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Digestibility and Utilization of Soy Sauce Residue as Dairy Cow Feed

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Abstract

The study was conducted to determine the rumen degradability and in vitro digestibility of soy sauce residue (SSR). Soya sauce residue was incorporated at 0, 10, 20 and 30 % of the total rations and offered to four rumen fistulated crossbred Thai Indigenous × Holstein Friesian cattle of average 380 ± 74 kg in a Latin Square Design study. Rumen degradation of SSR was determined using the nylon bag technique and the digestibility using MENKE in vitro gas technique. The SSR had 82.37 % DM and the nutrient profile in percent of dry matter (DM) was: 85.91 % organic matter (OM), 22.10 % crude protein (CP), 20.08 % ether extract (EE), 11.89 % crude fibre (CF), 45.32 % neutral detergent fibre (NDF) and 20.84 % acid detergent fibre (ADF). The constants for SSR degradation were: for the rapidly soluble fraction (**a**): 20.8 %, for the fraction that will be degraded with time (**b**): 67.2 % and for the rate of degradation of the b fraction (**c**): 0.0306 h^{-1} . Effective degradation of DM at 0.05 h^{-1} flow rate was 79.4 %. The effective degradation of DM and CP of SSR in the 30 % SSR diets were significantly ($p < 0.05$) higher than in 0, 10 and 20 % SSR diets. DM intake, digestible DM, growth rate index values estimated using the nylon bag technique were significantly ($p < 0.05$) different from the other treatments and ranked least. The predicted values of OM digestibility, Metabolisable energy, Net energy for lactation, DM intake, digestible dry matter and growth rate using the MENKE in vitro gas technique on the 10 % dietary treatment were significantly ($p < 0.05$) higher than on the other diets. In both the nylon bag and gas test methods there was an evident curvilinear response. There is potential for the use of SSR in dairy cattle diets and in this study 10 % inclusion was optimum.

Keywords: Dairy cow, digestibility, soy sauce residue