EFFECT OF SUPPLEMENTATION OF *TINOSPORA CORDIFOLIA* ON LACTATION PARAMETERS IN EARLY LACTATING MURRAH BUFFALOES

N.A. Mir[1,*], P. Kumar[1], S.A. Rather[2], F.A. Sheikh[3] and S.A. Wani[4]

ABSTRACT

The present study was conducted to study production parameters of lactating Murrah buffaloes supplemented with *Tinospora cordifolia*. Twelve lactating Murrah buffaloes in early stage of lactation were selected from the herd of National Dairy Research Institute Karnal, Haryana. The buffaloes were divided into two groups of six animals each. One group was taken as control and the other group supplemented with *Tinospora cardifolia* 120 g/ animal/day from day 3 to day 75 of lactation was taken as treatment group. All the buffaloes were hand milked throughout the experimental period. Milk samples from mixed whole milking were collected early in the morning in sterilized milk sampling bottles from all the animals upto 75th day of lactation. The milk samples were analyzed for somatic cell count, composition and milk total immunoglobulin's. The milk yield was recorded daily. Significant increase ($P<0.05$) in milk yield of treatment group as compared to control group was obtained. The milk somatic cell count was significantly lower in treatment group as compared to control group. The milk composition (fat %, protein %, lactose % and SNF %) was estimated using LactoScan milk analyzer. No significant change was observed in milk fat %, lactose % and SNF % however significant change was observed in milk protein % of treatment group compared to control group. No significant difference in total milk Ig was observed between control and treatment group. The DMI showed an increasing trend with significant difference from day 11 up to day 75 of lactation between control and treatment.

Keywords: Murrah buffaloes, *Bubalus bubalis*, *Tinospora cordifolia,* lactating

INTRODUCTION

Buffalo is the major source of milk production and contributes more than 54% of annual milk production in India. The buffalo has evoked worldwide interest as an animal with potential for meeting the emerging demand for meat, milk and work in developing countries. Further, in countries like India, the buffalo is the major milch animal, accounting for more than 50% of the milk produced. However it is well known fact that large amount of milk produced is not because of higher productivity but because of the higher population of animals. The low productivity of buffaloes is primarily due to poor genetic potential, inadequate supply of nutrients and unscientific

[1]DCP Division, [2]ABC Division, [3]DCN Division, [4] DX Division, National Dairy Research Institute, Karnal, Haryana, India, *E-mail: mir643@rediffmail.com

approach in feeding. Hence in order to improve the productivity of buffaloes, there is need to adopt scientific feeding strategies.

Guduchi (*Tinospora cordifolia*) is a large glabrous deciduous climbing shrub belonging to family Menispermaceae. It is one of the most versatile rejuvenating herbs found throughout tropical Indian subcontinent. Commonly known as a rasayan plant, it is widely used in veterinary folk, ayurveda and other systems of medicine for its general tonic, immunomodulatory, antioxidant, antibacterial, hepatoprotective and anti-inflammatory properties (Krishna *et al.*, 2009). Guduchi itself means the "one which protects our body" and Amrita means "the nectar that confers immortality". In Hindi the plant is commonly known as 'giloya', which is a Hindu mythological term that refers to the heavenly elixir that has saved celestial beings from old age and keeps them eternally young. Though every part of plant has therapeutic value the stem is used in most of the medicinal preparations. It is claimed that the plant climbing up the Neem tree is said to be the best as synergy between these two bitter plants enhances guduchi's efficacy. A variety of constituents belonging to different classes such as alkaloids, diterpenoid lactones, glycosides, ecdysteroids, sesquiterpenoids, phenolics, aliphatic compounds and polysaccharides have been isolated from *Tinospora cordifolia* (Singh *et al.*, 2003). In present times, *Tinospora cordifolia* has been subjected for numerous chemical, Pharmacological, Pre-clinical and clinical investigations and many new therapeutic applications have been indicated, however in buffaloes no study has been conducted regarding supplementation of *Tinospora cordifolia*. Thus present study was undertaken to study the effect of supplementation of Tinospora cordifolia on lactation parameters of murrah buffaloes during early lactation.

MATERIALS AND METHODS

The experiment was conducted in cattle yard of National Dairy Research Institute, Karnal, Haryana, India. Twelve early lactating murrah buffaloes were selected from institute herd. The animals were in 2nd lactation number with the mean body weight of 480 kg. The experiment was conducted during the months of april to june. Animal experimentation was performed in compliance with regulations set by the cattle yard, NDRI and approved by the Institutional Animal Ethics committee.

The nutrient requirements of animals were met by feeding concentrate mixture and green fodders as per NRC 1989 .Animals had round the clock access to ad libitum fresh water. The dried cylindrical stem pieces of Tinospora cordifolia were collected from the local ayurvedic shop. Authentication of the stem was performed by the ayurvedic doctor in the institute health complex. The stems were ground to powder form in a medicinal herb grinding machine, weighed and packed in polythene. The animals under treatment group were fed dried guduchi stem powder by mixing it in small amount of concentrate 120g/day for a period of 72 days after calving(from day 3rd postpartum upto 75th day postpartum). The control animals were fed equal amount of concentrate without guduchi powder for similar period. Both control and treatment buffaloes were hand milked throughout experimental period. Milk samples from mixed whole milking were collected early in the morning in sterilized milk sampling bottles from all the animals upto 75th day of lactation on days 3, 11,19, 27, 35, 43, 51, 59, 67 and 75 of lactation. Milk samples were analyzed for somatic cell count by the method of (Singh and Ludri 2001). Milk composition (Fat %, SNF %, Lactose

% and protein %) was estimated using Lacto Scan milk analyzer (Netco Company), The milk samples were maintained at 28-32^{o}C at the time of analysis ,which is the calibration temperature of analyzer. Milk total immunoglobulin's were estimated by zinc sulphate turbidity method of(McEvan and Fisher, 1970). Dry matter intake was estimated at weekly intervals.

RESULTS AND DISCUSSION

Milk yield

The overall average milk yield of control and treatment group of lactating murrah buffaloes was 7.19±0.10 and 8.00±0.12 kg/day. The milk yield of treatment group of buffaloes was significantly (P<0.05) higher from 12-19th day of lactation. There was 10.10% increase in milk yield of treatment group as compared to control group of buffaloes. (Mallick and Prakesh, 2011 a)also reported significant increase in milk yield of guduchi supplemented cows as compared to untreated control group.

Somatic cell count

Milk somatic cell count was higher on day 3rd of lactation in both control and treatment group and decreased thereafter, but the reduction was more in treatment group as compared to control group. The overall average of somatic cell count was significantly lower (P<0.05) in treatment group as compared to control group of buffaloes. Similar results were reported by (Mallick and Prakash, 2011b), they reported that somatic cell count was significantly higher in untreated control cows through the period of experiment as compared to guduchi supplemented group of cows. (Mukherjee *et al*, 2006) also reported that intramammary infusion of hydromethanolic extract of Tinospora cordifolia in bovine subclinical mastitis initially enhanced somatic cell count but a significant reduction in somatic cell count was observed on day 15 of the treatment period.

Milk composition

There was no significant difference (P>0.05) in the milk fat%, SNF% and lactose% of control and treatment groups of lactating Murrah buffaloes, however there was significant (P.<0.05) difference in milk protein % of control and treatment groups, being higher in treatment group as compared to control group. However no literature is available in large animals for comparison of our study.

Dry matter intake

The overall average dry matter intake in control and treatment groups was 11.27 and 11.88 (kg/day). The dry matter intake showed an increasing trend with significant difference between control and treatment group from day 15th up to 75th day postpartum. The percent increase in dry matter intake of treatment group as compared to control group was 5.13%. The increasing trend of dry matter intake during the period of our study is supported by Ingvartsen and Anderson, 2000; they reported that increase in dry matter intake during the lactation is the result of greater sensation of hunger caused by the rapid increase in nutrient demand. However no literature is available in large animals for comparison of our study.

Milk total immunoglobulin's

The overall average of milk total immunoglobulin level of control and treatment group of lactating murrah buffaloes was 2.00±1.55 and 2.01±1.54 mg/ml. No significant difference (P>0.05) was observed in milk total immunoglobulin

level of control and treatment group of lactating murrah buffaloes during the experimental period.

CONCLUSION

Supplementation of *Tinospora cordifolia* increased milk production (10%) and milk quality in terms of reduction in somatic cell count. Supplementation of *Tinospora cordifolia* also enhanced dry matter intake (5%) of lactating murrah buffaloes, however there is need to carry out study in large group of animals and isolation of various constituents of Tinospora cordifolia for studying their pharmacological actions in bovines at cellular level.

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