PERFORMANCE OF BEEF BUFFALO CALVES IN RESPONSE TO DIETARY SUPPLEMENTATION OF *(SACCHAROMYCES CEREVISIAE)*

By

Gamal A.R. **, Mohamed F. F.*, and Elbana R.A.

Department of Nutrition and Clinical Nutrition

Faculty of Veterinary Medicine, Cairo University

* ffmohamed@staff.cu.edu.eg

** Vet. Officer, ministry of defence (E.A.F)

ABSTRACT

A feeding trial was conducted to evaluate the effect of live yeast cells (*Saccharomyces cerevisiae*) on the growth performance of beef buffalo calves. The experiment was performed on 45 intact (non-castrated) male buffalo calves of (246.8±7.1 kg and 8to 9 months). They were randomly divided to three equal groups of 15 animals each. The control group was fed ration without live yeast cells (CD = control diet), 2nd experimental group was fed ration fortified with 0.5g/day of live yeast cells in the diet (YC0.5) and 3rd experimental group was fed ration with 1 g/day of live yeast cells in the diet (YC1). During the trial, calves in all groups were offered a conventional concentrate mixture to meet the protein requirements for maintenance and growth. Feeding of all animals carried out by TMR according to their planned ration requirement that calculated for animal based on that for cattle in the same size and weight. The beef buffalo calves were fed on ration supplemented with *Saccharomyces cerevisiae* (YC 0.5) (YC 1) showed a significant ($P < 0.05$) improvement in final body weight and weight gain with no significant difference in DMI compared to control group. The average daily gains (ADG) were significantly increased ($P<0.05$) in (YC 1) compared to control group. The FCR for buffalo calves in (control, YC0.5 and YC 1) groups were (8.94 ±0.96, 8.31 ±0.6 and 7.82±0.55) respectively. The cost of feed /kg gain for buffalo calves in the (control, YC0.5and YC 1) were calculated as (42.2, 37.5 and 36.9) £ respectively. It was concluded that inclusion of yeast culture (*Saccharomyce scerevisiae* CNCM I-1077 strain) has a positive effect on final body weight, body weight gain and FCR with decreasing the cost of feed per unit live weight gain in buffalo bull calves without any adverse effects.

INTRODUCTION

Recent research has focused on the feeding of *Saccharomyces cerevisiae* as feed additives because of its beneficial effects on animal performance. Although, there have been numerous theories proposed, the mode of action of yeast culture has not yet been defined **(Ali and Goksu, 2013; Hassan and Saeed, 2013)**. *Saccharomyces cerevisiae* are able to grow rapidly in the rumen and facilitate fiber digestion. Micro-nutrients found in *Saccharomyces cerevisiae* also stimulate cellulolytic bacteria growth. In addition to, Saccharomyces cerevisiae protect ruminal fermentation from lactic acid accumulation **(Dawson *et al.,* 1990)**. Based on the theory proposed by **(Newbold *et al.* 1996)** who mentioned that *Saccharomyces cerevisiae* in the rumen environment can utilize the remaining dissolved oxygen and save anaerobic microorganisms from the toxic effect of oxygen which results in increased digestion rate and better growth performance **(Frizzo *et al.,* 2010; Kawakami *et al.,* 2010 and Frizzo *et al.,* 2011)**. Moreover, reports on performance responses of ruminants fed on yeast culture have been variable. Growth rate and efficiency of gain were similar or reduced as mentioned by **(Mutsvongwa *et al.,* 1992; Kamra *et al.,* 2002).** While others suggested improved weight gain, feed consumption and feed efficiency of gain on yeast supplementation as **(Reddy and Bhima, 2003; Kumar and Ramana, 2008)**. Further, different yeast strains differ in their ability to produce such responses. Therefore, the present experiment was conducted to study the effect of a selected yeast culture *Saccharomyces cerevisiae* CNCM I 1077 strain on growth rate and feed efficiency in buffalo calves.

MATERIAL AND METHODS

A 194 - day feeding trial including 14 days for adaptation and optimizing the amount of roughages required for 45 intact (non-castrated) male buffalo calves of (246.8±7.1 kg and 8 to 9 months) were divided to three equal groups of 15 animals each in a completely randomised design with taking their life body weight in consideration. The trial was carried out at governmental buffalo farm. During pre-treatment (adaptation time 14 days) the calves were received the same ration. Treatments were: ration without live yeast cells (control diet = CD), ration fortified with 0.5g/day of live yeast cells (YC0.5) and ration supplemented with 1 g/day of live yeast cells (YC1). During the feeding trial, rice straws were fed adlibitum. Live yeast cultures were mixed with small portion of concentrate and mineral powder mixture then top dressed over the TMR. Calves had ad libitum access to water. All animals were housed in well-ventilated sheds provided with individual feeding and watering arrangements.

All animals were dewormed and vaccinated according to farm protocol before the start of the experiment. During the trial, calves in all groups were offered a TMR (conc. mixture, barseem hay, wheat straw and fertilised corn silage) once daily at 8.00 AM to meet the protein requirement for maintenance and growth.

The yeast culture was administered by top dressing over TMR every day.

The animals were weighed before the start of the feeding trial and at intervals of every 15 days early in the morning before offering feed and water. Daily consumption of rice straw and consumed TMR were recorded. The ADG and final FCR were calculated.

All data collected were statistically analyzed using SPSS® version 18 software PC (2008). Means are compared by one way ANOVA ($P < 0.05$) according to **(Snedecor and Cochran, 1980).**

RESULTS AND DISCUSSION

The results of the final body weight, body weight gain, DMI, average daily gain, FCR and economic efficiency for both control and two treated groups are given in the (Table 1, 2). It was noticed that, the beef buffalo calves were fed on ration supplemented with *Saccharomyces cerevisiae* (YC 0.5) (YC 1) showed a significant ($P < 0.05$) increased in final body weight and weight gain with no significant difference in DMI compared to control group. But group fed on supplemented ration with 1 g/kg *Saccharomyces cerevisiae* (YC1) showed a significant improvement in FCR and average daily gain (kg) (ADG).Our findings are in agreement with **(Panda *et al.,* 1995)**, **(Umesh Kumar *et al.,* 1998)**, **(Saha *et al.,* 1999)**, **(Reddy and Bhima 2003)**, **(Kumar and Ramana 2008)** who observed significantly increased daily gain when animals were fed ration supplemented with yeast culture.

The higher growth rate in yeast supplemented rations might be due to increased flow of microbial protein leaving the rumen and enhanced supply of amino acids entering the small intestine as reported by **(NagamalleswaraRao *et al*., 2003).** The FCR improved with addition of yeast culture in the ration and was be reflected in the significantly increased ADG in buffalo bull calves fed yeast culture supplemented diets. These results are in agreement with the findings of **(Saha *et al.,* 1999) and (Kumar and Ramana 2008)** who reported that there were significant improvements in groups fed to ration fortified with yeast culture. The cost of feed / kg gain for buffalo calves in the control and treated groups (YC0.5 and YC1) was calculated as (42.2, 37.5and 36.9) £, respectively (Table 1). In the present study, the marginal

decrease in cost of feed in the yeast culture supplemented group was attributed to improved feed efficiency in buffalo calves.

Table (1): Growth performance of beef buffalo calves fed ration supplemented with *Saccharomyces cerevisiae* during experimental trial (180 days).

parameter /group	Control group	YC0.5	YC1
Initial weight after adaptation period	**260.75 ±18.3**	**259.6 ±14.4**	**258.4 ±15.2**
Final weight at end of trial	**441.75 ±12.99**	**477.1±19.31**[a]	**481.33±10.43**[a]
Total weight gained (kg)	**184.5 ±28**	**217.2 ±10.65**[a]	**223.1±14.97**[a]
Average daily body weight gained (kg)	**0.96 ±0.06**	**1.17 ±0.08**[b]	**1.23±0.08**[a]
Average DMI(kg/day)	**9.28 ±0.06**	**9.61 ±0.09**	**9.75 ±0.08**
FCR	**8.94 ±0.96**	**8.31 ±0.6**	**7.82±0.55**[a]
Total DMI intake (kg)	**1436.3 ±70.7**	**1488.9±90.18**	**1496.2± 69.01**
Total cost /180 days	**7729.95** £	**8147.20**£	**8248.70**£
Average cost/ gained kg	**42.2**£/kg	**37.5**£/kg	**36.9**£/kg

***Values are means (± SE)**

***Values with different superscript in the same row are significantly different at p ≤ 0.05.**

***(YC 0.5): basal diet fortified with 0.5 g live (Saccharomyces cerevisiae) yeast culture**

***(YC1): basal diet fortified with 1 g live (Saccharomyces cerevisiae) yeast culture**

Table (2): The body weight development of the of beef buffalo calves fed ration supplemented with *Saccharomyces cerevisiae* during experimental trial (180 day).

Experimental period (days)	Control group	YC0.5	YC1
Initial weight after adaptation period	**260.75 ±18.3**	**259.6 ±14.4**	**258.4 ±15.2**
After 15 days of trail	**275.3±8.1**	**277.5 ±7.5**	**277.7 ±5.3**
After 30 days of trail	**290.3±8.1**	**295.6±11.78**	**293.3±6.2**
After 45 days of trail	**303.33±6.01**	**313.1±11.55^{a}**	**315.3±7.67^{a}**
After 60 days of trail	**318±7.23**	**328.66±15.77^{b}**	**332.33±10.37^{a}**
After 75 days of trail	**333.2±6.11**	**347.2±13.01^{a}**	**350.1±14.05^{a}**
After 90 days of trail	**346.4±5.4**	**365.5±9.8 ^{a}**	**369.23±7.23 ^{a}**
After 105 days of trail	**359.75±8.02**	**389±18.33^{a}**	**390.11±15.95^{a}**
After 120 days of trail	**375.33±6.49**	**401.2±15.50^{b}**	**408.55±11.46^{a}**
After 135 days of trail	**391.2±8.72**	**423.2±13.24^{a}**	**426.41±9.41^{a}**
After 150 days of trail	**403.25±9.64**	**439.4±17.56^{a}**	**441.30 ±11.05^{a}**
After 165 days of trail	**418.5±12.99**	**460.1±10.70^{a}**	**462.10 ±13.81^{a}**
Final weight 180 days	**441.75±12.99**	**477.1±19.31^{a}**	**481.33±10.43^{a}**

***Values are means (± SE)**

***Values with different superscript in the same row are significantly different at p ≤ 0.05.**

***(YC 0.5): basal diet fortified with 0.5 g live (Saccharomyces cerevisiae) yeast culture.**

***(YC1): basal diet fortified with 1 g live (Saccharomyces cerevisiae) yeast culture.**

CONCLUSION

It was concluded that inclusion of yeast culture (*Saccharomyces cerevisiae* CNCMI-1077 strain) has a positive effect on final body weight, body weight gain and FCR with decreasing the cost of feed per unit live weight gain in buffalo bull calves without any adverse effects.

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