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DRY MATTER AND WATER INTAKE IN LACTATING MURRAH BUFFALOES

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ABSTRACT

The study was conducted on 18 lactating Murrah buffaloes to know the effect of different regime of watering on water intake and dry matter intake(DMI). The different regime of watering were as group-I *ad lib* watering, group-II, watering before 1hr of milking, group-III, watering after 1 hr of milking and group-IV, watering before and after 1hr of milking. The overall DMI (kg/day/animal) for the experimental group was 12.22± 0.06 12.15±0.06, 11.73±0.06 and11.30±0.06 in group IV II, III & I respectively. The statistically the overall DMI significantly (P<0.01) varies among the group. The water intake were 46.0±0.57, 52.0±0.65, 49.7±0.56 and 53.0±0.62 in the groups I, II, III and IV respectively. Overall water intake (lit/day) varies significantly (P<0.01) among the groups. The concentration of sodium in the group III has a significantly higher sodium concentration as compare to group I & IV but group III did not differ from group II. The data of potassium concentration revealed that all the treatment group did not differ significantly. The hematological parameters like RBC & PCV also not significantly varies among the groups.

Key words: Lactating murrah buffaloes, water intake, dry matter intake

Water is second in importance only to oxygen to sustain life and performance of dairy animal. To obtain the better performance of animal it is necessary that the animal health, performance and welfare status should be optimum for which water is most essential nutrient like other nutrients such as protein, carbohydrate, fat etc. The concentration of water in buffalo milk is about 84%. Milking dairy cows consume 4 to 5 kg water per litre of milk they produce. of this amount, drinking water provides 70 to 90% of these needs with the remainder coming from moisture found in feeds and metabolic water generated by body itself. The water intake of the animal has positive correlation between feed intake and milk yield. In Indian condition generally the animals are milked in the morning and then are allowed to drink the water. Similarly, in the evening time after grazing, watering is done before milking and animal is tied for over night. This overnight deprivation of water may affect the milk yield and DMI.In view of the above facts, the present study was undertaken to assess the effect of different regime of watering on water intake and dry matter intake (DMI) in lactating murrah buffaloes.

MATERIALS AND METHODS

The study was conducted on twenty four lactating Murrah buffaloes maintained at livestock farm, Adhartal College of Veterinary Science and

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Animal Husbandry, NDVSU Jabalpur (M.P.). The recently calved (15- 45 days) buffaloes having similar range of body weight were selected and grouped based on parity and milk yield to maintain homogeneity among experimental animal in each group, based on this grouping there were six animals in each group.

The experimental lactating Murrah buffaloes were fed with known quantity of chaffed green berseem and wheat straw in the morning daily and leftover were measured. Amount of concentrate mixture was given on the basis of body weight and milk production of individual buffalo as per ICAR norms. All experimental animals were kept under similar managemental condition. The different regime of watering were, Group-I animal was provided *ad lib* water. Group-II animal was provided water 1hr before milking , Group-III animal was provided water 1hr after milking and Group-IV animal was provided water both 1hr before and after milking

Water intake and Dry matter intake of experimental animals

Measured quantity of water offered to the animal and left over was measured to find out actual intake of water. The intake of chaffed green feed, wheat straw and concentrate were recorded daily by subtracting the amount of left over from the quantity offered. The samples of feed offered were subjected to overnight drying in oven for determination of dry matter intake. The values thus obtained were used in the computing dry matter intake in lactating Murrah Buffalo.

Biochemical and Hematological parameter

Sodium and Potassium was analyzed by using flame photometer. 2 ml whole blood was collected in EDTA coated glass vial for estimation of RBC(10^6/µl) and PCV(%) using auto blood analyzer.

Statistical analysis:

The obtained **d**ata were analyzed by using the method described by [12].

RESULTS AND DISCUSSION

Average daily water intake:

Average daily water intake at monthly interval of the animals were depicted in table 1. Result revealed that the maximum water consumption was in group IV (53.00±0.62Kg/day) where water is allowed both before and after milking followed by group II (52 ± 0.65Kg/day) when the watering was done 1 hr. before milking. (Table 1)

Statistical analysis revealed that the water intake in different group was differed significantly ($p<0.01$) among the treatment groups. (Table 1). Our findings are in agreement with others [10]. Contrary to this[11]reported the higher water intake than the present investigation.

Earlier researcher[1] reported 3lb drinking water/ lb of milk and 4 to 5 lb of water intake/lb of DMI as a thumb rule which is just enough to determine water intake.

Daily dry matter intake

The DMI of buffaloes has directly influenced by their water intake.The Table 2 revealed the maximum DMI was 12.22± 0.06 kg/animal/day in group IV followed by 12.15±0.06, 11.73±0.06 and 11.30±0.06 in group II, III & I respectively. On statistical analysis the group III and IV did not differ significantly where as the group I differed significantly from group II, III and IV where the animal receive *ad lib* water but the DMI consumption is lower. Whereas the highest DMI was observed in group-IV where watering was done just before and after milking followed by group-II where watering was done 1 hrs before milking.

Some other workers[4] noted that the average daily intake of drinking water and DMI 75.4 lit/day and 16.9 kg/day respectively for animal producing 13.7 kg milk/day.

Researchers[14] reported that watering frequency did not influence the DM intake in cows. In our study also a weak correlation was noticed between DMI and water intake. (Table 3)

Some researchers[9] recorded more or less similar DMI when fed with leguminous crop and non leguminous crop respectively, as compared to present finding in Murrah buffalo and the values were 11.22 and 10.84 kg/day.contrary to this, higher DMI in lactating Murrah buffaloes were obtain ie.13.96, 14.48 and 14.03 kg/day when given and 10 and 20% higher DCP in the experiment as compared to ICAR norms[11].

Correlation between water intake, dry matter intake and milk yield

To investigate the relationship between water intakes, DMI and milk yield studies were done in which water intake was restricted and milk yield and DMI were measured. There are scarcity of published literature regarding the relationship between water intake, feed intake and milk yield.

Correlation among milk yield, water intake and dry matter intake are depicted in Table 3. The DMI and milk yield were significantly correlated. Whereas the correlation between DMI and water intake and milk yield and water intake were weekly correlated. Earlier workers while studying the repeated measures traits in cow such as daily milk yield and DMI concluded that these repeated measures are moderately autocorrelated[13]. This is in accordance to the earlier findings[6,7].

In contrary to this, earlier workers observed that the average milk yield, water intake and DMI were 24.9, 84.3 and 20.3 kg respectively[5]. They also observed correlation after applying fixed regression model between milk yield and water and dry matter intake and between water and dry matter intake were 0.73, 0.59 and 0.73. This was in agreement earlier findings[15].

Biochemical and Hematological parameters

Electrolytes like sodium and potassium play a major role in the activity of the body. Sodium plays an important role in maintenance of body water and osmotic pressure. Serum potassium concentration does not always effect potassium balance but is influenced by factors that alter internal balance as well as factors that change external balance. Therefore the concentration of sodium and potassium were estimated and presented in table 4. The concentration of sodium were 140.78, 144.28, 146.78 and 135.33(meq/l) in group I, II, III and IV respectively. The data stated that the group III has a significantly ($P<0.01$) higher sodium concentration as compared to group I and IV but group III did not differed from group II. (Table 4).

The data of Potassium (meq/l) was analyzed in different treatment groups and presented in Table 4 . The data of potassium concentration revealed that all the treatment group did not differed significantly.

Workers while studying the effect of reduced water intake in lactating dairy cows found that in the restricted group there were significant increase in the concentration of sodium in serum[8]. Whereas seasonal variation was observed in potassium concentration in different indigenous and cross bred cattle[3].

The effect of different regime of water intake on PCV (%) in blood in lactating Murrah buffaloes was shown in Table 4. The results revealed that the overall PCV (%) in group-III was 37.00±1.38. however in group-IV mean value of PCV% was 34.8±1.36. On statistical analysis there was no significant difference between the treatment groups.

The RBC count in blood is depicted in table 4, from the study, it is clear that the different regime of watering did not effect significantly in RBC count. However during experimental period a consistence increase in the RBC count was observed during different month of study.

The RBC count observed during experiment in different groups of lactating Murrah buffaloes fall under similar range as reported by earlier workers[2]. Moreover similar findings were also reported with 50% more voluntary intake of water in treatment group as compare to control group[8].

Table 1. Effect of different regime of watering on water intake (liter/animal/day) in lactating murrah buffalo

Months / Groups	1	2	3	Overall
I	41.30±0.66	43.00±0.81	54.40±1.20	46.00^{a}±0.57
II	44.20±0.79	49.40±0.97	63.6±1.09	52.00^{b}±0.65
III	45.90±0.61	47.20±0.93	56.7±1.15	49.70^{c}±0.56
IV	46.60±0.65	48.6±0.88	65.00±1.12	53.00^{d}±0.62

Means bearing different superscript differ significantly (P<0.01)

Table 2. Effect of different regime of watering on dry matter intake (kg/animal/day) in lactating Murrah buffalo

Months / Groups	1	2	3	Overall
I	11.73±0.11	10.96±0.12	10.82±0.11	11.30^{a}±0.06
II	12.52±0.12	12.02±0.12	11.89±0.11	12.15^{b}±0.06
III	12.33±0.89	11.53±0.11	11.30±0.09	11.73^{c}±0.06
IV	12.59±0.11	12.07±0.11	11.97±0.11	12.22^{c}±0.06

Means bearing different superscript differ significantly (P<0.01)

Table 3. Correlation between dry matter intake, water intake and milk yield

	Dry matter intake	Milk yield	Water intake
Dry matter intake	1		
Milk Yield	0.42	1	
Water intake	0.06	0.04	1

Table 4: Effect of different regime of watering on some biochemical and hematological parameter in lactating Murrha buffalo

Group No. / Parameter	Group I	Group II	Group III	Group IV
Sodium (meq/l)	140.78^{b}±1.18	144.67^{a}±1.48	146.78^{a}±0.90	135.33^{c}±0.77
Potassium (meq/l)	4.55±0.12	4.65±0.09	4.55±0.13	4.62±0.11
PCV (%)	35.80±0.86	35.10±1.32	37.00±1.38	34.80±1.36
RBC (million/µml)	6.88±0.23	6.69±0.25	6.90±17.5	6.78±0.19

Means bearing different superscript differ significantly (P<0.01)

CONCLUSION

The watering of animal before one hour of milking has the positive correlation between the feed intake and milk yield of the animal. The different regime of watering did not affect concentration of RBC and PCV percentage of the blood.

REFERENCES

1. Beede, D. K. 2006. What will our ruminants drink, *Animal Frontier*, **2**(2): 36-43.
2. Jain, A. 2007. Assessment of Immunocompetence of buffalo and cow calves and role of neem oil as immunomodulater. M.V.Sc. Thesis, J.N.K.V.V., Jabalpur
3. Jain, A., Pathak, R. K. and Jain, P. K. 2003. Effect of mineral supplementation on -fertility of crossbred cows. Indian veterinary medicine of journal. **27**: 259-260.
4. Kabuga, J. D. and Alhasson, W. S. 1983. Water and feed intake of Canadian HF cow in Ghana, *Trop Animal Health production*, **15**(4): 239-244.
5. Kramer, E., Stamer, E., Spilke, J. Thaller, G. and Krieter, J. 2008. Analysis of water intake and dry matter intake using different lactation curve models .*American Dairy Science Association,* 92:4072-4081.
6. Little, R. C., Henry, P.R. and Ammerman, C. B. 1998. Statistical analysis of repeated measures data using SAS procedures. *Journal of Animal Science*, **76**: 1216-1231.
7. Little, R. C., Milliken, G. A., Stroup, W.W., Wolfinger, R. D. and Schabenberger, O. (2006). SAS for mixed models, users manual. SAS Inc., Cary, NC, USA, pp. 174-203.
8. Little, W., Collis, K. A., Gleed, P.T., Sansom, B. F., Allen, W. M. and Quick, A. J. 1980. Effect of reduced water intake by lactating dairy cow on behavior, milk yield and blood composition. Veterinary. Rec., 106: 547-551.
9. Roy, B., Mehta, R. K. and Sirohi, S.K. 2005. Effect of dietary feeding regimens on urea and protein concentration of milk in Murrah bufflaoes, *Asian-Australian Journal of Animal Science*, **18** (7): 973-979.
10. Sebastian, L., Mudgal,V. D. and Nair, P. G. 1970. Comparative study of milk production by Sahiwal Cattle and Murrah Buffalo. *Journal of Animal Science*, **30**:253-256.
11. Sharma, S. 2008. Effect of feeding different level of protein on milk and blood urea concentration in lactating Murrah buffalo. M.V.Sc. thesis, J.N.K.V.V., Jabalpur.
12. Snedecor, G. W. and Cochran, W. G. 1994. Statistical Methods, 7th Edn., Oxford and IBH Publishing co., New Delhi.
13. Stamer, E. 1995. Futteraufnahmeverhalten von Milchkühen – Analyse der Zeitstruktur und Nutzungsmöglichkeiten. Schriftenreihe des Institutes für Tierzucht und Tierhaltung derChristian-Albrechts-Universität zu Kiel, Band 85.
14. Thokal , M. R., Patil, V. C. and Udar, S. A.(2004). Effect of drinking water frequency on milk yield,fat, total solids and souds-not-fat content in crossbred cows. *Indian Journal of Animal Research*, **38** (1): 47- 49.
15. Veerkemp, R. F. and Thompson, R. 1999. A covariance function for feed intake, live weight and milk yield estimated using a random regression model. *Journal Dairy Science*. **82**: 1565-1573.

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