Kikuyu Grass Composition and Implications for Silage Production

Alan G. Kaiser, John W. Piltz, Euie J. Havilah* and John F. Hamilton*

NSW Agriculture, Wagga Wagga Agricultural Institute, PMB, Wagga Wagga, NSW, 2650, Australia

* NSW Agriculture, Pasture Research Unit, PO Box 63, Berry, NSW, 2535, Australia

Introduction

Kikuyu grass (*Pennisetum clandestinum*), often top-dressed with nitrogen (N) fertiliser, is an important summer growing pasture along the east coast of Australia, especially in NSW and south east Queensland. Cutting surplus summer and autumn growth for silage would improve forage utilisation and the management of these pastures (Kaiser *et al.* 1993). Strategic silage cuts could be integrated with grazing to maintain the grass at a more vegetative, higher quality stage of growth for dairy and beef cattle. In order to ensile kikuyu grass with an organic matter digestibility of 0.60 to 0.70 a regrowth interval of 20 to 50 days would be required. This interval would vary with the prevailing growing conditions. There are few data on the ensiling characteristics of kikuyu grass when cut at this stage of growth.

Materials and Methods

Fresh kikuyu grass samples were collected at silage cutting in 11 experiments conducted in the Nowra district of coastal NSW. Regrowth intervals varied from 20 to 50 days and N fertiliser was applied at 50 or 100 kg N/ha at the commencement of the regrowth period. Samples were dried in a forced-air oven at 80°C for 24 h to determine DM content, and were then ground prior to analysis for water soluble carbohydrate (WSC), starch and total N content. Buffering capacities were determined on fresh forage using the method of Playne and McDonald (1966). A summary of the data from the 11 experiments are presented in Table 1.

Table 1. Composition of kikuyu grass at the time of cutting for silage - summary of results from 11 experiments

	DM content (g/kg)	Water-soluble carbohydrates (g/kg DM)	Starch* (g/kg DM)	Total N (g/kg DM)	Buffering capacity* (m eq./kg DM)
Mean	195.9	44.5	38.9	25.6	350.6
Range	108.5-323.0	23.4-68.4	14.2-57.8	17.4-35.1	224.7-495.7

* Starch data available from 4 experiments, and buffering capacity from 2 experiments

Results and Discussion

Although there was some variation in kikuyu grass composition, it generally had low DM content, low WSC content, high N concentration and intermediate buffering capacity. Low DM content in the range 100 to 160 g/kg is common, and it is only under dry conditions when kikuyu grass is moisture stressed that DM content can reach 300 g/kg at cutting. The mean buffering capacity, an indicator of the ability of the forage to resist pH change, was similar to published values for temperate grasses (McDonald *et al.* 1991).

The results from four experiments indicate that kikuyu grass contains an appreciable quantity of starch. While starch will not contribute directly to the silage fermentation, as silage bacteria cannot ferment starch, hydrolysis of starch to sugars during wilting and prior to the establishment of anaerobic conditions in the silo could boost the supply of sugars available for fermentation, provided there are not significant losses due to respiration.

The low WSC content, low DM content and intermediate buffering capacity indicate that there is a significant risk of a poor fermentation if kikuyu is ensiled without wilting or with only a minimal wilt (<300 g/kg DM content). Data based on UK studies with temperate grasses have shown that the critical sugar level for successful (low risk) silage production is 25-30 g/kg fresh crop (Wilkinson 1990). In our experiments the mean sugar content of kikuyu grass on a fresh crop basis was only 8.7 g/kg, well below this critical level.

Conclusion

Because of its low DM content, low WSC content and intermediate buffering capacity, farmers ensiling kikuyu grass will need to rely on wilting or silage additives to improve the probability of achieving a satisfactory lactic acid fermentation.

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