Evaluation of the Indonesian coffee pulp as a ruminant feed using the Reading Pressure Technique

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Introduction Indonesia is the world's third largest producers of coffee with the residual coffee pulp being included in ruminant diets. However, coffee pulp has a low palatability although studies have shown that this can be increased by ensiling. In addition, coffee pulp contains anti-nutritive factors such as caffeine and tannins. Washing the residue with hot water reduces caffein concentration by about 90 % (Kiflewahid, 1982). In this study, the effects of washing and ensilage on the degradability profiles were examined by estimating gas release using the Reading Pressure Technique.

Materials and methods Fresh coffee pulp (FCP) was obtained from coffee grown locally in Jambi, Indonesia. FCP was ensiled for two weeks (CPE). FCP was also washed in running hot water (± 90 °C) until the water drained clear. The washed FCP (WCP) was then ensiled for 2 weeks without (WCPE) or with 6% molasses (WCPEM) on a fresh weight basis. The substrates were incubated in buffered rumen fluid as described by Mauricio *et al*. (1999) at 39 ^{0}C for 96 h. Gas production was measured at 2, 4, 6, 8, 10, 12, 15, 19, 24, 30, 36, 48, 72 and 96 h post-inoculation. Rumen fluid was taken one hour before feeding from a dry cow allowed access to pasture 6 h per day plus hay/straw overnight.

Results FCP and WCPE had similar total gas production values at 96 h (Figure 1), but FCP was fermented faster than WCPE in the early stages (Figure 2) indicating that washing the substrate with the hot water removed some of the soluble carbohydrate (CHO). This negative effect increased when the washed residue was ensiled. The loss of CHO resulting from washing treatment was confirmed by the lower total and rate of gas production of WCP than those CPE. Nevertheless, washing treatment seemed to remove anti-nutritive effects reflecting by a higher total and rate of gas production from the incubation of WCP than those FCP.

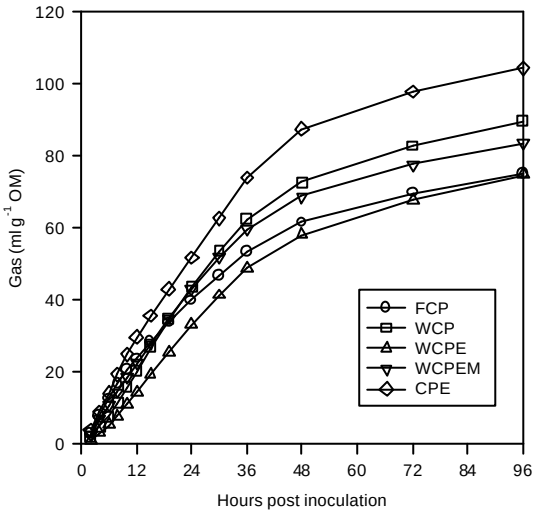

Figure 1. Cumulative gas release

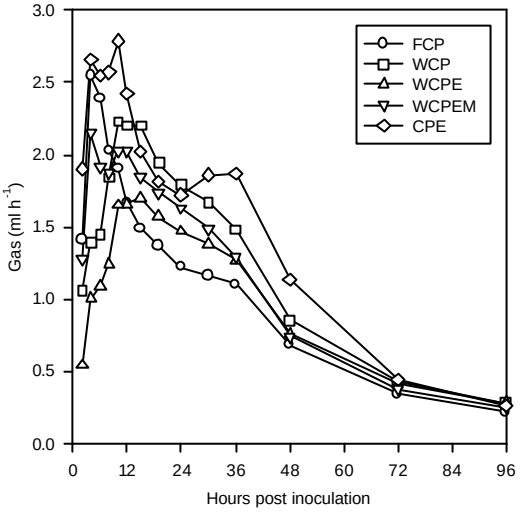

Figure 2. Rate of gas release

Conclusion Ensiling improved the fermentability of coffee pulp. Washing treatment seemed to reduce anti-nutritive effects but under practical situations this treatment ought to be followed by ensiling with an additive such as molasses. Further studies should focus on how the ensiling and washing treatments influence intake and anti-nutritive factors.

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