

COMPARATIVE STUDY ON MILKING ABILITY OF SAHIWAL COWS AND MURRAH BUFFALOES UNDER HAND AND MACHINE MILKING

B. Patel, P.K. Pathak, N. Kumar*, S.S. Lathwal and S. Prasad

Livestock Research Centre

National Dairy Research Institute, Karnal—132001 (Haryana)

E-mail: drnishantvet@yahoo.com (*Corresponding Author)

Abstract: Present study was undertaken to compare the effect of two different milking methods (hand vs. machine milking) on milking ability in Murrah buffaloes and Sahiwal cows. 30 lactating Sahiwal cows and 30 lactating Murrah Buffaloes were selected and divided into four equal groups having 15 animals each. 15 animals of each species were subjected to machine milking and 15 animals of each species were subjected to hand milking respectively. The results of this study indicated that the average milk let down time was differ significantly ($P < 0.05$) both between milking system and species. The average total milking time in Murrah buffaloes under machine milking was significantly ($P < 0.05$) less than that of hand milking (487.49 ± 18.72 Vs. 520.78 ± 18.94 second) where as in Sahiwal cows it was numerically less (363.05 ± 14.05 seconds Vs. and 369.37 ± 12.00 second) but the difference was not significant. Average milk yield in Murrah and Sahiwal cows under machine milking (5.43 ± 0.20 kg and 4.04 ± 0.25 kg) was higher than under hand milking (5.22 ± 0.22 kg and 3.93 ± 0.14 kg) respectively and overall milking rate under machine milking was higher than that under hand milking in case of Sahiwal cows (681.06 ± 42.28 Vs 650.08 ± 8.9 gm/min) but the case was not so in case of buffaloes. It can be concluded that machine milking can be resorted to, in case of Murrah buffaloes and Sahiwal cows at organized farms without appreciable adverse effect on quantity and quality of milk.

Keywords: Hand milking, machine milking, Sahiwal, Murrah.

INTRODUCTION

India has emerged as leading milk producing country in the world (FAO, 2014). Milk harvesting is an art and science as well as it is the most important aspects on a dairy farm management (Bhagat *et al.*, 1992). The quest to enhance the efficiency of milk production led the dairymen to different innovations in milk production system. Machine milking was introduced as an alternative of hand milking at organized farms for this purpose. This change in milking environment brought changes in the milking ability of animal. Murrah buffaloes and Sahiwal cows are two main indigenous breeds which contribute significantly to the total milk production of country. Now days, machine milking is commonly employed as an

alternative to hand milking for crossbred animals, however, its suitability remains questionable for indigenous cows and buffaloes. The primary objective of our study is to find out whether machine milking can be safely resorted to in these animals or not, would it have any implications regarding quality or production of milk. The milk yield, led down time, milking time and milk flow rate were significantly influenced by under machine and hand milking environment. Hence our major objective of this study is to compare the milking ability of Sahiwal Cows and Murrah Buffaloes under hand and machine Milking.

MATERIALS & METHODS

Experimental area

The Experiment was conducted at Livestock Research Centre, NDRI, Karnal. Geographically NDRI livestock farm is situated at an altitude of 250 meters above the mean sea level in Indo-Gangatic alluvial plain on 29°42'N latitude and 72°02'E longitude. The climate of farm is subtropical in nature. As far as temperature is concerned, the maximum value above 45°C during summer months; whereas the minimum value fall near the freezing point (0°C) during winter months. The average annual rain fall ranges from 760 to 960 mm.

Experimental design

Thirty lactating Sahiwal cows and thirty lactating Murrah Buffaloes were selected and divided into four equal groups having 15 animals each. 15 animals of each species were subjected to machine milking and 15 animals of each species were subjected to hand milking respectively.

Animal management and hygiene

The animals were maintained in loose housing system. They were offered green fodder *ad libitum* in their paddock and concentrate during milking in the byre. All animals were maintained in standard feeding, management and housing conditions. Machine milking and hand milking was carried out in clean milking byres. The animals were brought and their udder, hind quarters and perineal region were thoroughly washed with clean water and milking procedure by both methods was followed.

Machine milking

Electrically operated floor mounted Alpha Laval combine milker machines were used. The pulsation rate was maintained around 50 per minute and vacuum level 400 mm Hg was maintained.

Hand milking

For hand milking, the milker approached the animal, patted her on back, washed and massaged the teats. When milk was let down, the full hand milking was performed by standard method.

Parameters recorded**Milk let down time**

The milk let down time in case of hand milking was taken as the time gap between the putting of hand on udder for the act of milking and the appearance of milk streams with considerable pace. In case of machine milking as the time gap between the putting of teat cups on udder for the act of milking and the appearance of milk streams with considerable pace

Milking time

In case of machine milking, milking time was measured from the moment the milking machine was fixed to the udder to the moment the last streams of milk were released from the udder till the removal of milking machine. In the case of hand milking, milking time was measured from the moment the milker placed his hands on the udder to begin milking to the moment the last drop of milk was released from the udder.

Milking flow rate

Milking rate was calculated by dividing milk produced (gm) by the time spent on milking including strippings (sec).

MILK YIELD

It is the amount of milk obtained after complete milking. It was weighed on a spring balance and recorded as kilograms.

STATISTICAL ANALYSIS

The means and standard errors of the result of various tests were computed using Analysis of variance and Regression analysis. Statistical procedures and tables were used from Snedecor and Cochran (1967).

RESULTS AND DISCUSSION**Milk letdown time**

Results pertaining to milk let down time of both Sahiwal cow and Murrah buffaloes under hand and machine milking system are presented in Table 1. The overall mean milking letdown time for Murrah buffaloes was 303.32 ± 4.93 seconds and 280 ± 8.10 seconds, whereas the corresponding values of Sahiwal cows were found 241.53 ± 3.07 seconds and

222.49 \pm 2.07 seconds under hand and machine milking respectively. Similarly, milk letdown time was more in Murrah buffaloes than in Sahiwal cows (291.57 \pm 2.81 seconds and 232.01 \pm 2.81 seconds) as found by previous workers (Roy and Nagpal, 1884).

Total milking time

Least square means of milking time are presented in Table 1. The overall mean milking time of Murrah buffaloes was 487.49 \pm 18.72 and 520.78 \pm 18.94 second whereas the corresponding values of Sahiwal cows was observed as 369.37 \pm 12.00 and 363.05 \pm 14.05 second respectively. Milking time was significantly affected between species. The variation among fortnight might have been caused due to several factors, as advancement of stage of lactation, changes in yield as well as changes in environmental stressors. Similar observation have also been reported by Bhagat et al, (1992) and Reddy and Tripathi,(1987).

Milking flow rate

The least square means of milking rate are presented in Table 1. The value of overall milking rate under machine milking was higher than that under hand milking in case of Sahiwal cows (681.06 \pm 42.28 Vs 650.08 \pm 8.9 gm/min). The case was not so in case of buffaloes, in buffaloes overall milking rate under hand milking was higher than that under machine milking (695.68 \pm 67.84 gm/min Vs 624.65 \pm 5.76 gm/min). Our finding indicates that machine milking is more suitable in case of Sahiwal cows. Milking rate varied significantly between species; however, variations between milking systems were non-significant.

Milk yield

The least square means of milk yield have been shown in Table 1. A perusal of data reveals slightly higher overall milk yield in machine milking irrespective of any other factor as the value for buffaloes under hand and machine milking showed milk yield 5.22 \pm 0.22 and 5.43 \pm 0.20 kg respectively. The same values for Sahiwal cows were 3.93 \pm 0.14 as well as 4.04 \pm 0.25 kg. This variation might have been caused due to better stimulation as well as efficient and complete removal of milk in machine milking compared to hand milking.

Conclusion

Machine milking can be resorted to, in case of Murrah buffaloes and Sahiwal cows at organized farms without appreciable adverse effect on milk qualitatively or quantitatively. The more milking rate of cow under machine milking indicates more suitability of Sahiwal cows for machine milking. Milking system influences letdown time.

Table 1. Mean \pm SE of milking ability of Sahiwal Cows and Murrah Buffaloes under hand and machine Milking

Parameters	MURRAH BUFFALO		SAHIWAL COWS	
	Hand milking	Machine milking	Hand milking	Machine milking
Milk led down time(sec)	303.32 \pm 4.93 ^a	280.25 \pm 8.10 ^b	241.53 \pm 3.09 ^c	222.49 \pm 2.07 ^d
Milking time (sec)	487.42 \pm 18.72 ^a	520.73 \pm 18.94 ^b	360.34 \pm 12.11 ^b	363.05 \pm 14.05 ^b
Milk yield (kg)	5.22 \pm 0.22 ^a	5.43 \pm 0.20 ^a	3.93 \pm 0.14 ^b	4.04 \pm 0.26 ^b
Milking rate (gm/min)	695.68 \pm 67.84 ^a	624.65 \pm 5.76 ^a	650.08 \pm 8.19 ^b	681.06 \pm 42.28 ^b

Means with different superscripts a, b and c in row differ significantly (P<0.05)

REFERENCES

- [1] Bhagat, S.S., Shastry, N.S.R. and Yadav, R.S. 1992. Studies on the efficiency of milker in relation to milkability of Murrah buffaloes. *Indian J. Anim. Prod.Mangt.* **8 (4)**: 240—245
- [2] Mishra, R.R., Chauhan, R.S. and Gupta, S.C.1975. Studies of dairy temperament of Karan Swiss cows. *Indian J. Dairy Sci.* (2): 85—88
- [3] Prasad, S. 1994. Studies on body condition scoring and feeding management in relation to production performance of cross bred cows. PhdD. Thesis, NDRI, Karnal, Haryana
- [4] Rahman, S.M., Gill, R.S. and Parmar, O.S. 1998. Effect of dairy temperament and type on milkability of milking Murrah buffaloes. *Indian J. Anim. Sci.* **54**: 566—568
- [5] Rai, D.K. 1997. Studies on certain behavioral patterns in Murrah buffaloes under loose housing system. PhdD. thesis submitted to NDRI, Karnal
- [6] Reddy, A.O. and Tripathi, V.N. 1987. Studies on temperament of Murrah buffaloes. *Indian J. Anim. Prod.Mgmt.* **3 (4)**: 188—192
- [7] Rupp, R. and Boichard, D. 2000. Relationship of early first lactation somatic cell count with risk of subsequent first clinical mastitis. *Livestock Produc. Sci.***62**: 169—180
- [8] Snedecor, G.W. and Cochran, W.G. 1989. *Statistical methods*. 6th Ed., The Iowa State University Press, Ames, Iowa, USA
- [9] Tulloh, N.M. 1961. Behaviour of cattle in yards II. A study of temperament. *Animal behavior*, **9 (1-2)**: 25-30