

Oregano and green tea extracts as additives in the diet of dairy cows

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Plant secondary compounds are being studied to access their effects on production and sustainability of animal production systems. The effects of adding oregano extract (*Origanum vulgare*), green tea (*Camellia sinensis*) and their combination into the diet fed to lactating dairy cows on behavior, intake, milk yield and composition besides gas emissions were evaluated. Sixteen Holstein cows and 16 Holstein and Gir crossbred cows aged of 5.4 ± 2.3 years, weighing 533 ± 81.63 kg, with 58 ± 20 days in milk and 2.5 ± 1.6 lactations were blocked by genetic group and randomly assigned to four treatments (groups) as follows: CO = control without herbal extracts, OE = with daily addition of 10 g of oregano extract, GT = with daily addition of 5.0 g of green tea extract and MIX = with daily addition of 10 g of OE plus 5 g of GT. Cows were housed in a free-stall barn, split in four pens (one for each treatment) and individually fed for 58 days. Measurements were performed weekly from day 1 to 58. Data was analyzed according to a randomized block design with repeated measures (days), testing the effect of breed, treatment, days and interaction between treatment and days. Cows fed CO spent more time eating (33 ± 8.5 min) and lying (83 ± 27 min) than those fed with MIX. Cows fed with GT spent more time ruminating (46 ± 12 min) than cows allocated to MIX and OE groups. Cows supplemented with GT had higher DM intake (1.9 kg) than cows fed MIX and produced more milk (1.6 kg) compared to CO and OE. Cows supplemented with GT and CO cows produced more fat corrected milk (2.5 kg) than cows fed OE and MIX, but the body weight and body condition score did not differ between treatments. Cows of the CO group produced milk with higher fat concentration (5.5%) compared with MIX and CO groups. Cows fed CO diet produced milk with higher concentration of milk ureic nitrogen (12%) in relation to GT and OE groups. The protein concentration was higher (2.3%) in the milk of animals fed with MIX compared to the others. The efficiency of milk production expressed as kg fat or energy corrected milk was similar between groups. Methane and carbon dioxide emissions either expressed as total amount or per kg of intake did not differ between groups. The inclusion of plant extracts into the diet changes the behavior, dry matter intake, milk production and composition but does not alter the milk production efficiency not methane and carbon dioxide emissions.

Keywords: essential oils, green house gases, polyphenols, production efficiency

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