Research Article

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EFFECT OF YEA SACC[1026] SUPPLEMENTATION ON BIOCHEMICAL PARAMETERS IN BUFFALO CALVES DURING SUMMER SEASON

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ABSTRACT

The study was carried out in eight apparently healthy male buffalo calves to study the effect of Yea Sacc[1026] supplementation on biochemical profile during summer season. The animals were divided into three groups of four each. Group I = Pre-summer group; Group II = summer control group and Group III = summer treatment group. Same animals were used in pre-summer (Group I) and summer control (Group II). The animals of Group III (summer treatment) were supplemented with Yea Sacc[1026]@ 1 bolus (consisting of 25 billion live yeast cells) / animal/ day. The results revealed that there was a significant (P<0.05) increase in plasma glucose, creatinine, urea nitrogen levels and a significant (P<0.05) decrease in plasma total protein during summer season in group II. However following supplementation of Yea Sacc[1026], the values of above parameters were restored towards normal in group III. The plasma cholesterol values did not change in any of the groups. It can be concluded from the present investigation that supplementation of Yea Sacc[1026] can be useful in order to maintain biochemical parameters during summer.

Key words: Yea Sacc[1026], buffalo calves, summer season, biochemical parameters

In India, buffaloes contribute about 55 million tons of total milk production and possess the best milch breeds (FAO, 2010). The primary factors that cause heat stress in dairy animals are high environmental temperature and relative humidity (West, 2003). Rise in the environmental temperature may impair production, reproductive performance, biochemical and physiological process of metabolism (Gaughan *et al*., 2010). Probiotic supplementation has been reported to be beneficial in ameliorating the thermal stress during summers (Shriver-Munsch, 2011). Therefore, the present study was planned to evaluate the effect of Yea Sacc[1026] supplementation on blood biochemical parameters during summer season in buffalo calves.

MATERIALS AND METHODS

Experimental protocols using buffalo calves in this study have been approved by the Institutional Animal Ethical Committee (IAEC) of the Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Punjab, India. All the experiments with buffalo were carried out according to the guidelines of the IAEC.

The experiment was performed on apparently healthy male buffalo calves (n=8) of 10-12 months age. The experimental animals were fed conventional diet consisting of green fodder, wheat straw, concentrate and mineral mixture. The experimental animals were divided into three groups of four each. Same animals were used in Group I and Group II for control study during pre-summer and summer seasons. Group III animals were supplemented with Yea Sacc[1026] @ 1 bolus (consisting of 25 billion live yeast cells) / animal per day. Three blood samples (6-8 ml each) in heparinized vials were collected before feeding aseptically by jugular vein-puncture from each animal in each group at weekly intervals over a period of 21 days. For glucose, samples were collected with sodium fluoride as anticoagulant. Plasma was separated and stored at -20 ^{0}C. Plasma total protein, glucose, cholesterol, urea, and creatinine were estimated with BPC Biosed Chemistry Analyser within one week of collection using BPC biosed kits. The data were subjected to one way analysis of variance (ANOVA) for comparison of means among different groups by using SAS software.

RESULTS AND DISCUSSION

The results of present study are presented in Table 1. The results revealed that the overall mean plasma total protein concentration was lower in group II as compared to group I. The significant decrease in plasma total protein with rise in temperature could be due to reduction in protein synthesis because of reduced anabolic hormone (El-Masry and Habeeb, 1989). Similar results were reported by Lakhani *et al*. (2017) in Murrah buffaloes. Das *et al*. (2013) observed lower plasma total protein concentration in lactating buffaloes during hot and humid season indicating fall in plasma total protein concentration with rise in summer stress. Plasma total protein concentration in group III was significantly (P<0.05) higher as compared to group II which may be due to enhanced microbial population by yeast supplementation resulting in increased flow of microbial protein from rumen to duodenum (Guedes *et al*., 2008). These results are also supported by Abu El-Ella & Kommonna (2013) in Damascus goats.

The overall mean plasma glucose concentration was significantly decreased during summer season and was restored to normal following feeding of Yea Sacc[1026] in group III. These results are supported by Sahin *et al*. (2003). They observed that glucose concentration in summer may be higher due to greater catabolic effect of corticosterone and also due to increased gluconeogenesis

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Table 1
Biochemical parameters during summer season in male buffalo calves supplemented with Yea Sacc[1026]

Groups	Biochemical parameters				
	Plasma protein (g/dl)	Plasma glucose (mg/dl)	Plasma cholesterol (mg/dl)	Plasma creatinine (mg/dl)	Plasma urea (mg/dl)
I Pre-Summer group	7.11±0.17^{A}	62.39±1.47^{B}	103.42±2.66^{A}	1.19±0.09^{B}	33.41±1.92^{B}
II Summer Control Group	6.58±0.1^{B}	69.26±1.01^{A}	94.28±2.04^{A}	1.58±0.08^{A}	39.95±1.94^{A}
III Summer Treatment Group	6.97±0.1^{A}	63.86±1.7^{B}	101.45±4.24^{A}	1.57±0.12^{A}	34.28±1.9^{B}

Each value is a mean of 12 observations representing triplicate samples from 4 experimental animals.
Means bearing different superscripts (A, B,) within columns differ significantly (P<0.05).

yielding more glucose. Similarly Singh *et al*. (2008) and Chaiyabuter *et al*. (1987) observed high levels of plasma glucose in buffaloes during summer stress. Marai *et al.* (1992) reported that blood glucose level was significantly (p<0.005) higher in Ossimi ewes during summer than in winters. Lakhani *et al*. (2017) also reported higher mean plasma glucose concentration in summer stressed buffaloes as compared to pre-summer group. Plasma glucose concentration in group III was restored to normal pre-summer values as compared to group II. The fall in blood glucose concentration following Yea Sacc[1026] supplementation during summer may be due to stabilizing the rumen fermentation and reducing the overall stress in the animals. Similar findings were reported in buffalo heifers by Singh *et al*. (2012).

There was no significant alteration in the levels of plasma cholesterol in any of the groups. However, there was a significant (p<0.05) increase in plasma creatinine and urea concentration in group II as compared to group I. Under heat stress conditions, there is decreased utilization of ammonia for microbial protein synthesis which enters the blood through rumen wall and converted to urea in liver thus contributing to plasma urea concentration. Gurdev *et al*. (2007) also reported that plasma urea level begins to be higher during heat stress. This rise in urea level could be due to negative effect of high temperature on rumen micro flora activity. Habeeb *et al*. (2007) found increase in creatinine levels during hot environment conditions in Egyptian buffalo calves. However, in contrary to this, Das *et al*. (2013) reported no significant difference in levels of urea and creatinine in Nilli-Ravi buffalo during heat stress.

There was a significant decrease in plasma urea level in group III as compared to group II which could be due to better utilization of ammonia for microbial protein synthesis (Petr Dolezal *et al*., 2011) which leads to lower concentration of blood urea-nitrogen in cows when treated with yeast culture supplementation. El-Ashry*et al*. (2003) and (Shakweer, 2003) also observed similar pattern for plasma urea concentration. However, there was no significant change in plasma creatinine levels with supplementation of yeast.

It can be concluded from the present study that yeast supplementation during summer season might have improved the digestion and enhanced the absorption of nutrients, thus can be useful to maintain biochemical parameters in buffalo calves.

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