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Effect of Partial Substitution of Commercial Concentrate by Cowpea (*Vigna unguiculata*) on Smallholder Milk Production and Net Income in Honduras

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Abstract

Dry season feed constraints often force Honduran smallholders to supplement forage with expensive commercial concentrates in order to prevent livestock production losses. This increases production costs significantly. It is suggested that integrating legumes such as cowpea can alleviate the problem. This contribution seeks to evaluate the effect of partial substitution of commercial concentrate (CC) by farm-produced (i) cowpea hay (CpH), and (ii) a cowpea/concentrate mixture (CpC) on milk production and net income.

Two collaborative farmer-led feeding experiments were conducted using a 3-period, 2-group crossover experimental design with two treatments. For the first experiment (A), 1.8 kg (33 %) of CC was substituted by 2.7 kg of CpH. Total feed costs per cow were 1.78 and 1.43 US$ for treatments with CC and CpH, respectively. For the second experiment (B), 2.8 kg (66 %) of CC was substituted by 1.4 kg of CpC and 1.4 kg of maize. Total feed costs were 1.13 and 0.75 US$ for treatments with CC and CpC, respectively. Eight and six crossbred cows with similar milk production were used in experiments A and B, respectively, which were evenly divided into two groups. The experimental period was 42 and 30 days, respectively. Milk production data from the last seven days of each of the three periods were taken for statistical analysis (Mann-Whitney Test).

Experiment A showed a significant ($p < 0.05$) difference in milk production (12.5 vs. 13.2 kg cow^{-1} day^{-1}) in favour of treatment CC. However, net income was significantly ($p < 0.001$) higher for treatment CpH compared to CC (16.7 vs. 14.6 US$-cents kg^{-1} milk). In Experiment B, milk production did not differ significantly ($p > 0.05$) between treatment CpC and CC (7.7 vs. 8.3 kg cow^{-1} day^{-1}). But again, net income was significantly ($p < 0.001$) higher for treatment CpC compared to treatment CC (19.1 vs. 14.7 US$-cents kg^{-1} milk).

Results show that partial substitution of commercial concentrate by cowpea hay or a cowpea/concentrate mixture can contribute to increased farmer income through reduced feed costs. In view of increasing prices for commercial concentrates, it is recommended to promote the production, processing, commercialisation and use of locally produced high-value feed supplements such as cowpea-based products.

Keywords: Cowpea concentrate, cowpea hay, income increase

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