

Comparison of the volatile fatty acid profiles of dry and fresh kikuyu incubated with rumen fluid *in vitro*

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Volatile fatty acids (VFA) are produced from the fermentation of feed organic matter by rumen microbes. In general, the quantity of VFA produced corresponds to the amount of fermentable organic matter ingested and the ratio of acetate: propionate (C2:C3) produced is altered by the rate of fermentation (Boss *et al.* 1996). In this study we investigated the VFA profiles of kikuyu (*Pennisetum clandestinum*) processed in three different ways before being incubated *in vitro* with bovine rumen fluid for 2.5 h. The three treatments were fresh (FRK), freeze dried (FDK) and oven dried (ODK) kikuyu. Samples of FRK (25 g fresh, 5 g dry matter) were chopped into 2–3 cm lengths whereas for FDK and ODK, 5 g dried material (1 mm sieve) was incubated with buffer and rumen fluid (Damry 2002). The rumen fluid used was collected from a heifer given a forage-based diet. Each treatment had four replicates. The concentrations of acetic, propionic, butyric, iso-butyric, valeric, and total VFA were determined from supernatants after incubation using a gas liquid chromatograph. Data were analysed using the GLM procedures of SAS (ver.8.2) to evaluate differences among treatments and means were

compared by Duncan's multiple range test. VFA concentrations ($\mu\text{mol/ml}$) at the end of the incubation are presented in Table 1.

Although the concentrations of acetic, propionic and butyric acids did not differ between methods of feed processing, there were significant differences between fresh, freeze dried and oven dried material in the amounts of iso-butyrate and iso-valerate produced (Table 1). The ratio of C2:C3 VFA produced also differed significantly between treatments (Table 1). We conclude that when *in vitro* tests are used for assessing fermentability of forages, the method of preparing the samples can have an effect on the concentrations of VFAs produced.

Boss, D.L. and Bowman, J.G.P. (1996). Barley varieties for finishing steers: II. Ruminal characteristics and rate, site, and extent of digestion. *Journal of Animal Science* 74, 1973–1981.

Damry (2002). Evaluation of duckweed as a protein supplement for ruminants. PhD Thesis, University of New England, Armidale NSW, Australia.

Table 1 VFA concentrations ($\mu\text{mol/ml}$) following *in vitro* incubation of fresh (FRK), freeze dried (FDK) and oven dried (ODK) kikuyu in bovine rumen fluid for 2.5 h.

| VFA | Treatments | | |
|-------------|-------------------|-------------------|-------------------|
| | FRK | FDK | ODK |
| Acetate | 21.35 | 20.23 | 20.57 |
| Propionate | 4.66 | 4.21 | 4.22 |
| Butyrate | 3.93 | 3.68 | 3.87 |
| Isobutyrate | 0.23 ^b | 0.19 ^b | 0.32 ^a |
| Valerate | 0.29 | 0.26 | 0.28 |
| Isovalerate | 0.54 ^a | 0.45 ^b | 0.57 ^a |
| Total VFAs | 30.99 | 29.03 | 29.83 |
| C2:C3 ratio | 4.57 ^b | 4.81 ^a | 4.87 ^a |

^{a,b} Means within a row with different superscripts differ significantly ($P < 0.05$)