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Influence of including broccoli in a dairy ewes diet on microbial fermentation in the Rusitec systemA. Martín^{1,2}, I. Mateos^{1,2}, C. Saro^{1,2}, T. De Evan³, R. Campos^{2,4}, M.D. Carro³ and M.J. Ranilla^{1,2}¹Instituto de Ganadería de Montaña (CSIC-ULE), Finca Marzanas, 24346, León, Spain, ²Universidad de León, Producción Animal, Campus Vegazana, 24071, León, Spain, ³Universidad Politécnica de Madrid, Producción Agraria, Ciudad Universitaria, 28040, Madrid, Spain, ⁴Universidad Nacional de Colombia, Ciencia Animal, Palmira, 763531, Colombia; imata@unileon.es

Broccoli is a product of the horticultural industry in Spain with high protein and sugars content, and its surplus, wastes and by-products could be used as a substitute of expensive protein feeds in ruminant diets like soybean meal. The objective was to assess the effect of replacing soybean meal and barley grains in the concentrate of a standard dairy sheep diet (CON) by broccoli (BRO) on ruminal fermentation parameters and apparent digestibility in Rusitec fermenters. Diets consisted of alfalfa hay and concentrate 1:1 and had similar protein and NDF contents (17.3 and 29.0% of dry matter, respectively). 4 Rusitec fermenters were used in a cross-over design with 14 days incubation period. Fermenters were given daily 30 g of diets, and in each period 2 fermenters received the diet with no broccoli (CON) and the other 2 received the diet with dried broccoli (14,7% BRO, as feed). On days 10, 11, 12 and 13 of incubation, samples of liquid effluents and gas were collected from the fermenters to analyse the daily production of volatile fatty acid (VFA) and methane, and nylon bags were washed and weighed to determinate the diet apparent digestibility. There were no differences between diets either in the total VFA or in the daily methane production. There were differences between diets in the VFA profile, being greater ($P \leq 0.03$) the acetate and caproate proportion and the acetate:propionate ratio for the BRO diet than for the CON one. Dry matter, crude protein, neutral and acid-detergent fibre apparent digestibility did not differ between diets. Under the present experimental conditions, broccoli successfully replaced soybean meal and barley grains in a dairy sheep without negatively affecting ruminal fermentation or diet digestibility.

Using tomato pulp in dairy sheep diets: nutrition parameters in Rusitec fermentersI. Mateos^{1,2}, R. Campos^{2,3}, A. Martín^{1,2}, T. De Evan⁴, C. Saro^{1,2}, M.D. Carro⁴ and M.J. Ranilla^{1,2}¹Instituto de Ganadería de Montaña (CSIC-ULE), Finca Marzanas, 24346, León, Spain, ²Universidad de León, Producción Animal, Campus Vegazana, 24071, Spain, ³Universidad Nacional de Colombia, Ciencia Animal, Palmira, 763531, Colombia, ⁴Universidad Politécnica de Madrid, Producción Agraria, Ciudad Universitaria, 28040, Madrid, Spain; imata@unileon.es

Spain is one of the most important tomato producers in the world. The industrial use of this fruit generates high quantities of by-products, tomato pulp (TP) being one of them. TP is a high-moisture product with a medium protein and energy content that can be used in ruminant feeding. The effect of partially replacing alfalfa hay, soybean meal and sugar beet pulp by TP in a dairy sheep diet on ruminal fermentation parameters and apparent digestibility was tested in Rusitec fermenters. Two dairy diets, with no tomato pulp (CON) and with 17.3% of the by-product (TP) were incubated in a cross-over design in 4 Rusitec fermenters for 14 days. On days 10, 11, 12 and 13 of incubation, samples of liquid effluents and gas were collected from the fermenters to analyse the daily methane and volatile fatty acid (VFA) production, and nylon bags were washed and weighed to determinate the diet apparent digestibility. Daily production of total VFA and methane were higher ($P \leq 0.0037$) in control fermenters than in those receiving the TP diet, but there were no differences between diets either in the VFA profile or in the acetate:propionate ratio. Dry matter, crude protein and neutral detergent fibre apparent digestibility was lower ($P \leq 0.020$) for the TP diet than the control one. In Rusitec fermenters, the inclusion of 17.3% of TP in a milk diet slightly decreased ruminal fermentation compared to a standard diet, but more research is required to determine its optimal inclusion level for dairy sheep feeding.