CONCENTRATIONS OF SOME BLOOD METABOLITES IN UNTRAINED AND TRAINED COWS

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A reduction in work capacity of a draft animal can be critical to its ability to perform the work it is required to do; particularly if the animal is of a small body size. Under normal work conditions, an untrained buffalo can sustain a draft load equivalent to only 8% of its live weight. This value can be increased to 11% if the animal were trained for 15 days (see Martin and Teleni 1989). The lower work capacity of the untrained animal is due largely to the pattern of utilisation of ATP-yielding substrates which results in increased lactic acid production in working muscles (Martin and Teleni 1989).

This communication reports on preliminary results of observations on changes in concentration of some important blood metabolites in untrained and trained cows.

Eighteen cows (twelve Bos indicus crosses and six Bos sondaicus) were used. During period I, the untrained animals were required, in pairs, to pull a draft load equivalent to 12% of their live weight at a walking speed of approximately 0.8 m/sec for three hours. Pulse rate and blood samples were taken at half-hourly intervals during one hour before work, three hours during work and three hours immediately after work.

Measurement and sampling were repeated after the animals had undergone a 15-day training period which involved animals pulling draft loads equivalent to 8% of their body weight over a two hour period each day.

The difference in the physical condition of the untrained and trained cows was reflected in the difference in the pulse rates of the animals during rest and work (see Table). While overall mean values for the concentrations of free fatty acids and glucose were significantly higher in the untrained animal, urea concentration was lower and lactate and packed cell volume values were not different between the two groups.

Variables	Physical conditions		SD (n = 18)	P
	Untrained	Trained		
Pulse rate (counts/min)				
Rest	55	51	10	0.0107
Work	94	79	15	0.0000
Plasma metabolites (mM)				
Free fatty acids	1.102	0.953	0.412	0.0002
Glucose	3.574	3.199	0.763	0.0000
Lactate	1.017	1.043	0.666	0.6834
Urea	1.598	2.002	0.551	0.0000
Blood packed cell volume (%)	25	25	4	0.4132

The lower concentration of free fatty acids and glucose in the trained animals suggest that the substrates were probably utilised at a greater rate than they were in the untrained animals. Similarly, amino acids appeared to be catabolised at a greater rate in the trained animals.

Contrary to what might have been expected (see Martin and Teleni 1989) there was no difference between the untrained and trained cows in lactate concentration. Further discussion on possible reasons for this must await more detailed analysis of the data.

ACKNOWLEDGMENT

The study was funded, in part, by the Australian Centre for International Agricultural Research.

MARTIN, D. and TELENI, E. (1989) Fatigue in buffaloes on different work loads. DAP Project Bulletin. 8: 2-6.

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