EFFECT OF DRINKING WATER FREQUENCY ON MILK YIELD, FAT, TOTAL SOLIDS AND SOLIDS-NOT-FAT CONTENT IN CROSSBRED COWS

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ABSTRACT

Effect of watering frequency on milk production, milk fat, SNF and TS was studied in crossbred cows. The DM intake was slightly higher in twice-a-day (13.59 kg) watering group. The average milk production was decreased by 16 per cent due to restriction of watering frequency from ad libitum to twice-a-day whereas, increased by 16.53 per cent when watering frequency increased to thrice-a-day. There was no significant effect of watering frequency on SNF and TS content of milk. However it was further observed that thrice-a-day watering was sufficient to maintain the normal SNF and TS content of milk.

INTRODUCTION

The chemical groups which make the gross composition of body are not distributed throughout the various organs and tissues but are more or less localized according to their function. Though the water is essential constituent of the body, feeding standards do not include water requirement for animals. The free access of water to the lactating animals plays an important role in connection with the production of milk. The present study was undertaken to find out the effect of watering frequencies on the milk production in crossbred cows.

MATERIAL AND METHODS

Eighteen crossbred cows were selected for the study and divided in to three groups (T₁, T₂ and T₃) comprising of 6 cows in each group. The experimental cows in group T₁ were allowed to drink water ad libitum, Group T₂ - in the morning at 9.00 hours and evening at 21.00 hours, where as Group T₃ - allowed for three times i.e. 9.00, 15.00 and 21.00 hours. The experimental lactating crossbred cows were fed with known quantity of chaffed green maize and wheat straws twice daily and leftover were measured and recorded after 24 hours, whereas amount of concentrate mixture was based on milk production of individual cow. All experimental lactating crossbred cows were kept under shed with asbestos roofing and sides open. Daily milk yield obtained from individual crossbred cows were recorded separately for morning and evening milking. The milk fat per cent was estimated as per the procedure, recommended in I.S.: 1479 Part 2 of Indian Standard Institute (By Gerber’s method ISI 1958). Total solids were estimated by gravimetric method recommended by ISI. The percentage of solid-not-fat was estimated by difference in fat percentage and the total solids. During the experiment (15th March to 15th May 2000) the mean ambient temperature inside the barns at 8.30, 14.30 and 19.00 hours of the day was 28.48, 39.44 and 37.72°C respectively. However, the relative humidity levels were 30.67 and 35.44 per cent at 8.30 and 19.00 hours respectively. The data was analyzed as per procedure recommended by Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

The average water intake by crossbred cows (Table 1) was significantly (P< 0.01) influenced by the frequencies of watering. The average water intake was significantly more in Group-T₃ (65.16 lit/day) as compared to group T₁ and T₂. The average water intake was less by 16 per cent in group T₂ and 3 per cent in group T₁ as compared to group T₃. The present finding are in agreement with the findings
Table 1. Effect of watering frequencies on feed intake and milk production in crossbred cows

<table>
<thead>
<tr>
<th>Watering frequency/ Feed intake and milk production</th>
<th>Ad'libitum (T₁)</th>
<th>Twice-a-day (T₂)</th>
<th>Thrice-a-day (T₃)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial milk yield (lit./day)</td>
<td>3.54</td>
<td>3.33</td>
<td>3.95</td>
</tr>
<tr>
<td>Water intake (lit./day)</td>
<td>62.89±1.16</td>
<td>54.68±6.42</td>
<td>65.16±1.23</td>
</tr>
<tr>
<td>Milk yield after treatment (lit/day)</td>
<td>3.81</td>
<td>3.16</td>
<td>4.44</td>
</tr>
<tr>
<td>Total feed intake (kg)</td>
<td>31.83±0.32</td>
<td>32.83±0.12</td>
<td>31.62±0.21</td>
</tr>
<tr>
<td>Dry matter intake (kg)</td>
<td>13.30±0.15</td>
<td>13.59±0.09</td>
<td>13.24±0.13</td>
</tr>
<tr>
<td>Dry matter through roughages (kg)</td>
<td>9.90±0.10</td>
<td>10.20±0.01</td>
<td>9.72±0.03</td>
</tr>
<tr>
<td>Dry matter through concentrates (kg)</td>
<td>3.40±0.04</td>
<td>3.40±0.04</td>
<td>3.51±0.09</td>
</tr>
<tr>
<td>Average Fat (%)</td>
<td>3.99±0.010</td>
<td>3.88±0.012</td>
<td>3.98±0.013</td>
</tr>
<tr>
<td>Average SNF(%)</td>
<td>9.04±0.015</td>
<td>9.07±0.009</td>
<td>9.04±0.009</td>
</tr>
<tr>
<td>Average TS(%)</td>
<td>13.03±0.021</td>
<td>12.96±0.020</td>
<td>13.03±0.018</td>
</tr>
</tbody>
</table>

Common superscripts in different rows indicates non significant difference between different treatments.

reported by Pode (1980). More intake of water in ad'libitum watering group (T₁) and comparatively lower water intake in twice-a­day (T₂) watering group were in agreement with the findings reported by Canon (1944) and Wieclaw et al. (1973).

The mean DM intake through roughages and concentrates was 9.90, 10.20, 9.72 kg and 3.40, 3.40, 3.51 kg in Groups T₁, T₂ and T₃ respectively. It was observed the mean DM intake through roughages was higher in Group T₂ whereas through concentrates, it was higher in Group T₃. The present study indicated that, the watering frequency did not influence the DM intake in cows. Similar observations were recorded by Mishra et al. (1963) and Payne and Hancock (1966). However, Phillips (1960), Thorntan and Yates (1969) and Mehta and Ludri (1976) reported that there was decline in DM intake due to water restriction.

The average daily milk yield was significantly (P<0.01) highest in group T₃ (4.44 lit/day). It was observed that the average milk yield was decreased by 16 per cent due to the restricting of watering frequencies from ad’libitum (T₁) to twice-a-day (T₂). Whereas the milk production was increased by 16.53 per cent when frequency was increased to thrice-a-day (T₃). From the present trend it was observed that the daily milk yield was related linearly to water consumption (Holtre and Urvan 1992, Murphy 1992 and Pode 1980).

On an average daily fat per cent of milk was 3.99, 3.88, 3.98 in Group T₁, T₂ and T₃ respectively. The similar trend was observed by Canon (1944) and MacEwan and Graham (1955), where more fat per cent in milk was noticed on ad'libitum watering over twice-a-day watering. However, the findings reported by of Pode (1980) does not agree with the present trend.

There was no significant difference in solids-not-fat content of milk due to frequency of watering. The average daily SNF content of milk was 9.04, 9.07 and 9.04 per cent in Group T₁, T₂ and T₃ respectively. The present values are in agreement with the observation of Singh and Chopra (1998). The total solids content due to frequencies of watering showed significant difference (P<0.05) between T₁, T₂ and T₃. The present trend was similar to trend reported by Little et al. (1976) and Singh and Chopra (1998). However Pal et al. (1975) reported that the restriction of watering to once or twice a day increased the total solids content of milk by 7.5 per cent which are contradictory to present observations.

CONCLUSION
The effect of watering frequency on milk quantity and quality viz., per day
production, Fat, SNF and TS per cent revealed therefore suggested that thrice-a-day watering that these could be adversely affected when watering frequency were restricted to twice a day. On the other hand provision of ad libitum watering, to animals did not give additional advantage over thrice-a-day watering. It is

REFERENCES


