

## Abstract

The present research studied on increasing protein in cassava products using microbes and the effect of fermented cassava products as a replacement for concentrate on fermentation in the rumen of fistulated cattle.

The first experiment aimed to determine the concentration of reducing sugar in the cassava products after incubating with *A. oryzae*. The experimental design was a 8 x 11 Factorial in CRD arrangement. Eight formula were then tested, (1) 100% cassava pulp (CSPu), (2) 100% cassava peel (CSPe), (3) 100% cassava chip (CSC), (4) 75% CSPu + 25% CSC, (5) 25% CSC + 75% CSPe, (6) 50% CSPu + 50% CSC, (7) 50% CSC + 50% CSPe and (8) 25% CSC + 37.5% CSPu + 37.5% CSPe (factor A) and were incubated at 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 days (factor B). The results showed that reducing sugar of all formulas at day 3 fermentation increased markedly, with formula 1 being the highest followed by formula 8 and 4, whereas formula 3 was the lowest. It can be concluded from the present study that the best fermentation period was 3 days and formula 1, 8 and 4 were the best for formulation.

Experiment 2 and 3 aimed to determine a suitable method of fermenting cassava products using fungi and yeasts. Experiment II was designed to determine the crude protein (CP) and urea contents of cassava products after incubating with *A. oryzae* and *Saccharomyces cerevisiae* plus urea: small scale. The 4 x 6 Factorial in CRD arrangement was used with factor A, four formula (1) 100% CSPu, (2) 100% CSPe, (3) 75% CSPu + 25% CSC and (4) 37.5% CSPu + 25% CSC + 37.5% CSPe, selected from Experiment I, and factor B, urea addition levels; 0, 1.25, 2.50, 5.00, 7.50 and 10.00% of DM. The results revealed that the highest CP content was observed in formula 4, followed by formula 1 while the lowest was found in formula 2 and 3. The CP content significantly increased with increasing levels of urea addition. Experiment III used 3 x 4 factorial in CRD, with factor A was formula 1 (100% CSPu), formula 2 (100% CSPe) and formula 3 (37.5% CSPu + 25% CSC + 37.5% CSPe) and factor B was 4 urea addition levels; 0, 4.0, 5.0 and 6.0% of DM. The results showed that CP content significantly increased with increasing level of urea addition. It can be concluded from these experiments that CP content can be enriched in cassava products through the fermentation process obtained from fungi and yeasts.

Experiment IV aimed to determine the effect of fermented cassava products as a replacement for concentrate in rumen fistulated cattle on rumen fermentation. Three Crossbred Holstein Friesian cows fitted with cannula were assigned to three treatments in a 3 x 3 Latin square. The treatments consisted of 0, 20 and 40% fermented cassava peel as a replacement for concentrate. The ammonia N, acetate, propionate, butyrate and acetate: propionate ratio, and microbes in ruminal fluids were unaffected by the treatments. However, replacement of 40% fermented cassava peel showed higher pH at 3 h post-feeding than the control while replacement of 20 and 40% fermented cassava peel at 6 h post-feeding showed higher BUN than the control.