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Evaluation of grape stalks residues in in vitro rumen fermentations

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In the Trentino Alto Adige region, (North-East Italy), wine cellars face significant costs related to the disposal of grape stalk (GS) residues. GS by-products still contain valuable nutrients and functional compounds that can directly influence the rumen microbiota and could be used as supplement in dairy cow feeding. In this work 3 red GS varieties were collected from a local wine cellar: Lagrein (L), Cabernet Sauvignon (CS), Merlot (M). Using Rumen Simulation Technique (RUSITEC) 5 diets were compared including a control diet (CTRL, no by-product), a grapeseed meal (GSM) diet at 8% and 3 diets with L-GS, CS-GS, M-GS used at 8% on a dry matter (DM) basis. All diets consisted of 35% hay, 35% grass silage, and 30% concentrate and were made isonitrogenous (16.5%). Two RUSITEC systems were used, each consisting of 5 bioreactors, over 3 experimental runs (n=6 per diet). Each run included 5 days of adaptation, followed by 5 days of sampling. At sampling, one aliquot of the fermentation liquid from each vessel was used immediately for pH, redox, protozoal counts and another aliquot stored at -20°C for other analyses. Gas produced was collected daily in air-tight bags and the gas composition was measured with an infrared detector. All diets were similar in pH (6.46 – 6.53), redox potential (-176 – -192mV), and protozoa counts. L-GS and CS-GS diets showed a lower production of NH₃-N (mmol/L) by 22 and 13%, respectively than CTRL diet (p<0.05), despite similar DM and crude protein degradation. Fermentation gas production was also similar among diets with the range of 1.1 – 1.2 L/d and the gas composition of 14.02-15.80% CH₄, 76-77% CO₂ and 0.07-0.09% H₂. Overall, the tested by-products at 8% in diet DM didn't show any detrimental effect on rumen fermentation characteristics investigated. L-GS and CS-GS diets additionally reduced NH₃ production without compromising nutrient degradation. Funding: EU's Horizon 2020 program under the Marie Skłodowska-Curie grant, agreement n° 956265 FoodTraNet and by i-NEST project.