

CHANGES IN THE BLOOD CONSTITUENTS OF WORKING BULLOCKS DURING EXERCISE ON TREAD MILL MACHINE

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ABSTRACT

Bullocks of breeds Gaolao, non-descript and buffalo of 6-7 years of age were made to work on Tread Mill Machine with particular speed and weight for three hours. Haemoglobin, glucose, alkaline phosphatase and creatinine level in blood showed increasing trend in all the three breeds used. The increase in level of these components was minimum in Gaolao and maximum in buffalo bullocks. These results indicated that the Gaolao bullocks are better suitable for draft purpose.

KEYWORDS: Tread Mill Test, blood constituents, draught power, bullock.

INTRODUCTION

Draught animals, an excellent source of energy, are lying within the economic and technological capability for millions of farmers in tropical and subtropical countries. The ability of working bullocks has hardly been evaluated. Very few studies have been conducted on this aspect. Therefore, an attempt was made to know the changes in certain biochemical values of bullocks during work on Animal Tread Mill Machine.

MATERIALS AND METHODS

For the present study, 34 bullocks of nearly of same age (6-7 years) from three different types of animals viz. Gaolao bullock (12), non-descript bullock (12) and buffalo (10) were used. The bullocks were made to walk on tread mill machine for three hours at different speeds (2, 3 and 4Km/hr) and with different load (0%, 5% and 7% of body weight). The blood sample of these animals was collected at rest and at set intervals of time after 1, 2 and 3 hours of work. The samples were estimated for change in the haemoglobin, glucose, alkaline phosphatase and creatinine. The values recorded were analysed statistically by applying unequal Completely Randomised Design as per Snedecor and Cochran (1967).

RESULT AND DISCUSSION

The values of haemoglobin showed increasing trend in all the animals at all speed and with increasing load (Table 1). However, highly significant difference was observed in these breeds with 5% load, where minimum rise was seen in Gaolao bullocks and

maximum in buffalo bullocks. At 7% of body weight load, there was no significant difference in all the breeds. This increase in the values of haemoglobin is attributed to the haemoconcentration caused due to salivation and sweating to maintain body temperature during exercise.

The blood glucose level increased with the increase in the time of exercise at all the speeds and with and without load. This increase in blood glucose level was minimum in Gaolao bullock than non-descript and buffalo bullocks (Table 2). There was highly significant increase in blood glucose level in all the breeds. This increase in glucose level is attributed to the fact that glucose in blood gets utilized during exercise. This loss of glucose in the blood is compensated by conversion of muscle glycogen into blood glucose and also by conversion of propionic acid into glucose in ruminants. The results indicate that buffaloes consume more energy due to less heat dissipation through skin because of less number of sweat glands and lead to early exhaustion (Beninati *et al.*, loc. cit.; Sreter, loc. cit).

The serum alkaline phosphatase was found to increase with exercise in all the breeds at all speeds and with and without load (Table 3). There was significant difference in the level of serum alkaline phosphatase in these breeds. Increased level was minimum in Gaolao cattle while maximum in buffalo bullocks. This increase is attributed to the alkaline phosphatase, a microsomal enzyme essential for energy. It is released in blood from all the cells of body during exercise

The serum creatinine level was found increasing during exercise at different speed and with and without

Table 1: Changes in hemoglobin at different intervals of time during TMT (gm%)

Speed (Km/Hr)	Load (Body weight)	Interval of time	Gaolao	Non-descript	Buffalo	F Cal	CD
2 Km/hr	0 %	0 Hr	13.86±0.18	13.67±0.25	13.72±0.27	0.20NS	0.63
		3 Hr	16.63±0.19	16.75±0.24	16.74±0.17	0.09NS	0.56
	5 %	0 Hr	13.25±0.20	13.62±0.19	13.6±0.27	0.92NS	0.59
		3 Hr	16.95±0.13	17.72±0.15	17.93±0.13	13.39**	0.37
	7 %	0 Hr	13.3±0.20	13.3±0.26	13.68±0.19	0.89NS	0.61
		3 Hr	17.32±0.17	17.1±0.14	17.56±0.17	1.95NS	0.44
3 Km/hr	0 %	0 Hr	13.3±0.19	13.33±0.18	13.26±0.18	0.04NS	0.49
		3 Hr	17.73±0.11	17.62±0.12	19.8±0.47	21.22**	0.69
	5 %	0 Hr	13.3±0.9	13.33±0.18	13.26±0.18	0.04NS	0.49
		3 Hr	17.73±0.11	17.62±0.12	19.8±0.46	21.22**	0.69
	7 %	0 Hr	13.33±1.41	13.3±1.11	13.67±1.21	0.91NS	0.71
		3 Hr	18.02±0.17	18.64±0.1	19.78±0.14	1.42NS	0.46
4 Km/hr	0 %	0 Hr	12.8±0.16	13.2±0.14	13.3±1.11	0.04NS	0.41
		3 Hr	17.99±0.16	18.94±0.14	20.24±0.45	20.21**	0.74
	5 %	0 Hr	13.4±0.26	13.6±0.18	13.33±0.14	0.04NS	0.56
		3 Hr	18.64±0.27	18.98±0.15	20.46±1.04	20.18**	0.74
	7 %	0 Hr	13.4±0.42	12.9±1.12	14.2±0.98	1.42NS	0.94
		3 Hr	18.48±0.16	19.42±0.98	20.04±1.14	0.99NS	0.86

*P=0.05, **P=0.01, NS=Non-significant

Table 2: Changes in Blood Glucose at different intervals of time during TMT (mg/dl)

Speed (Km/Hr)	Load (Body weight)	Interval of time	Gaolao	Non-descript	Buffalo	F Cal	CD
2 Km/hr	0 %	0 Hr	43.83±0.87	44.17±0.85	45.0±0.97	0.43NS	2.40
		3 Hr	65.17±1.50	70.8±1.97	73.0±2.11	4.89*	5.04
	5 %	0 Hr	45.58±0.87	44.92±1.17	45.3±1.17	0.09NS	2.99
		3 Hr	69.67±1.11	83.25±1.34	75.7±1.28	31.59**	3.36
	7 %	0 Hr	46.67±1.45	46.33±1.38	48.2±1.18	0.59NS	3.37
		3 Hr	74.±1.54	77.67±1.70	79±1.82	2.36NS	4.53
3 Km/hr	0 %	0 Hr	45.92±0.98	47.25±1.39	47.0±1.24	0.36NS	3.27
		3 Hr	76.92±1.56	78.92±0.99	81.1±1.10	2.52NS	3.40
	5 %	0 Hr	45.92±0.98	47.25±1.39	47±1.24	0.36NS	3.27
		3 Hr	72.14±1.12	78.47±1.42	80.42±1.36	25.64**	4.56
	7 %	0 Hr	44.26±1.16	45.48±1.47	47.37±1.57	1.02NS	2.64
		3 Hr	74.34±1.18	78.56±1.26	82.74±1.64	6.48**	2.34
4 Km/hr	0 %	0 Hr	44.35±0.46	46.37±1.24	48.42±1.34	1.34NS	2.98
		3 Hr	72.46±1.12	76.35±1.14	81.64±1.74	5.64**	3.64
	5 %	0 Hr	44.84±0.14	48.95±1.42	49.64±1.16	0.45NS	2.94
		3 Hr	75.42±1.34	81.34±1.42	84.92±1.36	6.42**	4.46
	7 %	0 Hr	43.64±1.46	44.73±1.12	46.84±1.17	1.48NS	3.02
		3 Hr	78.28±1.14	80.64±1.64	84.19±1.36	4.34*	3.98

*P=0.05, **P=0.01, NS=Non-significant

Table 3: Changes in Serum Alkaline Phosphatase at different intervals of time during TMT (IU/dl)

Speed (Km/Hr)	Load (Body weight)	Interval of time	Gaolao	Non-descript	Buffalo	F Cal	CD
2 Km/hr	0 %	0 Hr	35.85±0.69	36.89±0.89	37.95±1.25	2.34NS	2.52
		3 Hr	59.59±1.21	68.62±1.16	70.15±1.41	21.07**	3.37
	5 %	0 Hr	33.04±0.94	35.99±1.04	37.25±1.25	4.49*	2.89
		3 Hr	66.97±1.31	68.61±0.89	75.03±1.68	10.22**	3.48
	7 %	0 Hr	36.60±0.89	36.0±1.04	36.08±1.11	0.10NS	2.71
		3 Hr	70.87±1.44	79.47±0.98	77.94±1.41	13.30**	3.46
3 Km/hr	0 %	0 Hr	37.04±1.28	37.32±0.97	36.28±1.27	0.19NS	3.16
		3 Hr	71.78±1.24	79.46±0.98	91.95±1.55	61.19**	3.57
	5 %	0 Hr	52.39±1.76	56.07±2.09	72.18±1.34	39.08**	4.63
		3 Hr	72.87±1.44	82.46±0.98	94.95±1.55	61.19**	3.57
	7 %	0 Hr	34.26±0.78	36.34±1.15	38.46±1.45	0.15NS	1.98
		3 Hr	72.89±1.54	81.48±1.12	84.64±1.25	15.78**	3.64
4 Km/hr	0 %	0 Hr	34.12±1.24	36.24±0.95	37.34±1.34	1.28NS	2.14
		3 Hr	74.35±1.11	82.64±1.04	95.69±1.57	58.14**	4.56
	5 %	0 Hr	48.46±1.27	52.35±2.14	64.14±0.98	36.91**	3.98
		3 Hr	76.14±1.24	85.25±1.15	95.36±0.98	59.14**	2.65
	7 %	0 Hr	33.46±1.48	36.42±2.18	39.15±0.98	1.54NS	1.94
		3 Hr	76.78±1.24	83.46±1.12	86.12±1.08	19.45**	5.45

*P=0.05, **P=0.01, NS=Non significant

Table 4: Changes in Serum Creatinine at different intervals of time during TMT (mg/dl)

Speed (Km/Hr)	Load (Body weight)	Interval of time	Gaolao	Non-descript	Buffalo	F Cal	CD
2 Km/hr	0 %	0 Hr	2.12±0.15	2.16±0.15	2.45±0.19	1.14NS	0.44
		3 Hr	8.99±0.21	9.51±0.21	11.04±0.28	20.09**	0.62
	5 %	0 Hr	2.25±0.17	2.45±0.2	2.18±0.20	0.47NS	0.54
		3 Hr	10.80±0.27	12.11±0.22	14.27±0.41	32.79**	0.80
	7 %	0 Hr	2.32±0.45	2.78±0.18	2.58±0.14	0.71NS	0.42
		3 Hr	11.45±0.29	12.83±0.52	13.07±0.56	3.61*	1.25
3 Km/hr	0 %	0 Hr	1.81±0.08	1.88±0.12	2.19±0.14	3.24NS	0.29
		3 Hr	11.72±0.16	12.83±0.52	13.07±0.56	2.71NS	1.18
	5 %	0 Hr	1.79±0.07	1.77±0.06	1.88±0.09	0.51NS	0.20
		3 Hr	12.36±0.25	12.85±0.19	14.73±0.30	24.27**	0.66
	7 %	0 Hr	2.31±0.01	2.64±0.02	2.94±0.04	0.74NS	0.22
		3 Hr	13.85±0.14	15.64±0.18	16.14±1.26	22.46**	1.34
4 Km/hr	0 %	0 Hr	2.12±0.07	2.34±0.12	2.95±0.18	3.46*	0.26
		3 Hr	12.26±0.11	13.38±0.56	14.58±0.38	2.89NS	0.98
	5 %	0 Hr	2.26±0.09	2.57±0.12	2.98±0.16	0.56NS	0.21
		3 Hr	13.74±0.24	14.02±0.15	15.64±0.31	23.27**	0.76
	7 %	0 Hr	1.78±0.12	2.12±0.27	2.48±0.36	1.78NS	0.56
		3 Hr	12.94±1.21	13.64±1.01	15.74±1.11	20.46**	0.74

*P=0.05, **P=0.01, NS=Non-significant

load in all the breeds (Table 4). The increase in level of serum creatinine was maximum in buffalo bullocks followed by non-descript and minimum in Gaolao bullocks. There was highly significant difference in the level of serum creatinine in all the breeds. This increase in creatinine value is due to break down of creatinine phosphate, a major source of energy hydrolyzed to creatinine and phosphate. This increase in creatinine in blood beyond optimum limit is retained in blood before it gets excreted in urine (Singh *et al.*, 1980).

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