetch-COD ($p < 0.01$). Polyunsaturated fatty acids (PUFA) increased in all CODs by 1–12 % compared to the control group ($p < 0.01$). However, conjugated linoleic acid CLA c9t11 was not affected by the treatments. The observed differences in the fatty acid profiles will directly impact on the organoleptic properties of yogurt and the quality of ghee and thereby influence their market value in the Middle Eastern countries.

Keywords: Agro-industrial by-products, Awassi sheep milk, fatty acid

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