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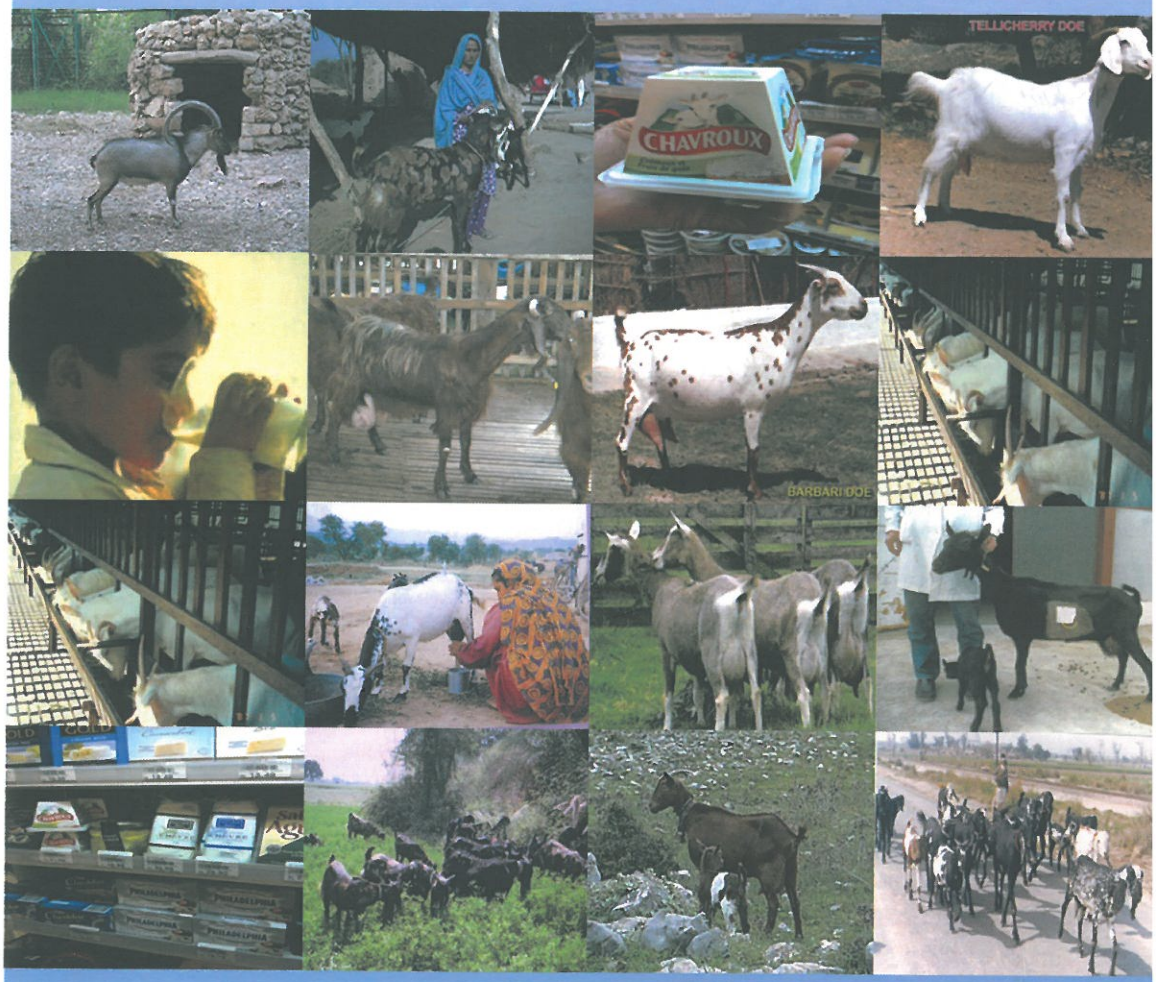
Proceedings of the 1st ASIA DAIRY GOAT CONFERENCE

PROCEEDINGS



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Paper 27

"Feed less Food" - Effect of a Low Concentrate Diet on Milk Quality, Milk Fatty Acid Composition and Performance of Dairy Goats

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Introduction

More than a third of the world's grain harvest is used to feed animals. According to the environmental agency of the UN, losses of calories by bad conversion factor of grain into animal food could theoretically feed 3.5 billion people (McIntyre, 2009). This shows that the production of animal protein is very energy consuming, especially when concentrates are fed to ruminants. Consequently, a major goal is to explore the potential of dairy goats for producing high quality milk in an extensive but ecological friendly way.

Ruminants can be divided into three feeding types: concentrate selector (CS), grass and roughage eaters (GR) and intermediate types (IM) (Hofmann, 1989). CS-types include deer and elk, whereas cattle and sheep are all grazers. Goats together with chamois, red deer, fallow deer belong to the IM types. IM-types are able to browse bushes and even trees besides consuming traditional ruminant diets. The additional source of food ingredients also widens up the goat diet by tannins, which cannot be utilised by GR-types. Goats are generally very selective in choosing food with ingredients of the highest quality, thereby optimising their roughage ration. Due to their anatomical advantages and excellent roughage conversion, goats are destined to produce high quality milk at a minimum amount of concentrates in their ration. Thus, our objective for this study was to measure effects of a low concentrate diet on fatty acid composition and milk yield of dairy goats.

Materials and Methods

In 2011, 50 dairy goats of our experimental herd were divided into two homogenous groups of 25 goats each, considering parity, milk yield and body weight of individuals. One group (KF10) was fed according to the Bio Suisse guidelines with a 10% concentrate proportion of annual ration and the other group (KF40) in accordance with the requirements of the EC regulation on organic farming with a 40% concentrate portion of the annual ration fed. The concentrate consisted of 100 % wheat grist. Mineral licks were made available. Part-time grazing was offered to both groups during the growing season. During the entire lactation there was extensive monitoring of the herd. According to the standards, monthly milk recordings and bodyweight controls were made. Every two weeks, feed samples were taken (concentrate, hay and fresh grass) and analysed. Milk samples were taken weekly and monthly to assess milk composition. Data recordings were statistically analysed using SAS 9.3 (SAS Institute Inc.). Test of normality was done by calculating Shapiro-Wilk-test (proc univariate). Where appropriate, t-test or non-parametric test procedures were used to compare group means, box-whisker plots were created to illustrate data distributions.

Results

Figure 1 shows the annual performance regarding milk yield, fat and protein content. The fatty acid compositions are of monthly samples. Milk yield of KF10 was 68.8 kg, and fat and protein contents were respectively 4.1 and 2.4 kg lower compared to KF40. The annual amount of concentrates for KF10 was 66 kg/goat, whereas it was 259 kg/goat for KF40.

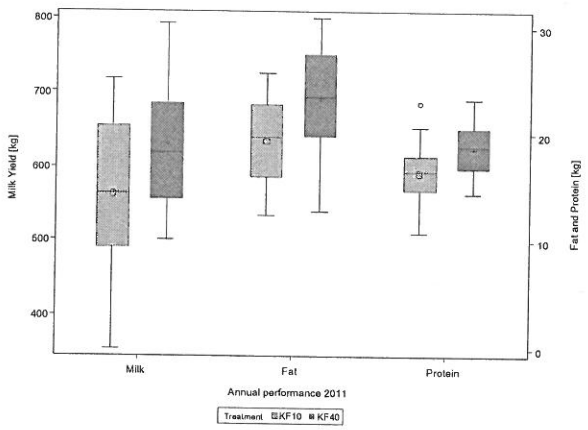

Figure 1. Annual milk yield, fat and protein contents of goats fed according to Bio Suisse guidelines (KF10) and EC regulation on organic farming (KF40).

Conjugated linolenic acid (CLA, C18:2 c9t11), as an example of fatty acids analysed in this study, was higher in KF10 throughout the whole lactation period (Figure 2). Body weight was significantly lower for KF10 during the last three months of lactation. Health status was checked regularly for both groups and did not show any difference. The results indicate that less concentrate feeding is feasible. Future studies should quantify selective abilities of goats as a base of breeding selection.

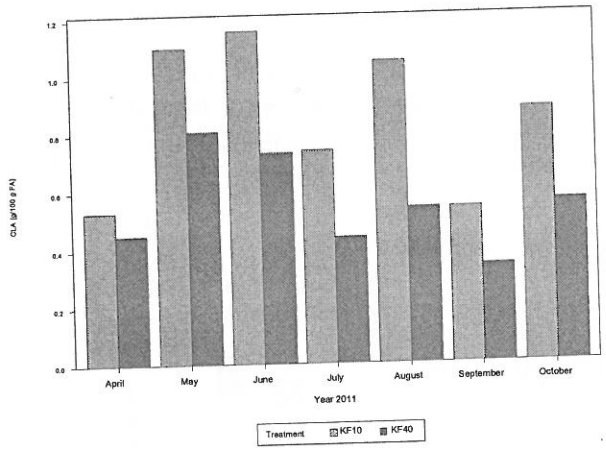

Figure 2. Milk conjugated linolenic acid content of goats fed according to Bio Suisse guidelines (KF10) and EC regulation on organic farming (KF40).

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