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WORK PERFORMANCE OF DROMEDARY CAMELS ON MULTIPURPOSE TOOL CARRIER

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ABSTRACT

The adult camels (n=10) in the similar age group weighing 618 kg were trained to pull the multipurpose tool carrier machine in the farm area for tillage operation during March 2010. The average area ploughed was 2200 m^2 per hour at an average draught power of 40 kg varying highly among animals. The endurance time varied between 60-90 minutes and the camels fatigued thereafter. There was a significant change ($P<0.05$) in the physiological responses *viz*. rectal temperature (degree centigrade), respiration and pulse rate was 36.47 ± 0.148, 37.63±0.116; 15.6±0.306, 18.8±0.133; 45±0.333, 49±0.333 before and after the work, respectively. The blood serum was collected to analyse the changes in the biochemical attributes after tilling work. The serum glucose, lactate, cholesterol and aspartate transaminase activity changed significantly ($P<0.05$) after the work.

Key words: Camel, draught, endurance, tilling, multipurpose tool carrier

The dromedary camels are widely used in the state of Rajasthan for agricultural operations despite of an increase in the number of tractors. The camels are considered as powerful draught animals offering environment friendly energy at an affordable price. The escalating cost of feed and fodders with diminishing grazing lands have posed a serious challenge on the sustainability of this species in the arid climate of desert. There is a need to increase the draught output of camels through the improvement of traditional farm implements. Earlier a multipurpose tool carrier machine developed by (College of Technology and Agriculture Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur) was used to assess the draught ability and endurance of camels (Tiwari *et al*, 2009). The camel serum biochemical studies have been reported in racing camels (Mohamed and Hussein, 1999) and draught capacity under ploughing stress by camels (Roy *et al*, 1992). The present study has been undertaken on an improved tilling device to get better work efficiency.

Materials and Methods

The experiment was conducted at National Research Centre on Camel Bikaner using 10 adult camels trained adequately for carrying out draught work under farm conditions. The camels were housed in separate sheds and fed groundnut roughage *ad lib* and water was offered once in a day. The camels were made to pull the multipurpose tool carrier machine until fatigued in the farm area. This period was measured as the endurance time and the area ploughed was measured in square metres. The draught force was measured in kg with the help of a dynamometer and load cell (Infra Enterprises, Roorkee, INDIA). The physiological responses viz. rectal temperature, pulse and respiration rate were recorded before and after doing the ploughing work. The blood samples were drawn through the puncture of jugular vein before starting and after finishing the work at endurance time due to fatigue. The serum was separated and used for the assay of certain biochemical attributes with standard analytical procedures. The reagent kits supplied by Chemelex S.A. Barcelona, Spain were utilised for the analysis of biochemical attributes with Biotron (BTR-830) photometer. The data was analysed using paired t test to compare the mean values before and after doing the draught work by camels.

Results and Discussion

The camels started showing fatigue symptoms like frothing in the mouth, producing gurgling sound, frequent urination and defecation besides in-coordination of legs while on the move. The camels stopped tilling work after an average time of 80 minutes (Range 60-90) which was recorded as its endurance. The average area ploughed at an

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average draught power of 40 kg in an hour was 2200 m^2 (Range 1800-2400) before fatigue. The means of different physiological responses and biochemical attributes are presented in the Table 1. There was a significant increase in the rectal temperature, pulse and respiration rate after doing the tilling work which is suggestive of higher metabolic activity in the camels. The higher level of glucose after tilling may be associated with its increased demand due to the work stress. Bogin (2000) has also reported an increase in the levels of proteins, albumin, lactic acid, creatinine and glucose in camels after a stress of 5 km race. The changes in the proteins, albumin and certain electrolytes occur due to haemo-concentration and should be interpreted accordingly. The nutritional status could also induce significant changes in the physiological responses of the dromedary camels (Amin *et al,* 2007). Serum total protein is also considered as a useful index for the nutritional status of animals (Lynch and Jackson, 1983) and therefore included in the tests. The food deprivation decreases plasma glucose levels (Rule *et al,* 1985) in monogastric as well as ruminant animals. There were no significant changes in the serum triglycerides concentration. Triglycerides are known to provide the metabolic fuel for most of the tissues when the animal has energy deficit (Beitz, 1993). The results indicate a slight decline in serum protein and increase in the urea and creatinine which could be due to enhanced protein metabolism under work stress. Camels have been reported to digest protein better than goats (Bakheit, 1985). They have higher rate of urea recycling (94-97%) when fed on a low protein dry grass with 3.2% crude protein (Mousa *et al,* 1983). The efficient urea cycling system does not allow urea to accumulate in the camel serum and almost normal levels are maintained even under stress conditions. Lactic acid also accumulates due to anaerobic metabolism during physical stress. The increased levels of lactate signify fatigue of muscles transforming into the incoordination of legs while moving. A significant decrease in the cholesterol levels could be due to its enhanced metabolism to produce stress harmone in the blood.

Table 1. The physiological and biochemical attributes of camels before and after tilling work.

S.N.	Attributes	Before Work ± S.E.	After Work ± S.E.
1.	Rectal Temperature	36.47±0.148	37.63±0.116*
2.	Pulse rate (beats/minute)	45±0.333	49±0.333*
3.	Respiration rate (Per minute)	15.6±0.306	18.8±0.133*
4.	Glucose (mg/dl)	138.87±6.558	182.03±14.980*
5.	Cholesterol (mg/dl)	30.028±2.094	25.68±1.916*
6.	Triglycerides (mg/dl)	34.18±4.878	39.83±4.497
7.	Total Proteins (g/dl)	7.015±0.215	6.93±0.161
8.	Lactate (mg/dl)	10.93±1.024	81.66±15.296*
9.	Urea (mg/dl)	25.51±2.904	29.52±2.162
10.	Creatinine (mg/dl)	1.77±0.111	1.87±0.135
11.	Calcium (mg/dl)	9.13±0.266	9.36±0.368
12.	Phosphorus (mg/dl)	7.084±0.373	6.90±0.386
13.	Lactate Dehydrogenase (I.U./L)	699.1±68.99	739.9±82.69
14.	Aspartate Transaminase (I.U./L)	54.67±4.476	60.40±4.926*
15.	Alanine Transaminase (I.U./L)	10.02±0.655	9.49±0.583

*The means are significant (P<0.05)

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