



## Effect of Bypass Fat With and Without *Saccharomyces cerevisiae* and Herbal Galactogogue on Milk Yield, Fat Content and Serum Triglyceride Levels of Murrah Buffaloes

G.G. Barley<sup>1,2\*</sup>, R.P.S. Baghel<sup>1</sup> and Babita Das<sup>1</sup>

<sup>1</sup>Department of Animal Nutrition and Food Technology  
College of Veterinary Science and A.H. Jabalpur, Madhya Pradesh, INDIA  
<sup>2</sup>AgriVenture, 10-SF, Sukhsagar Valley Jabalpur, Madhya Pradesh, INDIA

\*Corresponding author: GG Barley; Email: tofssbi@yahoo.co.in

Received: 25 January, 2015

Accepted: 27 February, 2015

### ABSTRACT

60 buffaloes of early and 60 buffaloes of mid lactation stages are selected to study the effect of Bypass fat with and without combination of Yeast (*Saccharomyces cerevisiae*) and Herbal galactogogue on milk yield, fat percentage and serum triglyceride content. It was observed that combination of Bypass fat with Yeast (*Saccharomyces cerevisiae*) and Herbal galactogogue supplementation increased weekly average milk yield of supplemented buffaloes as well as fat content and serum triglyceride content compared to plain Bypass fat supplemented buffaloes which in turn performed better than non supplemented buffaloes. This effect is attributable to beneficial effect of Yeast on rumen metabolism and subsequent increased dry matter (DM) digestion, propionic acid production, and protein digestion compared with the control provides energy as well as yeast to balance and improve rumen metabolism which in turn improves milk fat and serum triglyceride level. The increased energy supply to the animals in negative energy balance was responsible for increased milk yield and availability of low density serum triglyceride in plasma led to increased fat content and serum triglyceride levels.

**Keywords:** Bypass fat, Milk yield, Fat content, Serum Triglyceride, Buffaloes

The impact of energy is reflected significantly more in lactating and high producing animals which enters into negative energy balance during early lactation because they can not consume adequate feed to meet the nutrient requirements for high levels of milk production. Overton (1999) reiterate that optimize feeding management of cows through the transition period and early lactation in order to decrease the duration and magnitude of negative energy balance. Feed high quality diets to maintain rumen health, maximize microbial protein synthesis, and provide large amounts of energy to the cow Addition of fat sources may improve the energy status of high yield dairy animals. Further, it also causes increase in energy density of feed. There has been an increasing interest in feeding fats to dairy animals and a wide variety of fat sources are used to increase the energy density of diets fed to animals in early

lactation or to high yield dairy animals in negative energy balance.

Earlier workers (Hammon *et al.*, 2008) showed that Feeding rumen-protected fat (RPF) is an alternative to increase energy density of the diet and therefore energy intake in dairy cows. They also observed that Milk and lactose yields were higher in RPF fed animals than control. Palmquist and Jenkins (1982) demonstrated the digestibility of pre-formed calcium soaps of fatty acids, their beneficial effect on increased digestibility of all dietary components and increased energy for lactation (Palmquist, 1984). Palmquist and Jenkins (1980) stated that the uniquely high acidity in the duodenum combined with detergent action of bile acids, lysolecithin, and fatty acids causes saturated fatty acids to be more digestible in ruminants than in non ruminants. However, most of the

**Table 1:** Effect of Bypass fat supplementation on Milk Yield, fat Percentage and Serum Triglyceride content of Murrah Buffaloes.

Weeks	Milk Yield (lts. Weekly)		Fat Percentage (Avg.)		Serum Triglyceride	
	Control	Bypass Fat	Control	Bypass Fat	Control	Bypass Fat
PRE SUPPLEMENTATION PERIOD						
I	278.25±0.85 <sup>a</sup>	276.25±3.29 <sup>a</sup>	5.32±0.04 <sup>a</sup>	5.27±0.08 <sup>a</sup>	31.02±0.58 <sup>a</sup>	31.32±0.79 <sup>a</sup>
II	290.50±1.7 <sup>a</sup>	294.75±2.83 <sup>a</sup>	5.32±0.06 <sup>a</sup>	5.47±0.11 <sup>a</sup>	31.07±0.61 <sup>a</sup>	31.12±0.52 <sup>a</sup>
DURING TRIAL PERIOD						
I	289.50±2.06 <sup>a</sup>	339.25±2.32 <sup>b</sup>	5.74±0.02 <sup>a</sup>	6.42±0.11 <sup>b</sup>	31.16±0.70 <sup>a</sup>	37.23±0.70 <sup>b</sup>
II	296.25±1.43 <sup>a</sup>	366.50±1.93 <sup>b</sup>	5.77±0.16 <sup>a</sup>	6.45±0.15 <sup>b</sup>	31.44±0.51 <sup>a</sup>	39.53±0.50 <sup>b</sup>
III	311.25±1.03 <sup>a</sup>	373.25±3.59 <sup>b</sup>	5.85±0.03 <sup>a</sup>	6.60±0.14 <sup>b</sup>	31.37±0.21 <sup>a</sup>	41.44±0.26 <sup>b</sup>
IV	317.0±2.27 <sup>a</sup>	381.5±3.57 <sup>b</sup>	5.75±0.06 <sup>a</sup>	6.67±0.14 <sup>b</sup>	31.45±0.24 <sup>a</sup>	41.60±0.17 <sup>b</sup>

studies conducted so far are in high lactating cows only. In India, Buffaloes contribute a major part of high fat milk and suffer nutritional imbalances during the lactation period. Which require a study of supplementing their diet with protected fat and its effect in milk yield and its composition in Murrah Buffaloes. The present study was aimed to know the efficacy of by pass fat on over all milk production including increase of fat percentage and Serum triglyceride content of Murrah Buffaloes in early stages of lactation.

#### MATERIALS AND METHODS

The trials were conducted at private dairy farm at Jabalpur. All Murrah buffaloes were examined clinically for good health status. Optimum health score condition and good managerial care were confirmed in each animal before including the cases under trial. Forty buffaloes were divided in two treatments, each treatment having 4 replicates of 5 buffaloes each. The animals were subjected to identical housing and management conditions. The feed ingredients and fodder offered to them was unchanged during the period of trial and treatment group was offered By pass fat supplement @ 100 gms once in a day /animal.. The trial was conducted for 45 days and data was recorded for 2 weeks prior to supplementation and for 4 weeks during supplementation. Fat percentage was estimated by using Gerber's butyrometer using Gerber method. Serum triglycerides were estimated by using auto analyzer.

#### RESULTS AND DISCUSSION

The data was recorded for 15 days prior to start of feeding trial and as evident in table: 1 no significant difference was observed in milk production of various groups as the randomization is done to bring homogeneity amongst the different treatments.

During the first week of feeding the average milk production ranged from 289.5 ± 2.06 (Control) to 339.25 ± 2.32 (Bypass Fat). During the second week the production ranged from 296.25 ± 1.43 (Control) to 366.50 ± 1.93 (Bypass fat). During the third week the production ranged from 311.25 ± 1.03 (Control) to 373.25 ± 3.59 (Bypass fat). During the fourth week the production trend was continued from third week and ranged from 317.0 ± 2.27 (Control) to 381.5 ± 3.57 (Bypass fat). As evident from the data in table 1, all the groups were equal in terms of milk production prior to supplementation. Supplementation of bypass fat resulted in immediate increase in milk yield during the first week and sustained the increasing trend in subsequent weeks of lactation. This trend can be attributed to high energy supplementation by way of bypass fat which brings the animal out of negative energy balance. This clearly shows that the most important aspect at the early lactation is energy balance. Earlier workers (Hammon et al., 2008) have also showed the positive effect of rumen protected fat in increasing the milk yield during early lactation by correcting the negative energy balance of the animal. "By-pass" oil (protected with calcium salts) is incorporated directly into milk and body fat, thus

saving glucose needed for NADPH synthesis when fat is synthesized from acetate (Preston, 1995)

The milk fat percentage on first week was recorded in the range of  $5.32 \pm 0.04$  (Control) to  $5.27 \pm 0.08$  (Bypass Fat). However no significant difference was observed during pretrial period amongst the treatment and control. During the first week of trial highest fat percentage was recorded for Bypass Fat supplemented groups which is significantly higher than the control group. The fat percentage ranged from  $5.74 \pm 0.02$  (Control) to  $6.42 \pm 0.11$  (Bypass Fat). The trend of higher fat percentage in bypass fat supplemented group continued during second third and fourth week. Gulati *et al.* (2003) suggested that feeding protected fat supplements increased fat, protein and yield of milk significantly. In the present study the trend we observed that the fat content of milk was increased significantly during early lactation when compared to pretrial fat content of milk of same animal. This is due to correction of energy balance of animal that previously was in negative energy balance. It was stated (Palmquist and Jenkins., 1980) that large quantities of added dietary fat increase concentrations in plasma of very low density lipoprotein triglyceride which increases their uptake by the mammary gland with inhibition of short chain fatty acid synthesis and consequent changes in milk fatty acid composition. In some cases, secretion of milk fat is increased.

During the early lactation the pretrial serum triglyceride level ranged from  $31.02 \pm 0.58$  to  $31.18 \pm 0.77$  during the first week and from  $31.07 \pm 0.61$  to  $31.34 \pm 0.33$  during the second week. Non significant difference was observed amongst the treatment. During the trial the serum triglyceride of control animals ranged from  $31.16 \pm 0.70$  ( I week) to  $31.45 \pm 0.70$  (IV Week), while the serum triglyceride level of bypass fat supplemented animals ranged from  $37.23 \pm 0.70$  (I Week) to  $41.60 \pm 0.17$  (IV Week). Significant difference was observed in serum triglyceride levels of animals fed bypass fat compared to control animals. Critical perusal of data revealed an immediate increase in serum triglyceride in supplemented animals compared to control animals. It also showed an consistent increase in weekly averages

which indicates the beneficial effect of supplementation. This trend is in line with increased fat content of milk and supports the view of (Palmquist and Jenkins., 1980) who stated that large quantities of added dietary fat increase concentrations in plasma of very low density lipoprotein triglyceride which increases their uptake by the mammary gland with inhibition of short chain fatty acid synthesis and consequent changes in milk fatty acid composition. In some cases, secretion of milk fat is increased. On the basis of observation it was concluded that supplementation of Bypass fat to Murrah buffaloes during early lactation significantly increased milk yield and milk fat by correcting negative energy balance and increased serum triglyceride level.

## REFERENCES

- Gulati, S.K, Garg, M.R., Serashia , P.L. and Scott, T.W. 2003. Enhancing milk quality and yield in the dairy cow and buffalo by feeding protected nutrient supplements. *Asia Pac. J. Clin. Nutr.* 12 Suppl: S61.
- Hammon, H.M., Metges, C.C., Junghans, P., Becker, F., Bellmann, O., Schneider, F., Nürnberg, G., Dubreuil, P. and Lapiere, H. 2008. Metabolic changes and net portal flux in dairy cows fed a ration containing rumen-protected fat as compared to a control diet. *J. Dairy Sci.*, **91**:208-217.
- Palmquist, D.L. and Jenkins, T.C. 1980. Fat in lactation rations: Review. *J. Dairy Sci.*, **63**:1-14.
- Palmquist, D.L. and Jenkins, T.C. 1982. Calcium soaps as a fat supplement in dairy cattle feeding. In: *Proc of the XIIth World Congress on Diseases of Cattle*. Amsterdam. Dutch Section of the World Association for Buiiatrics. Utrecht, The Netherlands. pp. 477- 481.
- Palmquist, D.L. 1984. Use of fats in diets for lactating dairy cows. *Fats in Animal Nutrition* (Wiseman, J ed.). Butterworths, UK. pp. 357-381.
- Preston, T.R. 1995. Tropical animal feeding - A manual for research workers..., FAO Animal Production and Health Paper 126, Food and Agriculture Organization of the United Nations Rome.
- Overton, T.M. 1999. Update and new perspectives on interactions of nutrition and reproduction in lactating dairy cows. 6 p. <http://www.ansci.cornell.edu/dm/dm/html>

