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P 59

Effects of including increasing amounts of cauliflower in the concentrate of a dairy sheep diet on in vitro ruminal fermentation

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Reutilization of agroindustrial by-products in animal feeding could contribute to reduce the environmental problems associated with their accumulation and help to achieve an effective circular economy. The objective of this study was to investigate the potential of using market wastes of cauliflower as replacement for cereals and soybean meal in the concentrate of dairy sheep diets. Five cauliflowers were obtained at local markets, cut into pieces, dried (45ºC), ground (1 mm), and mixed before analyses. Cauliflower had low dry matter (DM) content (5.08%), but the DM was rich in crude protein (27.5%) and total sugars (25.7%) and had medium-content in neutral detergent fiber (27.5%) and acid detergent fiber (20.9%). Four concentrates were formulated: a control concentrate for dairy sheep (without cauliflower) and 3 concentrates that included dried cauliflower at 8, 16 and 24% (CA8, CA16 and CA24, respectively) of the concentrate replacing different amounts of cereals and soybean meal. The four experimental diets had 40:60 alfalfa hay:concentrate, and had similar content (DM basis) of crude protein (16.1%) and neutral detergent fiber (31.5%). Samples (400 mg) of each diet were incubated *in vitro* with buffered rumen fluid (40 ml) from sheep, and there were four replicates per diet. Gas production kinetics was determined in 120-h *in vitro* incubations, whereas the main fermentative parameters were measured after 24 h of incubation. Increasing the amount of cauliflower in the diet increased the potential gas production (quadratic; $P = 0.017$) and reduced the *lag* time (linear; $P = 0.043$), but did not affect ($P = 0.385$) the DM effective degradability. Compared with control diet, total VFA production increased ($P < 0.05$) by 6.4, 7.0 and 7.6% for C8, C16 and C24 diets, respectively. Molar proportions of acetate increased (linear; $P = 0.030$) and those of propionate decreased (linear; $P = 0.042$) as the amount of cauliflower in the concentrate augmented, resulting in increased acetate:propionate ratios (3.31, 3.35, 3.43 and 3.53 mol/mol for control, CA8, CA16 and CA24, respectively). There were no differences ($P \geq 0.142$) among diets in NH_3-N concentrations and CH_4 production, indicating a high degradability of cauliflower protein and the absence of antimethanogenic compounds. In conclusion, replacing cereals and soybean meal by up to 24% of dried cauliflower in a concentrate for dairy sheep increased ruminal fermentation and VFA production. These *in vitro* results suggest a potential of cauliflower wastes as ruminant feed that should be further explored.

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