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"The use of sorghum-legume silages for feeding of crossbred lactating cows in El Salvador"

"Submitted for the degree of Master of Science in Environmental Protection and Agricultural Food Production"

Master Thesis
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SUMMARY

Alternate crude protein (CP) sources in dairy nutrition were investigated by using sorghum-legume silages in comparison with traditional sorghum based silages consisting of soybean meal (SBM) as main source of CP to feed eight multiparous crossbred creole cows (444 ± 41 kg body weight; 125 ± 100 days in milk) in EL Salvador. Four dietary treatments were tested: sorghum silage supplemented with SBM (**control**); sorghum-jackbean combined silage (60:40 w/w DM) (**jackbean**); sorghum silage mixed with cowpea hay (50:50 w/w DM) (**cowpea**); sorghum silage supplemented with urea as nitrogen source (**urea**). The total mixed ration (TMR) on dry matter (DM) basis is composed of 70:30 ratio of roughage to concentrate. All diets offered were formulated to be iso-nitrogenous (125 g CP/kg) and iso-caloric (8.61 MJ metabolizable energy/kg DM). Feed and water were offered ad-libitum. Feed offered was calculated according to the requirements based on average body weight (450 kg) and milk yield by using CPM-Dairy and offered in excess. Dry matter intake (DMI) and digestibility did not differ (P -value > 0.1) between diets where DMI of control, jackbean, cowpea and Urea diets were 13.7, 14.1, 14.6 and 14.0 kg respectively. Digestibility coefficients of DM and nitrogen were in range of 0.52 to 0.59 and 0.54 to 0.63 respectively, where the coefficient values are lowest in jackbean and highest in urea diets. Average daily milk yield, fat corrected milk (FCM) and energy corrected milk (ECM) were 9.4 ± 0.13 , 9.1 ± 0.30 , and 8.9 ± 0.24 kg, respectively. Milk composition was not affected (P -value > 0.1) with mean milk fat (40.8 ± 1.23 g/kg), protein (30.8 ± 0.13), solid not fat (85.1 ± 0.40) and milk urea nitrogen (14.1 ± 0.70 mg/dL). Feed efficiency and nitrogen utilization efficiency were 0.65 ± 0.03 and 0.15 respectively. Feed cost decrease (P -value < 0.001) in legume diets, 0.16 and 0.53 US\$/cow/d cheaper in jackbean and cowpea diets respectively when compared to control diets. Income over feed cost (IOFC) was 0.50, 0.28 and 0.18 US\$/cow/d in cowpea, jackbean and urea diets respectively and cowpea diet earned 0.22 and 0.32 US\$/cow/d more IOFC than jackbean and urea diets. Overall benefit in cowpea, jackbean and urea diets were 0.21, 0.10 and 0.05 respectively when compared to control diets. And benefit from cowpea diets was 0.10 and 0.16 US\$/cow/d more than jackbean and urea diets. Hence legume forage will be more beneficial to use in dairy ration as combined silage with sorghum forage or as a sun dried hay mixed with sorghum silage. Further can reduce dependency on imported (SBM) and purchased (urea) feeds.