PRODUCTION OF HIGH QUALITY MILK BY USING NATURAL PLANT COMPOUNDS IN LACTATING GOATS' DIETS

By

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B.Sc. Agric. Sc. (Animal Production), Cairo University, 2003

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ABSTRACT

Fatma Ibrahim Ismail Mohammed Hadhoud: Production of High Quality Milk by Using Natural Plant Compounds in Lactating Goats' Diets. Unpublished Ph.D. Thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2014.

To study the effect of feeding lactating goats on some medicinal plant, two experiments were carried out. The first experiment aimed to determine the proper level of *Echinacea purpurea, Nigella sativa* and *Cichorium intybus* to be used in ruminant rations using in vitro techniques. In the second experiment, twenty Damascus lactating goats weighting 29.2 ± 1.96 Kg LBW (2.5 – 3 years old) were used in this experiment. Animals were randomly divided into five groups where the control group (G_1) was given a basal diet, G_2 was given the basal diet mixed with 4 g/h.d *Echinacea purpurea*, G_3 was given the basal diet mixed with 8 g/kg *Echinacea purpurea*, G_4 was given the basal diet mixed with 7.5 g/h.d *Nigella sativa* and G_5 was given the basal diet mixed with 10 g/h.d *Cichorium intybus* for 98 days. The results obtained from the first experiment showed that the levels of 8 g *Echinacea purpurea,* 7.5 g *Nigella sativa* and 10 g *Cichorium intybus* / kg DM diet, had improved both dry matter and organic matter disappearance in the rumen. While the results of the second experiment showed that, the rumen parameter (pH – TVFs' – Ammonia) tend to increase significantly ($P \leq 0.05$) in G_2. Digestion coefficients of all nutrients (DM – OM – EE – CP – CF) tend to be higher in the treated groups compared with the control group.

Using medicinal plants lead to improve milk production in the treated groups than control group, where milk production was 1345.4, 1718.4, 1516.8, 1363.3 and 1380.0 g/h/d for $G_{1,}$ G_2, G_3, G_4 and G_5, respectively. Regarding to milk composition, milk fat % in the treated groups was slightly higher than the control group. However total milk protein % was lower in G_3, G_5 and G_4 compared with G_2 and $G_{1.}$ The values of milk protein percent were 2.89, 2.93, 2.77, 2.52 and 2.57 %, for $G_{1,}$ G_2, G_3, G_4 and $G_{5,}$ respectively. Using *Echinacea purpurea* effectively decreased somatic cell counts (SCC) in G_2 and G_3. Also adding *Nigella sativa* and *cichorium intybus* to the lactating goats' diets tend to decrease SCC. The obtained values of SCC were 608.1, 64.3, 96.7, 179.0, and 105.2 $*10^3$ CFU for $G_{1,}$ G_2, G_3, G_4 and G_5, respectively. Total microbial count was affected by adding *Echinacea purpurea* and *Nigella sativa*, where G_2 recorded the lowest count followed by G_3 then G_4 (5.17, 5.18 and 5.38, respectively). Also, G_2 and G_3 recorded the lowest count of *Staphylococci* count and *St. auraus* count than G_5, G_4 and G_1. The results indicated that using *Echinacea purpurea, Nigella sativa* and *cichorium intybus* as additives in the dairy goats' diets tend to improve nutrient digestion coefficient also improve milk quantity and quality.

Key Words:

medicinal plant, *Echinacea purpurea*, *Nigella sativa*, *Cichorium intybus*, milk production, milk composition, somatic cell counts, microbial count, *Staphylococci* count, *St. auraus* count.

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