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Data on methane (CH4) emissions in goat compared to ovine and mostly bovine species are scare. The objective of the work was to assess, in a direct comparative study, the response of dairy goat and cow to diets known to modulate digestive process in cow, including methanogenesis. This work is part of a larger trial aiming at characterizing animal responses (performance, milk composition) to diets involved in milk fat depression or increase in ruminants.

Four Holstein cows and 4 Alpine goats were fed limited (95% ad libitum) a basal diet (45% forage + 55% concentrate) not supplemented (CTL) or supplemented with corn oil plus wheat starch (COS; 5% dry matter (DM)), marine algae powder (MAP; 1.5% DM), or hydrogenated palm oil (HPO; 3% DM) in a replicated 4×4 Latin square design with 28-d experimental periods. Methane emissions, total-tract digestibility, eating and ruminating time measurements occurred during 5 days (d-21 to d-26) when animals were in open-circuit respiration chambers. Volatile fatty acids (VFA), ammonia and protozoa concentrations were determined in rumen fluid sampled before feeding by stomach tubing (d-27).

Methane emissions (g/kg DM intake, g/kg milk) were similar between goat and cow, and were lower with COS (-25% and -29% on average, respectively; $P<0.01$) than with others diets. DM intake and milk production were similar among diets for each species. Digestibility of DM, organic matter and fibre was similar between goat and cow. Compared to other diets, COS decreased fibre digestibility in both species (-18% on average; $P<0.05$). Irrespective of the diet, large differences in VFA concentration (-45%) and composition (+30% butyrate), ammonia (+80%) and protozoa (+1.1 log10) concentrations were observed in rumen fluid of goat compared to cow ($P<0.01$). Compared to other diets, rumen fermentation parameters were altered ($P<0.05$) with COS in both species (+26% propionate, -30% butyrate, -42% ammonia, -2.1 log10 protozoa), and with MAP in goat (+25% propionate). Eating and rumination times (min/kg DM intake/kg BW) were 2 times lower in goat ($P=0.03$) and similar among diets for both species.

Methane yield and total tract digestibility were similar between dairy goat and cow despite different rumen fermentations and feeding behaviours between species. Mitigating effect of COS on methanogenesis for both species are in accordance with changes in rumen fermentations and total tract digestibility. In our experimental conditions, digestive process responses to diets supplemented with various lipid sources were similar in dairy goat and cow.