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Effect of Yeast (*saccharomyces cerevisiae*) Supplementation on Haematological Parameters in Surti Buffalo Calves

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Abstract

The present study was conducted to evaluate the effect of dietary supplementation of yeast (*Saccharomyces cerevisiae*) on haematological parameter in 21 Surti young female buffalo calves (aged 6-12 months). They were divided equally into 3 groups (7 calves in each group) viz. Group I (control), II (supplementation of rumen specific yeast *Saccharomyces cerevisiae* CNCM I-1077 @ $4x10^9$ cfu/animal/day) and III (supplementation of product of inactivated whole cell yeast *Saccharomyces cerevisiae* containing elevated levels of L (+) selenomethionine @ selenium inclusion rate in feed at 0.3 ppm). Whole blood was collected at day 0, 45 and 90 and haematological parameters were studied. Except in Group II which showed significant decrease in TEC, all haematological parameters were found within normal physiological range. Thus it was concluded that in female Surti buffalo calves supplementation of yeast and selenized yeast did not cause any significant change in haematological parameters.

Introduction

Buffalo (*Bubalus bubalis*) contributes significantly to the dairy sector by producing milk and meat and serving draught purpose. However their performance is hindered by inappropriate feeding, breeding, health and management (Birthal and Jha, 2005). Feeding is of prime importance that affects performance thus signifying the use of feed additives that improves gut health of the animals and results in increased digestion rate as well as better growth performance (Frizzo *et al*., 2010; 2011 and Kawakami *et al.,* 2010). Amongst several feed additives, the dietary supplementation of probiotic yeast *Saccharomyces cerevisiae* has been reported in several studies to have beneficial effects on production performance of ruminants. It has been reported that yeast culture improved feed intake (Robinson and Erasmus, 2009; Ayad *et al*., 2013), nutrient digestibility (Wohlt *et al.,* 1991) and feed conversion efficiency as well as growth rate (Lascano *et al.,* 2009) apart from being cost effective (Hutjens, 2007). Yeast supplementation in diet has also been found to

improve haematological parameters indicating improvement in health status of animals (Agazzi *et al.,* 2014).

Several derived products of yeast such as selenium enriched yeast which has selenium transformed into organic form have also been studied with the objective to render higher bioavailability of element selenium. Such selenized yeast is found to be rich in selenomethionine (SeMet) (Ortman and Pehrson, 1997).

Since haematological profile serve as basic indicator for optimum physiological and health status, the objective of this study was to determine the effect of probiotic yeast (*Saccharomyces cerevisiae*) and selenized yeast supplementation on haematological parameters of Surti Buffalo calves.

Materials and Methods

The present study was conducted in the Department of Veterinary Physiology and Biochemistry, Veterinary college, NAU, Navsari following ethical guidelines and was approved by IAEC vide NAU/NVC/IAEC/6/2015 01/08/2015. Twenty one randomly selected apparently healthy Surti young buffalo female calves (aged 6-12 months) were divided into three groups of 7 animals each viz. Group I (control), II (supplementation of rumen specific yeast *Saccharomyces cerevisiae* CNCM I-1077@ $4x10^9$ cfu/animal/day) and III (supplementation of product of inactivated whole cell yeast *Saccharomyces cerevisiae* containing elevated levels of L (+) selenomethionine @ selenium inclusion rate in feed at 0.3 ppm). The experimental animals were maintained at Livestock Research Station, NAU, Navsari as per the standard conditions of feeding and management. Whole blood was collected at 0, 45 and 90 day of study and haematological parameters were estimated by using MEDONIC CA 620/530 VET three part fully automated haematology cell counter manufactured by Boule Medical AB, Sweden.

Results and Discussion

Results of the present study (Table1) revealed that the yeast supplemented group (group II) had significantly low TEC at day 45 ($P \leq 0.05$) whereas there was no change at day 90. Some of the parameters viz MCV, MCHC, and LYM were non significantly high at day 45 and 90. Group II calves showed non-significant higher levels of MCV as well as MCH at day 45, and 90; PCV, Hb, MCHC and MID at day 90. The levels of Hb, PCV, PLT, MPV and MID were non significantly low at day 45 on the other hand there were non significant increase in these parameters at 90 day. In group III, all haematological parameters were within normal physiological range with slight (non significant) changes at both 45 and 90 day.

Earlier various researchers have been studying on the effect of yeast supplementation in number of species with variable levels and with age group depicting variable results. Ghazanfar *et al*. (2015) reported increased Hb and PCV and TEC on supplementation of yeast culture to 6-7 months old calves for 120 days at dose rate of 5 g/animal/day whereas Brun-Hansen *et al*. (2006) reported a decrease in TEC in calves in the age group 14-16 weeks to 27-29.

Group III calves demonstrated higher levels of MPV at day 90; TLC and LYM at day 45 and 90 and MCHC at day 45. Selenium is known to improve immune status and it may be possible that the immune system in Group III animals might be improved as revealed from increased TLC and LYM although non significant . Eze *et al.* (2011) while observing immunomodulatory effect of dietary selenium supplementation in rats reported significant increase in TLC which was due to increase in lymphocyte. Similar to the present findings, Alimohamady *et al.* (2013) also found non-significant increase in TLC in lambs after supplementing their diet with selenium yeast.

The observation of the present study reveals that supplementation of yeast and selenized yeast did not cause any significant change in haematological status in Surti buffalo calves . However non-significant increase of PCV and Hb with yeast supplementation and non-significant increase in LYM and TLC after selenized yeast supplementation suggests need for similar studies to be carried out in future for optimising dose and duration of supplementation.

Table 1: Hematological profile (LSM±SE) in Surti buffalo calves

Total erythrocyte count-TEC (10^6/mm^3)			
	0 day	45th day	90th day
Group I	9.58 ±0.82	8.83^{A}±0.32	7.43±0.07
Group II	9.02±0.24	8.00^{B}±0.06	7.44±0.24
Group III	9.34±0.36	8.25^{AB}±0.15	7.46±0.14
Mean corpuscular volume-MCV (µm^3)			
	0 day	45th day	90th day
Group I	37.43±1.85	37.06±1.62	38.57±1.30
Group II	33.60±0.51	38.36±2.29	40.23±3.58
Group III	37.13±1.47	34.74±0.92	36.49±0.87
Packed cell volume/hematocrit-PCV (%)			
	0 day	45th day	90th day
Group I	35.96±3.81	32.67±1.83	28.64±0.79
Group II	30.30±0.91	30.69±1.91	29.70±2.18
Group III	34.43±0.81	28.09±0.71	27.17±0.36
Platelet-PLT (10^3/mm^3)			
	0 day	45th day	90th day
Group I	336.29±31.81	337.71±62.52	280.43±26.45
Group II	358.57±33.25	283.57±31.21	258.14±23.92
Group III	328.57±35.01	279.00±15.74	269.86±30.98
Mean platelet volume-MPV (µm^3)			
	0 day	45th day	90th day
Group I	6.84±0.09	6.87±0.08	6.73±0.12
Group II	7.01±0.10	6.61±0.07	6.91±0.23
Group III	6.86±0.04	6.76±0.13	6.96±0.05
Total leukocyte count-TLC (10^3/mm^3)			
	0 day	45th day	90th day
Group I	11.66±1.43	10.97±0.99	11.49±1.08
Group II	11.03±1.04	11.17±0.89	11.89±0.65
Group III	10.40±1.12	12.94±1.04	12.57±0.42
Hemoglobin-Hb (g/dl)			
	0 day	45th day	90th day
Group I	12.20±1.21	10.76±0.51	9.70±0.27
Group II	10.60±0.28	10.23±0.49	10.29±0.77
Group III	11.36±0.22	9.57±0.29	9.14±0.11
Mean corpuscular hemoglobin-MCH (pg)			
	0 day	45th day	90th day
Group I	12.70±0.51	12.27±0.71	13.06±0.42
Group II	11.79±0.21	12.77±0.56	13.91±1.18
Group III	12.23±0.42	11.87±0.17	12.49±0.30
Mean corpuscular hemoglobin concentration-MCHC (g/dl)			
	0 day	45th day	90th day
Group I	34.13±0.47	33.14±1.10	33.91±0.35
Group II	35.14±1.10	33.53±0.76	34.79±0.91
Group III	33.03±0.46	34.81±0.72	34.24±0.66
Lymphocyte-LYM (%)			
	0 day	45th day	90th day
Group I	57.14±6.97	56.83±7.16	63.11±7.18
Group II	59.84±5.77	57.09±7.32	63.60±4.36
Group III	63.41±4.65	65.90±4.80	68.04±4.55
Mid sized cells-MID (%)			
	0 day	45th day	90th day
Group I	7.79±0.58	8.03±0.45	7.57±0.08
Group II	8.43±0.62	7.84±0.36	8.59±0.79
Group III	8.69±0.54	7.86±0.66	7.53±0.30
Granulocyte-GRAN (%)			
	0 day	45th day	90th day
Group I	35.07±6.66	35.14±7.15	29.31±7.22
Group II	31.73±5.77	35.07±7.17	27.81±4.70
Group III	27.90±4.50	26.24±4.47	24.43±4.68
Mean bearing different superscripts in upper case letters differ significantly (P≤0.05) between groups			

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Conflict of interest:

Authors declare no conflict of interest for this research work.

References :

Agazzi, A., Tirloni, E., Stella, S., Maroccolo, S., Ripamonti, B., Bersani, C., Caputo, J.M., Dell'Orto, V., Rota, N. and Savoini, G. (2014). Effects of species-specific probiotic addition to milk replacer on calf health and performance during the first month of life. *Ann. Anim. Sci.*, **14**(1): 101-115.

Alimohamady, R., Aliarabi, H., Bahari, A. and Dezfoulian, A.H. (2013). Influence of different amounts and sources of selenium supplementation on performance, some blood parameters, and nutrient digestibility in lambs. *Biol. Trace Elem. Res.*, **154**(1): 45-54.

Ayad, M. A., B. Benallou, M. S. Saim, M. A. Smadi, and T. Meziane (2013), Impact of Feeding Yeast Culture on Milk Yield, Milk Components, and Blood Components in Algerian Dairy Herds. *J. Veterinar. Sci. Technol.* **4**(135): 2

Birthal, P.S. and Jha, A.K. (2005).Economic losses due to various constraints in dairy production in India.*Indian J. Anim. Sci.*, **75** (12): 1470-1475

Brun Hansen, H.C., Kampen, A.H. and Lund, A., (2006). Hematologic values in calves during the first 6 months of life. *Vet. Clin. Path.*, **35**(2): 182-187.

Eze, J.I., Ngene, A.A., Anosa, G.N. and Ezeh, I.O. (2011). Immunomodulatory effect of dietary selenium supplementation on serum antibody response and leucocytic profile of *Trypanosoma bruceibrucei* infected rats. *Afr. J. Biotechnol.***10** (56): 12098-12106.

Frizzo, L.S., Soto, L.P., Zbrun, M.V., Bertozzi, E., Sequeira, G., Armesto, R.R. and Rosmini, M.R.(2010). Lactic acid bacteria to improve growth performance in young calves fed milk replacer and spray-dried whey powder. *Anim. Feed Sci. Technol.***157**(3-4): 159-167.

Frizzo, L.S., Zbrun, M.V., Soto, L.P. and Signorini, M.L., 2011. Effects of probiotics on growth performance in young calves: A meta-analysis of randomized controlled trials. *Anim. Feed Sci. Technol.***169**(3-4)**:** 147-156.

Ghazanfar, S., Anjum, M.I., Azim, A. and Ahmed, I. (2015). Effects of dietary supplementation of yeast (*Saccharomyces cerevisiae)* culture on growth performance, blood parameters, nutrient digestibility and fecal flora of dairy heifers. *J. Anim. Plant Sci.*, **25**(1): 53-59.

Hutjens, M.F.(2007). Practical approaches to feed efficiency and applications on the farm. In Proc. Penn State Dairy Nutrition Workshop. Penn State University, College, Station, TX, USA.

Kawakami, S. I., T. Yamada, N. Nakanishi, and Y. Cai (2010), Feeding of lactic acid bacteria and yeast on growth and diarrhoea of Holstein calves. *J. Anim. and Vet. Advances*. **9** (7), 1112-1114.

Lascano, G.J. and Heinrichs, A.J. (2009). Rumen fermentation pattern of dairy heifers fed restricted amounts of low, medium, and high concentrate diets without and with yeast culture. *Livest. Sci*, **124**(1): 48-57.

Ortman, K. and Pehrson.B. (1997). Selenite and selenium yeast as feed supplements for dairy cows. *J. Vet. Med.* **4**:373- 380.

Robinson, P.H. and Erasmus, L.J. (2009). Effects of analyzable diet components on responses of lactating dairy cows to *Saccharomyces cerevisiae* based yeast products: A systematic review of the literature. *Anim. Feed Sci. Technol.***149**(3-4): 185-198.

Wohlt, J. E., A. D. Finkelstein, and C. H. Chung (1991), Yeast culture to improve intake, nutrient digestibility and performance by dairy cattle during early lactation. *J. Dairy Sci.* **74**: 1395- 1400

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