

Orange Leaves and Rice Straw on Methane Emission and Milk Production in Murciano-Granadina Dairy Goat Diet

Authors : Tamara Romero, Manuel Romero-Huelva, Jose V. Segarra, Jose Castro, Carlos Fernandez

Abstract : Many foods resulting from processing and manufacturing end up as waste, most of which is burned, dumped into landfills or used as compost, which leads to wasted resources, and environmental problems due to unsuitable disposal. Using residues of the crop and food processing industries to feed livestock has the advantage to obviating the need for costly waste management programs. The main residue generated in citrus cultivations and rice crop are pruning waste and rice straw, respectively. Within Spain, the Valencian Community is one of the world's oldest citrus and rice production areas. The objective of this experiment found out the effects of including orange leaves and rice straw as ingredients in the concentrate diets of goats, on milk production and methane (CH₄) emissions. Ten Murciano-Granadina dairy goats (45 kg of body weight, on average) in mid-lactation were selected in a crossover design experiment, where each goat received two treatments in 2 periods. Both groups were fed with 1.7 kg pelleted mixed ration; one group (n= 5) was a control (C) and the other group (n= 5) used orange leaves and rice straw (OR). The forage was alfalfa hay, and it was the same for the two groups (1 kg of alfalfa was offered by goat and day). The diets employed to achieve the requirements during lactation period for caprine livestock. The goats were allocated to individual metabolism cages. After 14 days of adaptation, feed intake and milk yield were recorded daily over a 5 days period. Physico-chemical parameters and somatic cell count in milk samples were determined. Then, gas exchange measurements were recorded individually by an open-circuit indirect calorimetry system using a head box. The data were analyzed by mixed model with diet and digestibility as fixed effect and goat as random effect. No differences were found for dry matter intake (2.23 kg/d, on average). Higher milk yield was found for C diet than OR (2.3 vs. 2.1 kg/goat and day, respectively) and, greater milk fat content was observed for OR than C (6.5 vs. 5.5%, respectively). The cheese extract was also greater in OR than C (10.7 vs. 9.6%). Goats fed OR diet produced significantly fewer CH₄ emissions than C diet (27 vs. 30 g/d, respectively). These preliminary results (LIFE Project LOWCARBON FEED LIFE/CCM/ES/000088) suggested that the use of these waste by-products was effective in reducing CH₄ emission without detrimental effect on milk yield.

Keywords : agricultural waste, goat, milk production, methane emission

Conference Title : ICRANRD 2019 : International Conference on Ruminant Animal Nutrition and Recent Developments

Conference Location : Berlin, Germany

Conference Dates : May 21-22, 2019