

## Effect of Supplementing Lactating Goats Rations with Garlic, Cinnamon or Ginger Oils on Milk Yield, Milk Composition and Milk Fatty Acids Profile

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**KEYWORDS** Essential Oil. Lactating Goats. Milk Yield. Milk Composition. Rumen Parameters. Blood Metabolites

**ABSTRACT** Plant essential oils are volatile aromatic compounds with antimicrobial activity that can alter ruminal fermentation when used as dietary supplements. Consequently, both milk quantity and quality can be modified. This work aims at verifying the effect of different plant essential oils (garlic, cinnamon and ginger oils) on the milk production when used as dietary additives. Twenty-eight lactating Damascus goats, seven days after parturition, were divided into four groups using complete randomized block design, with 90-days period to study the effect of adding Garlic oil (*Alilum sativum*) (GAR), Cinnamon oil (*Cinnamomum cassia*) (CIN) or Ginger oil (*Zingiber officinale*) (GIN) to their rations on milk yield and composition. These treatments included: (1) control ration consisted of concentrate feed mixture: bersem clover (40:60 dry matter bases); (2) control + 2 ml/head/day garlic oil; (3) control + 2 ml/head/day cinnamon oil; (4) control + 2 ml/head/day ginger oil. Ruminal volatile fatty acids and propionate proportions were increased and ruminal acetate proportion and ammonia nitrogen concentration were decreased with experimental additives. Blood serum proteins and glucose concentrations were increased and urea nitrogen and cholesterol concentrations were decreased with CIN and GAR additives. Results indicated that experimental additives, significantly increased ( $p < 0.05$ ) milk yield, protein and solids not fat contents compared with the control, however fat percent and milk non protein nitrogen were decreased ( $p < 0.05$ ) by treatments compared to the control. Total solids and ash were not affected by the experimental additives. The experimental additives were increased ( $p < 0.05$ ) unsaturated fatty acids in milk specially C18:1n9c and conjugated linoleic acids (CLA). CIN treatments increased C18:3N3 and C18:3N6 (omega 3 and omega6) compared with other treatments. In conclusion, plant essential oils especially CIN oil supplementation to ration of lactating goats had beneficial effects on milk yield and milk protein and so enhance healthy fatty acids (CLA and omega 3) contents in milk.