

STUDY ON FACTORS AFFECTING MILKING TIME IN BUFFALOES UNDER FARMERS' CONDITIONS

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ABSTRACT

Studies conducted on 118 buffaloes belonging to three breeds showed that the overall least square mean for milking time was found 289.85 ± 12.20 seconds. The milking time was influenced significantly ($P < 0.01$) by parity order, stage of lactation, method of milking and time of fodder and concentrate feeding.

INTRODUCTION

One of the important factors that make dairy industry profitable is realizing maximum efficiency in the milk yield/cow/day of life with minimum time required for milking. If it required seven minutes as compared to five minutes per milking, a cow would be involved in the milking operation for additional 20 hours during a 305 day (Rice *et al.*, 1972). Secretion of milk is a continuous process while milk harvesting usually occur twice daily. Thus efficient and rapid removal of milk from the udder should be the goal of every milking programme. In one word the pay off in the dairy farm operation is the harvesting of the milk crop. This investigation was taken up to study the milking time and factors affecting it under farmers' conditions.

MATERIAL AND METHODS

The observations and measurements of 118 buffaloes of three breeds; i.e., Murrah, Nili-Ravi and local, maintained by the farmers were recorded. The buffaloes under the study belonged to different stages of lactation and different parities. These buffaloes were milked twice a day, i.e., morning and evening by hand

milking and the calves were allowed to suckle their mothers. Some buffaloes were without calf. To such buffaloes hand stimulus and oxytocin injection were given for milk letdown. The milking was performed by full hand method and by thumb-in-method using both hands from beginning of milking till the end of stripping. The study group of animals had all four teats functional. All observations were taken in one-and-half month (i.e. from 5th July to 19th August, 1997). Four observations were taken continuously on each buffalo. The data on the milking time were collected for the study.

The time taken from oozing out of the first drop of milk till the removal of last drop of milk is known as actual milking time. The observations were taken with respect to various effects such as breeds of buffaloes, parity order, stage of lactation, shape of teats, buffaloes with or without calf, method of milking, time of fodder and concentrate feeding and shift of milking on the trait milking time and mean value for this was estimated by least square model (Harvey, 1966). The least squares model was used for milk letdown time as given below:

$$X_{ijklmnopqr} = \mu + a_i + b_j + c_k + d_l + e_m + f_n + g_o + h_p + i_q + e_{ijklmnopqr}$$

Where

$X_{ijklmnopqr}$ is the r^{th} observation on buffalo of i^{th} breeds of buffaloes, j^{th} parity, k^{th} stage of lactation, l^{th} shape of teat, m^{th} with or

without calf, n^{th} method of milking o^{th} time of fodder feeding, p^{th} time of concentrate feeding and q^{th} shift of milking.

μ is the overall mean,

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a_i is the effect of i^{th} breed of buffaloes,
 b_j is the effect of j^{th} parity,
 c_k is the effect of k^{th} stage of lactation,
 d_l is the effect of l^{th} shape of teat,
 e_m is the effect of m^{th} with or without calf,
 f_n is the effect of n^{th} method of milking,
 g_o is the effect of o^{th} time of fodder feeding,
 h_p is the effect of p^{th} time of concentrate feeding,
 i_q is the effect of q^{th} shift of milking,
 $e_{ijklmnopqrs}$ the random error assumed to be normally and independently distributed with mean zero and constant variance.

RESULTS AND DISCUSSION

The least square analysis of variance for various factors affecting the trait milk letdown times is presented in Table 1. The overall mean of actual milking time per milking was 289.85 ± 12.20 seconds. The milking time was comparatively higher to those reported by Bhardwaj *et al.* (1987), Bhagat (1988) and Singh (1996), although, it was lower as compared to the reports of Singh (1989) and Kumar (1993) in buffaloes. This might be due to the differences with ease of milking and the skill of milkers between these investigations.

Average milking time ranged from 275.09 ± 12.95 seconds (in case of local buffaloes) to 304.18 ± 16.64 seconds (in case of Nili-Ravi breed). These differences might be due to difference in milk flow rate. Although, the differences were not significant statistically.

The average milking time per milking was highest (309.96 ± 15.86 seconds) during second lactation and lowest (255.57 ± 16.50 second) during third lactation. The differences in milking time between different parities were highly significant. Significant influence of parity on milking time was also noticed by Alim (1983 and 1985), Bhagat (1988) and Kumar (1993). However, Roy and Nagpaul (1985) and Bhardwaj (1987) reported non-significant influence of parity on milking time in Murrah buffaloes. Singh (1996) also reported non-significant influence of parity on milking time

in local buffaloes.

The average milking time during different stages of lactation ranged from 215.30 ± 14.06 seconds (during late stage of lactation) to 334.44 ± 15.90 seconds (during mid stage of lactation). The differences in milking time between different stages of lactation were due to the differences in milk yield during early, mid and late stage of lactation. The differences were statistically highly significant. Similar findings have been noticed by Roy and Nagpaul (1984), Alim (1985) and Bhagat (1988) in Murrah buffaloes and Kumar (1993) in local buffaloes. Whereas Bhardwaj *et al.* (1987) and Singh (1996) reported non-significant effect of stage of lactation on milking time in buffaloes.

The average milking time per milking with different shape of teats varied from 284.71 ± 15.48 seconds (in case of conical shape of teat) to 293.37 ± 16.44 seconds (in case of pear shape of teat). Statistically, the differences were not significant. Kumar (1993) and Singh (1996) also observed non-significant effect of shape of teats on milking time in local buffaloes. However, Bhardwaj *et al.* (1987) and Kumar (1993a) found significant effect of shape of teat on milking time in buffaloes.

The actual milking time was 279.60 ± 12.86 seconds in buffaloes suckled by calf and 300.09 ± 16.02 seconds in buffaloes without calf. Statistically, the differences were not significant. However, Kumar (1993) and Singh (1996) found significant effect of with or without calf on milking time in buffaloes.

The average milking time was higher (320.50 ± 10.14 seconds) in case of thumb-in method of milking in comparison of full hand milking (259.19 ± 20.14 seconds). The method of milking had significant ($P < 0.01$) effect on milking time in buffaloes. Although, Kumar (1993) and Singh (1996) could not find significant effect of method of milking on

Table 1. Least-squares mean of trait milking time

Factors	n	Actual milking time (Seconds)	
		Mean±S.E.	
Overall mean (μ)	472	289.85	12.20
Breed of buffaloes			
Murrah	204	290.27	14.20
Nili-Ravi	80	304.18	16.64
Local (Non-descript)	188	275.09	12.95
Parity			
1	128	296.49 ^b	15.75
2	124	309.49 ^a	15.86
3	104	255.57 ^c	16.50
4 and above	116	297.37 ^b	13.94
Stage of lactation			
Early	236	319.80 ^b	15.37
Mid	104	334.44 ^a	15.90
Late	132	215.30 ^c	14.06
Shape of Teats			
Conical	160	284.71	15.48
Cylindrical	240	291.46	13.45
Pear shaped	72	293.37	16.44
With or without calf			
With calf	320	279.60	12.86
Without calf	152	300.09	16.02
Method of milking			
Full hand	40	259.19 ^b	20.14
Thumb-in	432	320.50 ^a	10.14
Fodder feeding			
Before milking	356	329.05 ^a	11.68
After milking	116	250.64 ^b	15.68
Concentrate feeding			
Before milking	208	315.29 ^a	13.50
After milking	140	308.25 ^b	11.77
During milking	100	312.54 ^{ab}	16.09
Without concentrate feeding	24	223.30 ^c	27.48
Shift of Milking			
Morning	236	289.30	13.20
Evening	236	290.40	13.20

* The means bearing different superscript differ significantly ($P < 0.05$).

milking time in buffaloes.

Average milking time of buffaloes feeding before milking was more (329.05±11.68 seconds) in comparison of buffaloes feeding after milking (i.e. 250.64±15.68 seconds). The difference was statistically significant ($P < 0.01$). The milking time in case of buffaloes fed before milking is higher due to higher milk yield of this group of buffaloes.

The average milking time was ranged

from 223.30±27.48 seconds (in case of buffaloes without concentrate feeding) to 315.29±13.50 seconds (in case of concentrate feeding before milking). The statistical analysis showed that the differences were significant ($P < 0.01$).

The average milking time was slightly higher (290.40±13.20 seconds) during evening shift than morning shift (289.30±13.20 seconds). Shift of milking was not found to have statistically significant

difference in milking time. Similar findings were also reported by Kumar (1993) and Singh (1996). However, Alim (1982) in Egyptian buffaloes, Bhardwaj *et al.* (1987) and Bhagat (1988) in Murrah buffaloes, reported that shift of milking had significant effect on milking time.

An Appraisal of results obtained in the present study indicated that parity order, stage of lactation, method of milking and time of fodder and concentrate feeding significantly affected the milking time of buffaloes in rural conditions.

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