



## Short Communication

# Comparative Performance of Jersey Sired Calves from Achai Dams and Azakheli Buffalo Calves Fed with Milk Replacer

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## ABSTRACT

Eight Jersey sired calves from Achai dams (AJC) and eleven Azakheli buffalo calves (ABC) were reared on milk replacer to compare their growth performance and economics. The experiment was performed at Livestock Research and Development Station (LR&DS), Surezai, Peshawar for a period of 12 weeks. The calves were fed with milk replacer (10% of their live body weight) in two equal doses, one in the morning followed by an evening dose, until the end of 8<sup>th</sup> week. The average birth weight of AJC was 15.75±2.43 kg; while, it was 28.18±0.87 kg for ABC calves. The average weaning weight was 43.56±4.3 kg and 56.5±2.75 kg for AJC and ABC calves, respectively. Whereas, the average weight gains in AJC and ABC calves was 0.331 kg/d and 0.337 kg/d, respectively. Average milk replacer consumed by AJC and ABC was 152.33 L/calf and 225.53 L/calf, respectively. Thus, the milk conversion ratio in ABC calves was significantly higher ( $p<0.01$ ) than the AJC with 7.99 milk conversion ratio in ABC as compared to 5.49 for AJC calves. Additionally, the cost of production was Rs.406.68/kg and Rs.591.32/kg for AJC and ABC, respectively. This study concludes that AJC calves performed better on milk replacer than ABC.

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### Authors' Contributions

AHKK, MNI and MI designed and conceived the experiments. AHKK, MNI, IAS, SG and ZH performed the experiment. MSK and AA performed the analysis. AHKK and TA wrote the manuscript. TA and MFH critically reviewed and revised the manuscript.

### Key words

Growth performance, Jersey sired calves from Achai dams, Azakheli buffalo calves, Milk replacer.

Livestock has an important and crucial role in national economy and rural socio-economic development. Nearly eight million families are involved in livestock raising, deriving more than 35% income from livestock production activities. Pakistan has a population of 44.4 and 37.7 Mil heads of cows and buffaloes, respectively. Gross milk production from cows and buffaloes is 20,143,000 and 34,122,000 tones, respectively (Anonymous, 2017). Milk has always been a precious commodity for farmers as they earn their livelihood from milk sales. Therefore, farmers could hardly afford to feed milk to calves. Due to high expenses during pre-weaning age, farmers allow very limited milk and colostrum feeding to calves which does not meet the nutrients demand of calf body and leads towards high mortality rate and poor growth rate. The pre-weaning

feeding cost of buffalo calves under conventional systems in Pakistan most often exceeds the market price available for weaned calves (Bhatti *et al.*, 2009). Composition, quantity and feeding method of milk replacer (MR) to neonatal calves have shown effects on their performance, behavior, health, and welfare traits (Brown *et al.*, 2005; Khan *et al.*, 2007a, b). Restricted milk or MR feeding to calves generally depresses their growth (Khan *et al.*, 2007a), health and behavior (Huzzey *et al.*, 2005) because of poor nutrients supply (Khan *et al.*, 2007b). Whereas, *ad libitum* supply of liquid feed to calves delays the initiation of ruminal fermentation and development (Baldwin *et al.*, 2004) due to depressed solid feed intake (Jensen, 2006). Several other factors such as colostrum feeding in calves also contributes significantly in the health and overall growth performance of calves (Prince *et al.*, 2017).

Regardless of species, infant pre-ruminants are unable to digest solid food and hence liquid milk or milk replacers are indispensable for nourishment. The present study was carried out to compare the growth performance of Jersey

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sired calves from Achai dams (AJC) and Azakheli buffalo calves (ABC) fed on milk replacers and to evaluate its suitability and economics.

#### Materials and methods

This study was conducted at Livestock Research and Development Station (LR&DS), Surezai, Peshawar. In the present study, eight newly born, AJC calves were purchased from LR&DS, Surezai and eleven newly born unweaned ABC calves were bought from local market and categorized in two groups (AJC calves and ABC calves). Calves of both groups were reared under same managerial conditions until the end of experiment. The birth weights of AJC and ABC calves were recorded. Calves of both groups were fed with colostrum @ 10% of live body weight for the first three days. From day 4-56, the calves were fed milk replacer @ 10% of their live body weight in two equal half doses, one half dose in the morning and other half in evening. During the 9-12<sup>th</sup> week, the milk replacer was reduced to 7.5%, 5%, 2.5%, 1.25% of the 56<sup>th</sup> day consumption, respectively. The milk replacer was fed using stainless steel buckets with nipples. All the calves were having free access to clean fresh water round the clock. Green fodder and calf starter ration were also made available to the calves. The milk replacer used in this study was purchased from the local market of Peshawar. The composition of milk replacer was crude protein-24%, Fat-21%, dry matter-96%, crude fiber-0.05%, crude Ash-8%, supplemented with vitamin -B, -D3, -E and -C. The powder milk replacer was reconstituted with water by mixing 150 g of milk replacer powder in 1 L of water. During reconstitution, the milk replacer was heated constantly and fed to the calves at 39°C. During the whole experimental period, the calves were weighed weekly, empty stomach and early in the morning, using digital weighing scale. All the data was entered in daily maintained register

and then analyzed through descriptive and inferential statistical tools. In descriptive statistics mean, minimum and maximum values and standard deviation were found for each variable of interest. Similarly, the mean values were further compared by using SPSS version 21.0 (SPSS Inc., Chicago, IL, USA).

#### Results and discussion

The average birth weights of AJC and ABC were 15.75±2.43kg and 28.18±0.87kg, respectively (Table I). The findings of Khan *et al.* (2012) are in line with our study who conducted an experiment on 112 calves in the LR&DS, Surezai and reported birth weights for Achai, Azakheli, (HF and Sahiwal cross) and Nili Ravi calves 15.23±0.49 kg, 28.70±1.00 kg, 21.92±0.70 kg and 31.90±1.10 kg, respectively. Bhatti *et al.* (2009) reported birth weights of Nili Ravi buffalo calves 34 kg and 29.5 kg, and for Sahiwal calves 22 kg and 20.7 kg for male and female, respectively. This study was conducted in Punjab so the higher birth weight of cow and buffalo calves may be due to difference in breeds of Punjab and Khyber Pakhtunkhwa Province as Khan *et al.* (2012) also quoted birth weight for Nili Ravi breed as 31.90±1.10 kg. In contrast to our results Akhtar *et al.* (2012) also reported higher birth weight for Nili Ravi buffalo calves (35.86±4.30 kg). Similarly, the average weaning weight of ABC (56.5±2.75kg) was significantly ( $p<0.01$ ) higher than AJC (43.56±4.31 kg) as presented in Table I. This may be due to the reason that buffalo calves have higher birth weight as compared to AJC. Bhatti *et al.* (2009) reported 77.2 kg weaning weight for nipple fed Nili Ravi buffalo calves. These weaning weights for Nili Ravi buffalo calves are much higher than our result which is again due to breed difference of the two provinces. However, Khan *et al.* (2012) reported lower weaning weight 65.21±1.31 kg for Nili Ravi buffalo calves which proves that not only the breed difference matters but also the environment of the two provinces also have effects

**Table I.- Comparison of growth performance and other parameters of Jersey sired calves from Achai dams (AJC) and Azakheli buffalo calves (ABC) fed milk replacer.**

	AJC (n = 8)		ABC (n = 11)	
	Mean	Range	Mean	Range
Birth weight (kg)	15.75±2.43	12.00-20.00	28.18±0.87*	27.00-29.00
Weaning weight (kg)	43.56±4.31	42.00-54.00	56.50±2.75*	51.00-60.00
Weight gain (kg)	00.33±0.33	00.30-00.40	00.34±0.03	00.29-00.37
Milk replacer intake	152.33±20.7	128.60-192.05	225.53±9.28*	207.36-236.13
Feeding cost (PKR**)	406.68		591.32	
Milk conversion ratio (MCR)	05.50±0.69	04.43-06.60	07.99±0.44*	07.32-08.64

\*Difference was considered significant when  $p$  value was equal or less than 0.05; \*\*PKR, Pakistani Rupees.

on growth performance. Similarly, Akhtar *et al.* (2012) reported 66.12±9.16 kg weaning weight for Nili Ravi buffalo calves. For Azakheli buffalo calves Khan *et al.* (2012) recorded 63.75±1.8 kg weaning weight which is higher than our study. This effect may have been due to the difference in green fodder or season in which the trials were conducted. Khan *et al.* (2012) reported 45.05±0.84 kg weaning weight in Achai calves which is in our support. In contrast to our results Bhatti *et al.* (2009) reported 53 kg and 50 kg weaning weights for male and female Sahiwal calves, respectively.

In addition, the results of growth rate revealed that the average weight gain recorded for AJC and ABC was 0.331 kg/day and 0.337 kg/day. The statistical analysis showed that there was no significant difference between the growth rates of two species. This may be due to feeding of same quality of milk replacer and in same quantity according to their live body weight. Khan *et al.* (2012) reported daily weight gain of 330 g/d and 320 g/d in Achai and HF, Sahiwal cross breed respectively which supports our data. Iqbal *et al.* (2014) reported average daily weight gain of 0.23±0.02, 0.37±0.02, 0.28±0.01, 0.38±0.00, 0.26±0.01 and 0.37±0.0 kg/calf (during 105 days) in Sahiwal calves reared on different feeding regimens including milk, milk replacer and calf starter ration. Bhatti *et al.* (2009) reported 366 and 350 g/d growth rate in male and female Sahiwal calves, respectively. This slightly higher weight gain as compare to our study may be due to breed and climate difference. The data for buffalo calves growth rate is highly dispersed. Khan *et al.* (2012) examined daily growth rate for Azakheli buffalo calves 390 g/d, Akhtar *et al.* (2012) noted 316.47±88.33 g/d for Nili Ravi buffalo calves, Bhatti *et al.* (2009) reported 542 g/d weight gain in Nili Ravi buffalo calves. This variation in daily weight gain of buffalo calves may be due difference in environment, breed, milk/milk replacer intake and one thing that in Pakistan, the milk replacer used are imported which are specially formulated for cow calves.

The results of milk replacer intake and milk conversion ratio revealed that on average 152.33 and 225.52 liters of milk replacer was consumed with milk conversion ratio of 5.49 and 7.99 for AJC and ABC calves, respectively, during the period of 12 weeks. Highly significant variations exist among the means of milk replacer intake and milk conversion ratio for AJC and buffalo calves. This may be due to use of imported milk replacers which are specially formulated for cow calves. In different previous studies higher milk consumption and milk conversion ratio has been reported. Bhatti *et al.* (2009) reported 258 L and 259 L milk consumption in Sahiwal male and female calves, respectively with milk conversion ratio of 8.7 in both. Similarly, higher milk consumption was also recorded for

buffalo calves (Bhatti *et al.*, 2009) with milk consumption of 344 L and 323 L liter and average milk conversion ratio of 7.8 and 7 in male and female Nili Ravi buffalo calves, respectively. Iqbal and Iqbal (1992) reported 288, 322 and 294 liters of milk consumption by Nili Ravi buffalo calves reared under different feeding regimens. In these studies higher milk consumption has been reported as compared to our study. This may be due to different reasons as climate, breed, some studies used whole milk instead of milk replacer, difference in milk replacer composition and different feeding regimens, *etc.* In this study better milk replacer conversion ratio and feeding cost was found for AJC than buffalo calves. In this study we also evaluated an average milk replacer expenditure of Rs. 406.68 and Rs. 591.32 for AJC and ABC calves. The powdered milk replacer was purchased on Rs. 495/kg. A previous study reported Rs. 261 and Rs. 260 expenditure of milk for producing 1 kg of meat in male and female Sahiwal calves, respectively, assuming the cost of cow milk as Rs. 30/liter. While they found Rs. 272 and Rs. 244 expenditure of milk for production of 1 kg of meat in male and female Nili Ravi buffalo calves, assuming the cost of buffalo milk as Rs.35/L (Bhatti *et al.*, 2009). If in the present study the reconstituted milk replacer cost for cow calves is assumed Rs.30/kg and for buffalo calves Rs. 35/kg, the cost of milk replacer to produce one kg of meat in AJC and Azakheli buffalo calves would be Rs.164.32 and Rs. 278.74, respectively. This is much lower for cow calves and nearly same to buffalo calves in comparison to Bhatti *et al.* (2009). Much higher expenditure has been found in case of buffalo calves. This is due to the reason that the milk replacer used in the study was imported and specially designed for cow calves, thus buffalo calves could not perform well. Thus, this study concludes that AJC calves performed better on milk replacer as compared to ABC calves.

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#### Statement of conflict of interest

Authors have declared no conflict of interest.

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