Methane Contrasting Groups in Three Sheep Breeds in Uruguay

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Breeding sheep for low methane (CH_4) emissions is an attractive mitigation strategy which implementation requires exploring the impact on other traits. This study aimed to explore these associations by comparing the performance of animals classified by CH_4 emission. Data of CH_4 emissions of 494 animals (218 Corriedale; 68 Texel; 208; Dohne Merino) born between 2018 and 2020, sired by 29 rams was collected using portable accumulation chambers. With the objective to allocate animals to contrasting CH4 groups, CH_4 (g/d) was analyzed with a repeated measure model including sex-pen-trial as fixed effect, and animal and date-hour of the measure fitted as random effects. Then, adjusted CH_4 emission (animal solutions) was used to define three groups: low (<25%), medium and high (>25%). The effect of CH_4 group on different traits was estimated with a linear model that included age, type of birth and sex-pen-trial as fixed effects. The analyzed traits in this trial were related to feed efficiency (feed intake, residual feed intake - RFI), growth (average daily gain - ADG, metabolic weight - MWT), carcass quality (rib-eye area - REA, fat thickness - FT), feeding behavior (number of meals) and wool (staple growth - SG). CH_4 group had a significant effect ($p<0.05$) on feed intake, ADG and MWT in all breeds. High emitters were heavier, had higher ADG, and ate more. A significant effect on number of meals was reported in Texel, showing that low CH_4 emitters had lower number of meals compared to high emitters. Non-significant differences ($p>0.05$) were observed on RFI, REA, FT and SG in any breed. More research will contribute to increasing the number of animals tested, leading to a more comprehensive description of associations, including genetic and phenotypic correlations, being also the basis for economic impact studies.