

Utilizing protected fat dietary supplementation for improving productivity in dairy goats
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Abstract

It is expected that dietary supplementation of protected fat will become a common practice in dairy herds of sheep and goats, concomitantly with its widespread use in dairy cows' rations. There is a variety of protected fat products, differ in fatty acid composition and protection method, and the decision which one to choose is usually based on availability and price. However, recent findings suggest that the fatty acid composition of the supplement may affect digestibility, availability, and utilization for milk fat production or alternatively, lipogenesis in adipose tissue. Therefore, there is a need to elucidate the effect of fatty acid composition in terms of the physiological response and production traits in dairy animals, especially in small ruminants, where the data on this subject is scarce.

In this study we aimed to compare two protected fat commercial products:

Bewispray (BW) 99: consists of 54% stearic acid and 40% palmitic acid.

RS 70: consists of 92% stearic acid.

The research plan included two in vivo experiments in two different commercial herds, using either early or established lactation period of dairy goats.

Experiment 1 was conducted in Ein Harod herd. Multiparous dairy goats (n=180), 75 DIM were allocated to two experimental groups. Each group received 1.4% protected fat (either BW or RS) which was incorporated into the protein pellet (Milobar, Israel). As a control we chose a similar number of goats with the same parity and at the same lactation stage, from the same herd ("virtual" control, the herd could not be divided to over two experimental groups). The study was conducted over 2 months and included milk and blood sampling at the beginning of the study, and 2 successive blood and milk samples after 30 and 60 days of the experiment. Milk samples were analyzed for solids and SCC in the central milk lab (Cesaria, Israel) and blood was used to determine concentration of ketone bodies. Compared with the "virtual" control group, the addition of protected fat elevated milk yield. The greatest effect was found in the RS group, with 7% higher milk yield compared with control. Also in the RS group, milk fat content was higher while urea content was lower compared with the BW group, suggesting a better synchronization and utilization of protein and carbohydrates from the diet.

The second experiment was conducted in Kishor (northern county, Israel). The study included goats at 2nd lactation (n=70) allocated to two treatment groups of supplements protected fat

(either BW or RS, 2% of dry matter). The fat supplement was provided as part of the protein pellets (Millobar, Israel). The study started 1 month prior to expected parturition and ended 4 months postpartum. Milk samples were collected at day 10, 30, 60 and 90 postpartum and analyzed for milk solids. Blood was sampled twice for ketone bodies concentration. In addition, body condition score (BCS) was determined in each sampling point. We did not find differences in ketone bodies concentration, BCS, protein and lactose concentrations throughout the experiment. Fat concentration was higher in the RS compared with the BW group, and this elevation maintained throughout the lactation period.

The results of the present study demonstrate the benefits of incorporating protected fat to enhance production efficiency in dairy goats. Moreover, differences in fatty acid composition between supplements resulted in different effect on production, with better performances in the RS group, in early and in late lactation goat.