

SUPLEMENTASI MINYAK *BLACK SOLDIER FLY LARVAE* TERPROTEKSI  
TERHADAP KECERNAAN NUTRIEN, PRODUKSI, KOMPOSISI SUSU,  
PROFIL ASAM LEMAK SUSU DAN PRODUKSI METAN  
PADA KAMBING SAANEN

INTISARI

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Penelitian ini bertujuan untuk mengetahui pengaruh suplementasi minyak larva *black soldier fly* dalam bentuk garam kalsium (CaS-BSFLO) terhadap pencernaan nutrien, produksi dan komposisi susu, profil asam lemak susu, metabolit biokimia darah serta emisi gas metan (CH<sub>4</sub>) pada kambing Saanen. Sebanyak 14 ekor kambing Saanen pada fase pertengahan masa laktasi dibagi menjadi dua perlakuan yaitu kelompok kontrol (CON, pakan basal tanpa CaS-BSFLO) dan kelompok perlakuan (CaS-BSFLO, pakan basal + 1,5% CaS-BSFLO). Periode perlakuan dilaksanakan selama 56 hari termasuk masa adaptasi, pemeliharaan dan periode koleksi. Hasil penelitian melaporkan bahwa suplementasi pakan dengan CaS-BSFLO meningkatkan konsumsi protein kasar (PK) (P=0,049) dan lemak kasar (LK) (P=0,005) secara signifikan, sedangkan parameter konsumsi nutrien lainnya tidak berbeda (P>0,05). Berdasarkan bobot badan metabolik (BB<sup>0,75</sup>), suplementasi CaS-BSFLO secara signifikan meningkatkan konsumsi serat kasar (SK) (P=0,039), PK (P=0,006), dan LK (P=0,001). Meskipun pencernaan nutrien secara keseluruhan tidak berbeda secara signifikan (P>0,05), pencernaan LK meningkat secara signifikan (P=0,002). Selain itu, kadar kolesterol serum (P=0,026), *low-density lipoprotein* (LDL) (P=0,030), dan *high-density lipoprotein* (HDL) (P=0,024) lebih tinggi pada kelompok CaS-BSFLO. Suplementasi CaS-BSFLO juga meningkatkan produksi susu (P=0,030) dan *fat-corrected milk* (FCM) 4% (P=0,039). Susu dari kambing yang diberi pakan CaS-BSFLO memiliki kandungan lemak (P=0,021) dan asam laurat (C12:0) (P=0,014) yang lebih tinggi. Emisi gas metan (CH<sub>4</sub>) berkurang secara signifikan (P=0,039) pada bulan kedua masa pemeliharaan dan sepanjang periode eksperimental (P=0,02). Meskipun emisi gas metan pada bulan pertama tidak terpengaruh (P>0,05) oleh suplementasi CaS-BSFLO dalam pakan. Berdasarkan hasil penelitian, dapat disimpulkan bahwa penambahan 1,5% CaS-BSFLO dalam pakan kambing Saanen pada masa pertengahan laktasi mampu meningkatkan kualitas dan produksi susu. Lebih dari itu, kandungan asam laurat dalam CaS-BSFLO mampu menurunkan produksi metan.

Kata kunci: Garam kalsium, Proteksi lemak, Minyak BSFL, Performa produksi, Asam laurat, Metan

SUPPLEMENTATION OF PROTECTED BLACK SOLDIER FLY LARVAE OIL ON NUTRIENT DIGESTIBILITY, MILK PRODUCTION, MILK COMPOSITION, MILK FATTY ACID PROFILE, AND METHANE PRODUCTION IN SAANEN GOATS

**ABSTRACT**

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This study aimed to evaluate the effects of supplementing black soldier fly larvae oil in the form of calcium salts (CaS-BSFLO) on nutrient digestibility, milk production, milk composition, milk fatty acid, blood biochemical metabolites, and methane (CH<sub>4</sub>) emission in Saanen goats. Fourteen mid-lactating Saanen goats were divided into two groups: control group (CON, basal diet without CaS-BSFLO) and treatment group (CaS-BSFLO, basal diet + 1.5% CaS-BSFLO). The experimental period took 56 days, including 14 days of adaptation and 7 days of sampling period. Results revealed that dietary supplementation of CaS-BSFLO significantly increased crude protein (CP) intake ( $P = 0.049$ ) and crude fat (CF) intake ( $P = 0.005$ ), while other nutrient intake parameters showed no differences ( $P > 0.05$ ). Based on metabolic body weight ( $BW^{0.75}$ ), CaS-BSFLO supplementation significantly increased fiber (NDF) ( $P = 0.039$ ), CP ( $P = 0.006$ ), and CF ( $P = 0.001$ ) intake. Although overall nutrient digestibility did not differ significantly ( $P > 0.05$ ), CF digestibility increased significantly ( $P = 0.002$ ). Additionally, serum cholesterol ( $P = 0.026$ ), low-density lipoprotein (LDL) ( $P = 0.030$ ), and high-density lipoprotein (HDL) ( $P = 0.024$ ) levels were higher in the CaS-BSFLO group. CaS-BSFLO supplementation also increased milk yield ( $P = 0.030$ ) and 4% fat-corrected milk (FCM) ( $P = 0.039$ ). Milk from goats fed CaS-BSFLO had higher fat content ( $P = 0.021$ ) and lauric acid (C12:0) ( $P = 0.014$ ). Methane (CH<sub>4</sub>) emission decreased significantly ( $P = 0.039$ ) during the second month of the maintenance period and throughout the experimental period ( $P = 0.02$ ), although CH<sub>4</sub> production in the first month was not affected ( $P > 0.05$ ) by CaS-BSFLO supplementation. In conclusion, adding 1.5% CaS-BSFLO to the diet of lactating Saanen goats improved milk quality and production. Moreover, the lauric acid content in CaS-BSFLO effectively reduced enteric methane emission.

Keywords: Calcium salt, Fat protection, BSFL Oil, Production performance, Lauric acid, Methane