



The Effect of Dry Period Length on Average Milk Yield in Early Lactation Period in Anatolian Buffaloes

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Abstract

This study aimed to investigate the effect of short and long dry period on milk yield in next early lactation period in Anatolian buffalo. The buffaloes (n=64) were assigned to three groups as a short dry period (Group SD; n=17; ≤6 weeks), a normal dry period (Group ND; n=20; 8-10 weeks) and a long dry period (Group LD; n=27; ≥12 weeks). Early lactation milk yields and lactation numbers of all groups were compared statistically. It was observed that there was no difference between SD, ND and LD groups in terms of lactation numbers (p >0.05). The milk yield in the early lactation was lower in the SD group compared to the other groups (p <0.05). There was no difference in milk yield in the early lactation period of the ND and LD groups (p >0.05). However, it was found that the milk yields of the ND and LD groups were similar in the early lactation period. In conclusion, short dry period had a negative effect on milk yield in early lactation period in Anatolian buffaloes. On the other hand, animals with normal and long dry periods had a similar milk yield. However, we think that milk yield should be followed throughout all lactation period for a more precise result.

Key Words: Buffalo, dry period, lactation, milk yield

Mandalarda Kuru Dönem Uzunluğunun Erken Laktasyon Döneminde Ortalama Süt Verimi Üzerine Etkisi

Öz

Bu çalışma, Anadolu mandalarında kısa ve uzun kuru dönem sürelerinin sonraki erken laktasyon dönemindeki süt verimine etkisini araştırmayı amaçladı. Mandalar (n=64) kısa kuru dönem (Grup SD; n=17; ≤6 hafta), normal kuru dönem (Grup ND; n=20; 8-10 hafta) ve uzun kuru dönem (Grup LD; n=27; ≥12 hafta) olarak üç gruba ayrıldı. Tüm grupların erken laktasyon süt verimleri ve laktasyon sayıları istatistiksel olarak kıyaslandı. Laktasyon sayıları açısından SD, ND ve LD grupları arasında bir fark yoktu (p>0.05). Erken laktasyon dönemindeki süt verimi diğer gruplara göre SD grubunda daha düşüktü (p <0.05). Ancak, ND ve LD gruplarının erken laktasyon dönemindeki süt verimlerinin benzer olduğu bulundu (p>0.05). Sonuç olarak, Anadolu mandalarında erken laktasyon döneminde kısa kuru dönem süt verimini olumsuz yönde etkiledi. Öte yandan, normal ve uzun kuru dönem uzunluklarına sahip olan hayvanlar benzer bir süt verimine sahipti. Ancak, daha kesin bir sonuç için süt veriminin tüm laktasyon dönemi boyunca takip edilmesi gerektiği düşünülmektedir.

Anahtar Kelimeler: Kuru dönem, laktasyon, manda, süt verimi

INTRODUCTION

A previous study stated that the world water buffalo population is about 206 million heads in 2018, of which 97.57% are bred in Asia (1). In addition, the buffalo population in Turkey is expressed as 0.04% of the global buffalo population (2). On the other hand, Turkey is among the countries that produce the most buffalo milk in Europe (3). The buffaloes have a very important role in the agricultural economies of developing countries (4) Furthermore, buffaloes are known as animals with high adaptability to different environmental conditions and resistance to diseases (2,5). They are bred especially for milk production (5), and it is also known that buffalo milk is the most produced milk worldwide after cow milk (6). It is also known that buffalo milk is an indispensable food source in the world, and although it is used by converting

into many products, it is mainly used in cheese making, especially in Italy (3). Buffalo milk has a higher ratio than cow milk in terms of nutritional parameters such as dry matter, protein, casein, fat, lactose, energy, some vitamins (6), calcium and phosphorous (7). On the other hand, buffalo milk is known for its lower cholesterol, sodium and potassium content than cow's milk (7). Therefore, the demand for buffalo milk is increasing day by day, but current buffalo milk production cannot meet this demand. In buffaloes, a number of management strategies are carried out to increase milk production or to keep it at an optimum level. Hussain et al. (8) reported that many factors such as lactation number, first calving age, animal breed, feeding, management, climate and health status can affect milk yield in buffaloes. In

addition, the previous studies have stated that the dry period length can affect the milk yield in the subsequent lactation in cows (9-11). The dry period is defined as the lactation-free stage before parturition in dairy cows (12), and it is necessary for the regeneration of the mammary gland, its preparation for milk production in the next lactation and to provide milk production suitable for their genetic capacities (13). Traditional length of the dry period has been reported to be approximately 8 weeks in dairy cows (14), but its length may vary depending on management strategies and other variables (15-17). On the other hand, it is stated that the length of the dry period may have different effects on milk yield during the next lactation period in buffaloes (16,17) and dairy cows (18).

This study hypothesized that the length of the dry period in buffaloes, similar to that in cows, may affect milk yield in the next lactation. Thus, the present study aimed to investigate the effect of short and long dry period on milk yield in next early lactation period in Anatolian buffalo.

MATERIAL AND METHODS

Ethical Statement

The present study was approved by Cukurova University Ceyhan Veterinary Faculty (Adana, Turkey) Local Ethics Committee, Adana, Turkey (approval number: 05/01 and 08.08.2022).

Animal and Study Design

The present study was conducted on 64 multiparous female Anatolian buffalo in small-scale commercial farms in Osmaniye province, Turkey. The animals included in the study had similar characteristics in terms of age, number of lactations and body condition, and were generally managed under the same conditions. Dry period and subsequent early lactation milk yield information of the animals were obtained from the owners. Animals whose dry period length and milk yield information are not known exactly were not included in the

study. According to the information obtained from the animal owners. All animals entered the dry period spontaneously. In addition, no treatment such as dry period treatment was performed and all animals were clinically healthy. Then buffaloes with different dry period lengths were assigned to three groups as a short dry period (Group SD; n= 17), a normal dry period (Group ND; n= 20) and a long dry period (Group LD; n= 27) as described below.

- Group SD: Buffaloes with a dry period length of 6 weeks or less
- Group ND: Buffaloes with a dry period length of approximately 8-10 weeks
- Group LD: Buffaloes with a dry period length of approximately 12 weeks or longer

Early lactation definition was done as previously stated (19), and the milk yields of buffaloes in the early lactation period were recorded as the average daily milk yield (L/day).

Statistical Analysis

Lactation numbers and milk yield of all groups were analyzed statistically with SPSS package program (IBM; version 24; USA). Statistical analyzes were done with the parametric One-way analysis of variance (ANOVA). Multiple comparisons were performed with post hoc Tukey and $p < 0.05$ considered as significant. Obtained results were given as mean \pm standard deviation (mean \pm SD).

RESULTS

Lactation numbers and milk yields were statistically compared in all groups. It was observed that there was no difference between SD, ND and LD groups in terms of lactation numbers ($p > 0.05$). It was determined that milk yield in the early lactation was lower in the SD group compared to the other groups ($p < 0.05$). However, it was found that the milk yields of the ND and LD groups were similar in the early lactation period ($p > 0.05$). Statistical results of lactation numbers and milk yields in all groups are detailed in Table 1.

Table 1. Obtained lactation numbers and milk yield results in SD, ND and LD groups

	Group SD (n=17) (mean \pm SD)	Group ND (n=20) (mean \pm SD)	Group LD (n=27) (mean \pm SD)	P value
Average milk yield (L/day)	8.15 \pm 0.63 ^a	8.83 \pm 0.94 ^b	8.96 \pm 0.84 ^b	^{a-b} $p < 0.05$
Lactation number	4.35 \pm 1.97 ^a	4.25 \pm 2.10 ^a	4.41 \pm 1.80 ^a	$p > 0.05$

Different lower-case letters (a, b): in the same line indicate the statistical difference between measurements ($p < 0.05$).

SD: Short dry period, ND: Normal dry period, LD: Long dry period.

DISCUSSION AND CONCLUSION

The presented study evaluated the relationship between different lengths of dry periods and average milk yields in early lactation period in Anatolian buffaloes. For this purpose, early lactation milk production records of animals with short, normal and long dry periods were examined. In this study, the dry period lengths were not created experimentally, the animals entered the dry period spontaneously at different times and all information used in the study was obtained from previous records of animals through their owners.

Dry period is a management strategy used to optimize milk yield in farm animals such as cow (18,20) and buffalo (21). Similarly, previous studies have reported that cows need a dry period for an ideal milk yield in the subsequent lactation period (15,18). In addition, the dry period has a relationship with udder health and milk composition (15). However, the dry period can be applied in different lengths (15,16). It has been reported that the normal length of the dry period is considered to be approximately 60 days in dairy cows (20,22), and similarly, it is stated that the traditional dry period length in buffaloes is approximately 60 days (60

or > 60d) (16). On the other hand, it is known that the application of the dry period in different lengths has some advantages and disadvantages in buffaloes (16,23). When this situation was examined in terms of milk yield, previous studies mentioned that the short dry period reduced milk yield in the next lactation in cows (17,24).

In the presented study, it was observed that milk yield decreased during the early lactation period in the SD group compared to the other groups. We think that this could be due to the incomplete regeneration of the udder alveolar cells of the buffaloes in the SD group. As known from a previous report, a dry period of approximately 60 days is required for the complete regeneration of mammary alveolar cells in cows and require complete regeneration of udder alveolar cells during the dry period for maximum milk yield in the next lactation (15). On the other hand, we observed that there was no difference between the ND and LD groups in terms of milk yield. Therefore, in this study, it is understood that the most ideal dry period length in terms of milk yield is in the ND group. Karthik et al. (25) reported that the most ideal dry period longer than 60 days is required for an ideal milk yield in buffaloes. It was also informed that a short dry period can provide additional milk as it prolongs the current lactation period (17). Although this situation can be evaluated as an advantage according to the long or normal dry period, more milk loss may occur in the next lactation due to the lack of regeneration of alveolar cells. In addition, considering udder health, colostrum quality and milk components, we think that the short dry period will not be an advantage. At the same time, we think that total milk yield during lactation should be evaluated in order to clearly determine the effect of dry period length on milk yield. In this study, we were able to compare early lactation because milk yield records were insufficient in the mid and late lactation period and animal owners reported that the milk yield of animals decreased significantly after early lactation. In addition, a previous study has shown that dry period and lactation lengths are very variable in Murrah buffaloes (21). Similarly, in the presented study, lactation and dry period lengths were highly variable, as dry period entries were often spontaneous and not under breeder control.

On the other hand, it is known that in addition to the dry period length (17), many different parameters such as lactation number, season and management can affect milk yield in buffaloes (8). Similarly, a previous study reported that the number of lactations can affect milk yield in Holstein dairy cows (26). Therefore, in the presented study, buffaloes with similar lactation numbers were used to eliminate the effect of lactation between groups, and the study was also conducted on animals managed in similar conditions during the same season.

In conclusion, the present study evaluated the relationship between different dry period lengths and average milk yield (L/day) in the early lactation period in Anatolian buffaloes. Short dry period had a negative effect on milk yield in early lactation period in Anatolian buffaloes. However, it was observed that animals with normal and long dry periods had a similar milk yield. However, we think that milk yi-

eld should be followed throughout lactation for a more precise result. Thus, we think that it will be more useful to determine the milk curve during the early, middle and late lactation periods in future studies. However, before the study is planned, it should be taken into account that the entry of buffaloes into the dry period may be spontaneous and therefore the length of the dry period may be very variable.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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