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Milk Production Trend of Milk Vita Throughout the Year

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Abstract: The present research work was undertaken to identify the quality milk production trend of Bangladesh Milk Production Co-operative Union Ltd. (Milk Vita) throughout the year. To achieve the objectives relevant data were collected during the period from January 1995 to December 1999 at different Milk Shed Area (MSA) of Milk Vita. Milk production trend of Baghabarighat and Takerhat MSA was differed significantly ($p < 0.01$) among different months of each year during the experimental period and the average values of milk production of different years (1995-1999) were also differed significantly at 5 and 1% respectively. In Sree-Nagor, Manikgonj, Rangpur and Tangail MSA, milk production of each year differs significantly ($p < 0.01$) and the average milk production values of different years did not differed significantly among different months of each year. From the mean values of five years record it was observed that milk production (TL/day) of Baghabarighat, Takerhat, Sree-Nagor, Manikgonj, Rangpur and Tangail MSA was 53.29, 4.19, 2.19, 2.47, 3.30 and 1.15 respectively. It was also revealed that the highest milk production was in February (10.01%) and lowest in September (6.46%) and milk production gradually increased from September to February which was indicated a specific milk trend throughout the year of Milk Vita. Fat and Solids-not-fat (SNF) production was little highest in December to April in Baghabarighat but same trend was not seen in all MSAs. From this study, it may be concluded that year round milk production of Milk Vita as well as Bangladesh were 9.97, 10.01, 9.20, 8.59, 8.17, 8.37, 7.27, 6.50, 6.46, 6.86, 8.73 and 9.88% respectively.

Key Words: Milk production, milk production trend, milk vita

Introduction

Milk is the first food for the newly born human beings. To serve its purpose it is a food that contains all the nutrients, the newly born requires. Milk production as well as chemical compositional trend is a seasonal operation, depending on the availability of feed, climatic conditions and on tradition (Berg, 1988). Bangladesh is deficit in milk and milk products. Domestic milk production ($1.41 \text{ MMT year}^{-1}$) represents only 12.77% of the actual need ($11.04 \text{ MMT year}^{-1}$). The gap between demand and production is $9.63 \text{ MMT year}^{-1}$ which is met by importing powder milk at the cost of valuable exchange. Bangladesh ranked 12th in the cattle population of the world and 3rd in the Asian countries arena, but it produces only a few portion of world's milk production. Where as India has become the world's largest milk producer, apart from the European Union (EU) and supplies gradually per capita more milk for their people i.e., 160 ml day^{-1} , 164 ml day^{-1} , and 166 ml day^{-1} in 1988, 1989 and 1990 respectively (Sandstad, 1998). Quality milk production trend throughout the lactation period of a cow varies according to breed, feed, stage and number of lactation etc. and there is an inverse relationship observed between milk yield with its fat% mentioned by Banerjee (1995).

Different Milk Shed Areas (MSA) of Milk Vita has presently more than 300 primary milk producing societies. During the period of 1995 to 1999, milk production trend of Milk Vita has increased 12.36% by each year. The member of

the society produces milk as a part of agricultural products like fish, paddy, poultry etc. But actual quality milk production trend of these MSAs as well as Milk Vita throughout the year is still unidentified which is very important for proper flourishment of dairying in Bangladesh indeed. For that reason, the present research was undertaken with the following objectives:

- i To identify the milk production trend throughout the year of Milk Vita for initiating and organizing the prescribed developmental activities routinely.
- ii To study the effect of different months/seasons throughout the year on quality milk production.

Materials and Methods

In this research work data on milk production, values of fat, solids-not-fat (SNF) and total solids (TS) were collected from January 1995 to December 1999 of different MSAs of Milk Vita namely: Baghabarighat, Takerhat, Sree-Nagor, Manikgonj, Rangpur and Tangail.

Milk Shed Area (MSA): Milk Vita has presently 10 MSAs that are placed in the different places of Bangladesh. Among 10 MSAs, 6 MSAs are encountered under this research work. Relevant information regarding type of animals, feeds and fodder situation, cattle population, nature of breeding practices, natural calamities etc. were collected from different MSAs through a consolidated short questionnaire.

Societies and animals: Milk Vita does have presently more than 300 primary milk producing societies. Average number of milking cows per member was 2.06 (Islam, 2000). The average number growth of membership per society was 39% in 1988-89, 52% in 1989-90 and 66% in 1990-91 session and the annual growth rate of membership per society was about 36% in 1989-90 and 26% in 1990-91 (Ali *et al.*, 1996). Breeds of different MSAs were Sahiwal x Local, Sindhi x Local, Sahiwal x Sindhi and Local non-descriptive type and in some instances Holstein Friesian. Feeding and overall management practices of animals were mostly conventional and in some instance more or less innovative. Feeding pattern are mostly straw based and if concentrates are added as a supplementary item they use til oil cake, wheat bran, khesary bran, masturd oil cake etc.

Parameters studied: In the context of Bangladesh we have 4 seasons of the year viz: Monsoon (August-October), Winter (November-January), Spring (February-April) and Summer (May-June). Parameters relevant information was collected from the collection center of different MSAs and by interviewing the randomly selected milk producers from 5 primary societies from each of the MSA. So, the total number of societies and members was 30 and 120 respectively. Four parameters were studied in this experiment.

Milk production: Daily milk production was regularly recorded in a register book of quality control division of different MSAs of Milk Vita. Milk production from 1st to 8th, 9th to 16th, 17th to 24th and 25th to rest of the days of individual month were recorded. The values were calculated to obtain 4 mean values (Replication) for a month. These mean values were further averaged to obtain daily average per month (Treatment) for parameter.

Fat value: Whole milk was collected from the producers through co-operative venture. Mixed milk samples were taken randomly from the reception vat every day after milk collection at morning and evening for determining the chemical qualities of milk. Fat percentage of milk was estimated in Milk Vita by commercial (Gerber) method. Then, that was converted to g/kg. Daily average fat values (g/kg) per month were measured as mentioned in milk production.

Solids-not-fat (SNF) value: This was calculated according to the following formula (Mian, 1986).

$$\text{SNF (\%)} = \text{CLR}/4 + (1.2 \times \text{Fat\%})$$

Raw data of SNF values were assembled by the same way as we did for fat value.

Total Solids (TS) Value: Total solids value of collected

milk sample of different MSAs were collected from the sum of fat value and SNF value and these fat value were averaged by the same way as we did for other parameters.

Design of Experiment: Data obtained for different parameters were analyzed statistically by Completely Randomized Design (CRD) and significant differences among the treatment means were adjusted by Duncan's New Multiple Range Test (Gomez and Gomez, 1984) using MSTAT statistical package program with the help of microcomputer.

Results and Discussions

Milk production: In Baghabarighat MSA highest and lowest milk production took place in December (68.02 TL day⁻¹) and August (41.14 TL day⁻¹) and average production was 53.29 TL day⁻¹ during the period from 1995 to 1999. Milk production of different years of this MSA differ significantly ($p < 0.01$) among different months. Their (5 years) average value was also statistically significant ($p < 0.05$) (Table 1).

In Baghabarighat MSA milk production gradually increases from October, stands pick point on December (Fig. 1) and begin to decrease from January to September. In the same way in respect of all MSAs milk production start to increase sharply from October to December. The milk production trend of Baghabarighat MSA and in respect of all MSAs clearly follows a specific trend. Razzak *et al.* (1995) found a unique relationship of milk production to the availability of feeds and fodder situation of Baghabarighat MSA, which supports of this research work. Variation in production for different months of the year and places might be due to availability of feeds and fodder, eco-environmental conditions and genetic make up of the individuals. Cady *et al.* (1983) also observed the effect of seasons or different months of the year on quality milk production and found that significant effects exist of season on milk production.

Fat value: Fat values of milk at Baghabarighat, Sree-Nagor, Manikgonj, Rangpur and Tangail MSA did not differ significantly but that of Takerhat MSA differs with others significantly ($p < 0.05$) between different months of the year. Highest, lowest and average fat value was observed as 49.50g/kg (January), 47.28g/kg (October) and 48.50g/kg respectively. Two factors may involve for highest fat value in the month of January such as wide abundance of legume fodder and exercise or rearing facilities. But in October, cattle have to keep in confinement rearing due to seasonal flood, which may causes lowering fat value. On the other hand, in Milk Vita overall mean values of fat were found maximum, minimum and average as 45.43g/kg (September), 43.45 g/kg (April) and 44.52g/kg respectively (Table 2). The

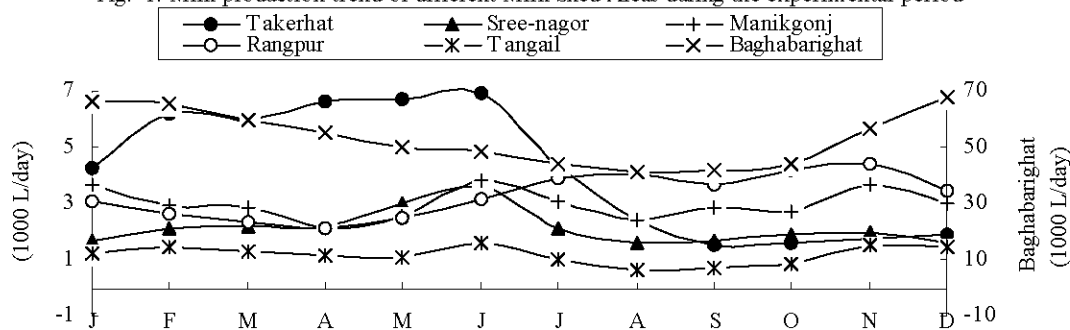
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Table 1: Average milk production day⁻¹ of different milk shed areas during the experimental period

Month	Mean (1000L day ⁻¹)						
	Baghabarighat	Takerhat	Sree-nagor	Manikgonj	Rangpur	Tangail	Mean/MSA
January	66.29 ^{ab}	4.29 ^{bcd}	1.65	3.67	3.06	1.21	13.36
February	65.23 ^{ab}	6.18 ^{ab}	2.11	2.96	2.64	1.44	13.42
March	59.44 ^{abc}	5.94 ^{ab}	2.17	2.83	2.34	1.27	12.33
April	54.96 ^{abc}	6.60 ^{ab}	2.19	2.11	2.09	1.14	11.52
May	49.82 ^{abc}	6.74 ^a	3.02	2.54	2.48	1.09	10.95
June	48.29 ^{bc}	6.91 ^a	3.59	3.80	3.18	1.56	11.22
July	44.07 ^c	4.34 ^{bc}	2.11	3.04	3.90	1.02	9.75
August	41.14 ^c	2.43 ^{cde}	1.58	2.43	4.05	0.60	8.71
September	41.55 ^c	1.54 ^e	1.67	2.83	3.67	0.72	8.66
October	43.93 ^c	1.60 ^e	1.87	2.74	4.18	0.82	9.19
November	56.78 ^{abc}	1.77 ^e	1.99	3.67	4.43	1.55	11.70
December	68.02 ^a	1.92 ^{de}	1.61	3.03	3.48	1.43	13.25
Average	53.29	4.19	2.13	2.97	3.30	1.15	11.17
Level of significance	*	**	NS	NS	NS	NS	NS
LSD	19.66	2.392					

Means with different superscript(s) within the same column differ significantly. *Significant at 5% level of significance. **Significant at 1% level of significance. NS Non-significant. LSD Least significant differences between two means.

Fig. 1: Milk production trend of different Milk Shed Areas during the experimental period



N.B : J,F.....D, indicates the name of different months of the year.

Table 2: Average Fat value day⁻¹ of different milk shed areas during the experimental period

Month	Mean (g/kg day ⁻¹)						
	Baghabarighat	Takerhat	Sree-nagor	Manikgonj	Rangpur	Tangail	Mean/MSA
January	49.5	37.20 ^{cd}	46.0	48.6	40.9	47.3	44.92
February	48.0	36.40 ^{cd}	45.3	48.4	40.5	44.6	43.87
March	48.9	35.40 ^d	44.7	48.3	39.7	44.6	43.60
April	48.6	36.20 ^d	44.4	48.1	39.2	44.2	43.45
May	49.3	37.70 ^{bcd}	44.3	48.1	39.3	46.0	44.12
June	48.9	39.00 ^{abcd}	44.2	47.8	39.8	44.4	44.02
July	48.7	41.00 ^{ab}	45.1	48.9	40.3	44.9	44.82
August	48.4	41.90 ^a	45.2	49.7	40.2	45.7	45.18
September	47.7	41.60 ^a	45.0	50.4	40.0	42.9	45.43
October	47.2	40.90 ^{ab}	45.0	50.2	40.5	46.9	45.12
November	47.5	39.50 ^{abc}	44.9	50.1	41.5	47.3	45.13
December	47.8	38.40 ^{abcd}	45.2	43.3	40.4	48.0	43.85
Average	48.4	38.80	44.9	48.9	40.1	46.0	44.52
Level of significance	NS	*	NS	NS	NS	NS	NS
LSD		0.3638					

Means with different superscript(s) in the same column differ significantly. *Significant at 5% level of significance. NS Non-significant LSD Least significant differences between two means.

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Table 3: Average SNF values day⁻¹ of different milk shed areas during the experimental period

Month	Mean (g/kg day ¹)						
	Baghabarighat	Takerhat	Sree-nagor	Manikgonj	Rangpur	Tangail	Mean/MSA
January	79.0	71.01	76.0	75.5	75.0	74.0	75.09
February	79.2	71.67	76.0	74.6	74.9	73.2	74.93
March	79.0	71.67	76.3	75.1	74.9	73.3	75.05
April	78.6	71.89	76.5	74.8	74.1	73.3	74.87
May	78.6	71.84	77.1	74.7	74.4	73.4	75.01
June	78.7	71.43	76.6	74.5	74.4	73.2	74.81
July	78.8	71.17	75.7	74.1	74.4	73.4	74.60
August	78.5	71.28	75.7	74.8	73.7	74.5	74.75
September	77.6	71.27	76.3	75.0	73.7	74.5	74.73
October	77.7	71.30	76.6	74.6	74.0	74.5	74.78
November	78.7	71.03	76.7	74.3	74.5	73.6	74.81
December	77.3	71.29	76.6	74.3	74.4	74.2	74.68
Average	78.4	71.40	76.3	74.7	74.3	73.8	74.82
Level of significance	NS	NS	NS	NS	NS	NS	NS

LSD

Means with different superscript(s) in the same column differ significantly. ^{NS} Non-significant. ^{LSD}Least significant differences between two means.

Table 4: Average TS values day⁻¹ of different milk shed areas during the experimental period

Month	Mean (g/kg day ¹)						
	Baghabarighat	Takerhat	Sree-nagor	Manikgonj	Rangpur	Tangail	Mean/MSA
January	127.6	107.86 ^{cd}	122.0	123.6	116.0	121.2	119.71
February	127.9	107.91 ^{cd}	121.5	123.2	115.4	117.8	118.95
March	127.8	107.22 ^d	120.9	125.7	114.5	117.9	119.00
April	126.9	108.25 ^{bcd}	121.2	123.0	113.2	117.5	118.34
May	129.5	109.86 ^{abcd}	121.3	122.8	113.6	119.4	119.41
June	128.5	111.04 ^{abcd}	121.3	122.3	114.3	118.3	119.29
July	127.7	112.51 ^{abc}	120.9	123.8	114.6	118.3	119.64
August	126.5	113.42 ^a	121.0	124.5	1136	120.2	119.87
September	126.0	112.97 ^{ab}	121.3	125.3	113.3	122.5	120.23
October	125.2	112.19 ^{abc}	121.7	124.7	114.8	121.4	120.00
November	125.8	110.29 ^{abcd}	121.8	124.1	115.6	120.9	119.75
December	126.5	109.66 ^{abc}	121.8	122.6	115.2	122.2	119.66
Average	127.0	110.27	121.4	123.8	114.5	114.8	119.46
Level of significance	NS	*	NS	NS	NS	NS	NS

LSD

4.854

Means with different superscript(s) in the same column differ significantly. *Significant at 5% level of significance. ^{NS} Non-significant; ^{LSD}Least significant differences between two means.

average fat value during the period of 1995 to 1999 of Milk Vita was within the range of said by Judkins and Keener (1960). Fat production was highest in December to April in Baghabarighat MSA but not seen in other MSAs due to possibilities of adulteration of milk.

Solids-not-Fat (SNF) value: SNF value of Baghabarighat MSA differed significantly ($p < 0.01$) among different months of different years, but their mean value did not differ. The difference between highest and lowest SNF value was 1.98g/kg. This figure is clearly denoting a specific trend of SNF production around the year. SNF production like fat was little highest in December to April

in Baghabarighat but same trend was not seen in other MSAs. On the other hand, in respect of all MSAs highest, lowest and average SNF values were 75.09g/kg (January), 74.60g/kg (July) and 74.82g/kg respectively (Table 3). Variation of SNF value in respect of different months might be due to linearship of fat and SNF; types of feed and fodder availability, breeds etc. Jacobson (1936) and Jack *et al.* (1951) also found the same relationship as we observed in this research.

Total solids (TS) value: Total solids value of Baghabarighat MSA were differed more significantly ($p < 0.01$) between different months but the average value

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of different years were in-significant. In respect of all MSAs highest, lowest and average TS values were 120.23g/kg (September), 118.34g/kg (April) and 119.46g/kg respectively (Table 4). These values were not denoting a specific trend throughout the year. When milk production increases the TS values in general point of view decreases. Azad (1998) reported the TS values of Baghabarighat MSA were between 103.98g/kg to 151.40g/kg, which supports this research output.

Conclusions: From this research work it may be concluded that milk production, fat value and TS value of milk at Milk Vita follows a specific trend of production throughout the year. As per research findings, it was observed that highest milk production took place in February (10.01%) and lowest in September (6.46%) and milk production gradually increases from September to February. It clearly indicates that a specific quality milk production trend exist in Milk Vita around the year. Different MSA's of Milk Vita are placed in different ideal milk potential zones of Bangladesh. Therefore, Milk Vita's quality milk production trend throughout the year is actually presenting the picture of all over the country. The findings of this research may be authentically used for milk procurement budget preparation annually in Milk Vita as well as in Bangladesh in respect of consumer's demand. However, further study covering more potential areas on the same objectives is needed for a firm conclusion.

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