THESIS TITLE : EFFECT OF CASSAREA AS A PROTEIN SOURCE REPLACEMENT FOR SOYBEAN MEAL ON FEED INTAKE, BLOOD METABOLITES, RUMINAL FERMENTATION, DIGESTIBILITY AND MICROBIAL PROTEIN SYNTHESIS IN DAIRY COWS FED UREA-TREATED RICE STRAW AS A ROUGHAGE

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Abstract

This experiment was conducted to investigate the effect of cassarea (a mixture of cassava starch and urea pelleted) as a protein source replacement for soybean meal on feed intake, blood metabolites, ruminal fermentation, digestibility, microbial protein synthesis and milk production. Three multiparous, rumen-fistulated Holstein Fresien crossbred cows with initial weight of 403±7 kg and 160±20 DIM were assigned according to a 3x3 Latin square design. Cows were offered urea treated rice straw (5%) (UTS) on ad libitum. The treatments were levels of cassarea replacement for soybean meal in concentrate at 30, 70, and 100% cassarea in the rations. The results showed that total dry matter intake (3.03, 3.10 and 3.01 %BW), UTS intake (1.63, 1.65 and 1.59 %BW), dry matter digestibilities (57.7, 60.0 and 56.8 %), organic matter digestibilities (59.0, 63.4 and 59.3 %), crude protein digestibilities (61.0, 64.7 and 66.5 %), neutral acid detergent fiber digestibilities (61.0, 64.7 and 66.5 %), ruminal pH (6.27, 6.29 and 6.30), ammonia-nitrogen (NH_3-N) (8.8, 9.3 and 14.8 mg%), blood glucose(40.2, 42.8 and

42.6 mg%), ruminal total volatile fatty acid (TVFA) (73.0, 73.9 and 69.6 mM), ruminal acetic acid (64.8, 63.9 and 63.2 mol/100mol), ruminal propionic acid (20.9, 21.3 and 21.6 mol/100mol), ruminal butyric acid (14.2, 14.7 and 15.1 mol/100mol), urinary allantoin concentrations (160.4, 173.6 and 172.3 mmol/d), apparent efficiency of microbial-N synthesis (44.0, 46.1 and 43.9 g microbial-N/kgOMDR), apparent efficiency of microbial-protein synthesis (807.9, 871.5 and 811.5 g microbial protein/d) and ratio of microbial protein per VFA energy (P/E ratio) (14.6, 15.2 and 14.8 g microbial protein/MJ), were not significantly different ($P>0.05$), respectively. Although it was found that ruminal ammonia nitrogen (NH_3-N) at 0.5 hour-post feeding were 9.1, 9.5 and 15.2 mg%, at 2 hour were 8.9, 11.2 and 18.7 mg% ($P<0.05$), NH_3-N concentrations at 1 hour-post feeding were 9.8, 10.3 and 17.8 mg%, respectively ($P<0.01$). While Blood urea nitrogen (BUN) concentrations were 12.4, 14.0 and 17.6 mg% ($P<0.05$) and were different at 1, 1.5 and 2 hour-post feeding ($P<0.01$) and increased with enhancing replacement levels of cassarea, respectively. However, milk yield (7.76, 8.08 and 7.51 kg/d), fat corrected milk yield (3.5% FCM) (7.72, 8.32 and 8.00 kg/d), milk fat (3.47, 3.68 and 3.92 %), milk protein (3.38, 3.30 and 3.36 %) and milk lactose percentages (3.90, 3.97 and 3.83 %), were not significantly different ($P>0.05$) when cassarea levels were increased from 30 to 70 and 100%, respectively. Therefore the results indicated that cassarea used as a protein source replacement for soybean meal in ration did not affect on feed intake, blood metabolites, end-products of ruminal fermentation and digestibility. Moreover, microbial protein synthesis and milk production tended to be highest at replacement level of 70 % cassarea in ration. The economical returns were highest at replacement level of 70 % cassarea in ration. Based on this experiment, cassarea can be used as a protein source in dairy ration especially when fed on urea-treated rice straw as a roughage.