

## MICROBIAL FERMENTATION OF CEREAL GRAINS IN VITRO

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Feeding of cereal grain to cattle on forage-based diets depresses intake of the forage, and the extent to which it is depressed is known as the substitution rate. This varies with the forage:concentrate ratio and intrinsic properties of these moieties. The purpose of the present study was to investigate properties of cereal grains which may influence their substitution rates. This report deals with fermentation rates of cereal grains, measured in vitro.

Seven species of cereal grain were assessed by collecting samples of all major varieties grown in Australia, each grown at two or more sites in the same year. Samples (100 mg) were incubated with 10 ml of a mixture (1:4) of rumen fluid and McDougall's buffer at 39°C; gas production was measured during 7 h of incubation.

Type	Gas volume (ml/mg)			Number of	
	Mean	SEM	Range	Varieties	Samples
Wheat	0.251 <sup>a</sup>	0.0011	0.166-0.307	12	35
Triticale	0.241 <sup>b</sup>	0.0031	0.199-0.284	5	10
Oats	0.237 <sup>b</sup>	0.0020	0.188-0.280	5	17
Barley	0.222 <sup>c</sup>	0.0021	0.144-0.257	8	21
Maize	0.138 <sup>d</sup>	0.0009	0.092-0.191	20	68
Rice	0.109 <sup>e</sup>	0.0021	0.087-0.137	3	9
Sorghum	0.104 <sup>e</sup>	0.0007	0.075-0.132	22	62

Means with different superscripts differ significantly ( $P < 0.05$ )

The results indicated large differences between species, with similar ranking for wheat, oats, barley, maize and sorghum to that reported by Herrera-Saldara et al. (1990). Also there were significant differences within the species wheat, maize and rice. Slow fermentation of maize and sorghum is associated with the resistance of the protein matrices surrounding starch granules to microbial digestion (Cheng et al. 1991). These and other factors related to fermentation rates are being investigated, as is the relationship between differences in fermentation rates and forage substitution rates in vivo.

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