Influence of diet supplementation with *Saccharomyces cerevisiae* on intake and nutrient utilization in Graded Murrah buffaloes

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Abstract

A feeding trial was conducted in graded Murrah buffaloes to study the influence of yeast culture (Saccharomyces cerevisiae CNCM I-1077 strain) supplementation on intake and nutrient utilization. 12 graded Murrah buffaloes with an average body weight of 465.4 ± 20.92 kg were randomly divided into two groups (Control and treatment) of 6 animals each. Animals in both the groups received a basal diet comprising of roughages and concentrates separately to meet the maintenance and production requirements (ICAR, 1998). In addition, the animals in treatment group received yeast culture @ 0.5 g/animal/day. The average DMI of buffaloes during the digestion trial was 114.31 and 119.24 g/kg W0.75 respectively, in control and treatment groups. The digestibility coefficients of gross nutrients and fibre fractions showed non-significant differences between the control and treatment groups, though the values were found to be comparatively higher in the yeast supplemented group. The DCP and TDN contents were observed to be 8.03 and 53.06 per cent in control group and 8.15 and 54.06 per cent in treatment groups, respectively. It can be concluded that yeast culture did not show any significant positive effect on nutrient utilization in graded Murrah buffaloes.

Key words: Yeast culture, DMI, Nutrient utilization.

Introduction

Yeast cultures have been fed to dairy cattle for more than 60 years with varied response. In some studies, yeast cultures improved dry matter intake (Williams et al., 1991; Wohlt et al., 1991) and milk production (Williams et al., 1991; Wohlt et al., 1991; Piva et al., 1993), whereas other studies (Erdman and Sharma, 1987; Arambel and Kent, 1990; Soder and Holden, 1999) found no response to yeast cultures. Similarly, in some studies, yeast cultures improved the digestibility of all nutrients (Reddy and Bhima, 2003; Kumar and Reddy, 2004; Kumar and Ramana, 2008), whereas in other studies, no change in total tract digestibility was observed by yeast feeding (Kamra et al., 2002; Mruthunjaya et al., 2003). There are many factors which influence the effect of yeast such as environment, nutritional status, mode of feeding, type of strain used etc. Therefore, the present experiment was conducted to study the efficiency of selected yeast culture (Saccharomyces cerevisiae CNCM I–1077 strain) as a probiotic in Graded Murrah buffaloes.

Material and methods

Twelve graded Murrah buffaloes with an average body weight of 465.4 ± 20.92 kg were randomly divided into two groups (Control and treatment) of six animals each. All the animals were kept in well ventilated shed with cemented floor and were dewormed before the start of the experiment. Animals in both the groups received a basal diet comprising of roughages and concentrates separately to meet the maintenance and production requirements (ICAR, 1998). Concentrates were offered twice daily at the time of milking and chopped hybrid Napier (APBN-1) was offered ad libitum. The animals in treatment group received yeast culture (*Saccharomyces cerevisiae* CNCM I-1077 strain) @ 0.5 g/animal/day. The yeast culture was administered by top dressing over concentrate mixture every day. Clean drinking water was offered to all the animals ad libitum during the entire period of the experiment. After 120 days of feeding, a digestion trial was carried out with an adaptation period of 2 days and collection period of 6 days.

All the animals were weighed before the start and after the experiment for two consecutive days and the average values were recorded as the actual body weight. During the digestion trial, the amount of feed (chopped hybrid Napier and concentrate mixture) offered, residues left and faeces voided was recorded.

Table-1: Chemical composition (% DMB) of feedstuffs

Nutrient	Hybrid Napier (APBN-1)	Concentrate Mixture
Dry Matter	24.24	91.23
Organic Matter	91.20	92.34
Crude Protein	8.50	19.63
Ether Extract	2.19	5.14
Crude Fibre	36.84	12.05
Nitrogen Free Extract	43.49	55.52
Total Ash	8.98	7.66
Neutral Detergent Fibre	75.13	33.52
Acid Detergent Fibre	47.80	17.80
Acid Detergent Lignin	7.40	4.81
Cellulose	37.93	12.99
Hemi-cellulose	27.33	15.72

Daily representative samples of the feeds, residue and faeces were collected and pooled animal wise. The samples were analyzed for the proximate principles as per AOAC (1997) and cell wall constituents as per Van Soest et al., 1991. The data generated were subjected for the test of significance (Snedecor and Cochran, 1976).

Results and discussion

The chemical composition of feeds and fodders used in the present study is shown in table 1. The average DMI of buffaloes during the digestion trial was 114.31 and 119.24 g/kg W0.75 equivalent to 2.49 and 2.57 kg/100 kg BW, respectively, in control and treatment groups (Table 2). Although differences in dry matter intake between the two groups were non-significant but an improvement in intake was observed on yeast supplementation which may be partly due to improved rate of fibre breakdown (Martin and Nisbet, 1992) and partly by improved duodenal flow of absorbable amino nitrogen. Similar results were observed by Garg et al. (2000) who reported increased DMI in HF cows by feeding yeast culture in the diet. On the contrary, Phondba et al. (2009) reported decreased DMI in crossbred cows fed yeast culture in the diet. The digestibility coefficients of dry matter, organic matter, crude protein, ether extract, crude fibre and NFE (Table 2) showed non-significant differences between control and treatment groups, though the values were found to be comparatively higher in the yeast supplemented group. The improvement in digestibility could be due to increased fibre breakdown (Dawson et al., 1990). Phondba et al. (2009) and Garg et al. (2009) reported non-significant improvement in digestibility of nutrients in ruminants on feeding yeast culture whereas Reddy and Bhima (2003) and Kumar and Ramana (2008) observed significant improvement in digestibility of nutrients on feeding yeast culture. The digestibility coefficients of fibre fractions were higher (P>0.05) in buffaloes fed with yeast culture as compared to the control group confirming the earlier reports of Garg et al. (2009).

The DCP (%) and TDN (%) content were observed to be 8.03, 53.06 and 8.15, 54.06 in control and treatment groups, respectively. However, no significant difference was observed between the two groups. Similarly, Garg et al. (2009) and Phondba et al. (2009) reported non-significant increase in DCP (%) and TDN (%) fed yeast culture in the diet whereas Kumar and Reddy (2004) reported significant increase in DCP (%) and TDN (%) content fed yeast culture in the diet. The DCP intake in terms of g / kg W0.75 and kg / 100 kg BW was found to be 9.16 and 0.20 and 9.73 and 0.21 in control and treatment groups, respectively, which were higher than the requirement (6.76 g / kg W0.75) suggested by ICAR (1998). The TDN in terms of g / kg W0.75 and kg / 100 kg BW was found to be 60.44 and 1.29 and 64.52 and 1.37 in control and treatment groups, respectively.

The probable reasons for the contradictory findings can be explained by the difference in the level of yeast culture used. Many researchers felt that unless the level is not adequate, probiotic will not have any beneficial effect on the host.

It is concluded that yeast culture did not show any significant positive effect on nutrient utilization in graded Murrah buffaloes.

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Table-2: Influence of feeding yeast culture on nutrient intakes, digestibility and plane of nutrition of Buffaloes

Parameter	Control Group	Treatment Group
Dry Matter Intake		
Kg / day	11.24 ± 0.27	11.95 ± 0.46
Kg / 100 kg BW	2.49 ± 0.13	2.57 ± 0.13
g / kg W0.75	114.31 ± 4.14	119.24 ± 4.82
Digestibility (%)		
Dry Matter	54.94 ± 1.71	56.48 ± 1.56
Organic Matter	57.17 ± 1.45	58.61 ± 1.49
Crude Protein	60.71 ± 1.11	62.85 ± 1.51
Ether Extract	64.75 ± 1.28	66.72 ± 0.79
Crude Fibre	50.57 ± 1.69	53.24 ± 1.1
Nitrogen Free Extract	60.12 ± 1.4	60.63 ± 1.7
NDF	51.71 ± 1.69	54.28 ± 1.36
ADF	48.24 ± 2.29	51.18 ± 1.3
Cellulose	52.4 ± 2.23	54.11 ± 1.35
Hemi-Cellulose	57.11 ± 1.33	59.15 ± 1.6
Plane of nutrition		
DCP (%)	8.03 ± 0.18	8.15 ± 0.21
TDN (%)	53.06 ± 1.27	54.06 ± 1.28
Intake of digestible nutrients (g / kg W0.75)		
DCP intake	9.16 ± 0.31	9.73 ± 0.48
TDN intake	60.44 ± 1.51	64.52 ± 3.20

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