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DEVELOPMENT TRAITS OF CALF'S WITH DRIED HAY ADDED TO THEIR RATIONS AT DIFFERENT PERIODS

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Farkli dönemlerde rasyonlarına kuru ot ilave edilen buzağıların büyüme özellikleri

Özet: Sığır yetiştiriciliğinde ekonomik üretimi sağlayan en önemli iki faktörden birincisi, üretim materyalinin, üretime başlayıncaya kadar daha ucuza mal edilmesi, ikincisi de üretim için gerekli girdilerin daha ekonomik olarak sağlanması ve kullanılmasıdır. Bu çalışma, erken sütten kesme sisteminde yetiştirilen buzağılara kuru ot verilmeye başlama zamanının, gelişme üzerindeki etkilerinin incelenmesi amacıyla yapılmıştır.

Araştırmada materyal olarak, özel bir işletmede yetiştirilen ve aynı dönemde ilk doğumunu yapan ineklerden elde edilen, tek doğmuş 50 Siyah-Alaca erkek buzağı kullanılmıştır. Çalışmada, Grup A'ya 60 gün boyunca hiç kuru ot verilmemiş, Grup B'ye 35. günden ve Grup C'ye 4. günden itibaren kuru ot verilmiştir. Buzağılar aynı dönemde (35. günde) sütten kesilmiş ve aynı rasyonla beslenmiştir. Elde edilen verilerin istatistik analizlerinde Duncan testi kullanılmıştır.

Çalışmada buzağıların doğum, sütten kesim ve 60. gün canlı ağırlıkları, toplam canlı ağırlık artışı ve yem tüketimleri incelenmiş, gruplar arasındaki farklılıkların istatistik bakımından önem taşımadığı bulunmuştur. Bu sonuçlar, kuru ot vermeye başlama zamanının önemli olmadığını göstermiştir. Ancak, gruplardaki buzağılar, canlı ağırlık artışları ve yem tüketimlerine göre değerlendirildiğinde, 35. günden sonra kuru ot verilmeye başlanan Grup B'deki buzağıların, daha ekonomik olarak büyütüldüğü belirlenmiştir.

Anahtar kelimeler: Siyah-Alaca, buzağı, sütten kesim, kuru ot.

Summary: One of the most important two factors enabling economical cattle production is the cheapest maintenance of the stock until productivity and the other is economically obtaining and use of necessities. This study was conducted to investigate the effects of starting time to feed the early-weaned calves with dry hay on development.

The material of the study was 50 Holstein male calves reared at the same company, all at same age and single calves of primiparous heifers. Group A did not receive hay during 60 days, Group B has started to have hay at the 35th day and Group C at the 4th day of the study. The calves were weaned simultaneously (35th day) and all fed with the same ration. The data was evaluated statistically by Duncan test.

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The birth, weaning and 60th day live weight total live weight increase and food consumption were investigated during the study and no statistical importance was observed among the groups. These results showed that the starting time to dry hay has no importance. However, when the calves were evaluated according to their live weight increase and food consumption, Group B calves, which have started to receive hay after the 35th day, have developed none economically.

Key words: Holstein, calf, weaning, dry hay.

Introduction

One of the most important two factors enabling economical cattle production is the cheapest maintenance of stock until productivity and the other is economically obtaining and use of necessities **(4).**

The required criteria to wean calves is a daily food consumption of at least 680 g for 3 consecutive days, at least 3 weeks of age and at least 4.5 kg live weight gain from birth. Researchers have reported these criteria between ages 31.8 to 34.7 days **(1).**

Feeding calves with hay until weaning is still a subject of dispute among researchers. Production of volatile fatty acids from digestible carbohydrates is important for rumen development. For this purpose, concentrated food which has higher protein levels are advised to be fed instead of hay. Meantime, for healthy development of the muscular layer of rumen and health of epithelia dried hay is an important factor **(7).**

Too much or too little forage content of early weaning system rations decreases the live weight gain **(8).** In a study where concentrated food and forage rates were 60:50, 50:50, 40:60 between the days 8 to 120, development rate was slow in the 40:60 group and the difference between the other two groups was not important **(13).**

The Holstein male calves are reported to have 38.5 - 44.7 kg birth weight, 50.3 – 54.3 kg 35th day's live weight, 67.8 – 71.6 kg 60 h day's live weight **(2, 3, 9, 10, 15, 16),** 29.3 – 29.7 kg 60 days live weight gain **(5, 9, 11),** 46 – 57 kg food consumption during 60 days **(7, 13)** and 94.3% - 97.5% survival rate **(2, 6, 11).**

This study was conducted to investigate the effects of starting time to dry forage administration to the rations of early-weaned calves on development.

Material and Method

The materials of the study were Holstein male calves in a private company. Fifty calves were selected from single calves of primiparous heifers delivered together, they were ear-tagged and birth weights were recorded.

The calves were separated from their mothers after having colostrum for 3 days and put in single boxes equipped with calf-food and fresh water. The calves were kept separately till the 35th day and put into groups after that.

Three random groups were established. Group A (n=20) did not receive any forage for 60 days, Group B (n=20) has received forage after the 35th day and Group C (n=10) has received forage after the 4th day (Table 1). All the calves were given two

equal portions of milk in the morning and evening of 2 litres each during the days 4-28, they were fed with 2 litres of milk only evenings between the days 29-35 and weaned at the 35th day.

Table 1. Feeding schedule for the calves.

Groups	Days			
	0-3	4-28	29-35	35-60
Group A	Colostrum	Milk (Morning 2 l, Evening 2 l) Calf Ration, Water (ad-libitum)	Milk (Evening 2 l) Calf Ration, Water (ad-libitum)	Calf Ration, Water (ad-libitum)
Group B	Colostrum	Milk (Morning 2 l, Evening 2 l) Calf Ration, Water (ad-libitum)	Milk (Evening 2 l) Calf Ration, Water (ad-libitum)	Dry Hay, Calf Ration, Water (ad-libitum)
Group C	Colostrum	Milk (Morning 2 l, Evening 2 l) Dry Hay, Calf Ration, Water (ad-libitum)	Milk (Evening 2 l) Dry Hay, Calf Ration, Water (ad-libitum)	Dry Hay, Calf Ration, Water (ad-libitum)

The calves have received ad-libitum calf ration containing 18% protein and 2800 kcal/kg and water after the 4th day. The left ration remainings were weighed and daily consumption was calculated, but since remaining hay was mixed with litter consumed hay amount could not be calculated. The nutritive values of calf starter ration and dry hay are presented in Table 2.

Table 2. Nutritive values of the calf starter ration and dry hay.

Substance	Calf Starter Ration	Dry Hay
Dry Matter (%)	88	88.48
Raw Protein (%)	18	8.56
Metabolic Energy (kcal/kg)	2800	1240
Raw Cellulose (%)	12	29.58
Calcium (%)	1-1.5	-
Phosphor (%)	0.6	-
Raw Ash (%)	8	6.40
Raw Fat (%)	-	2.56

The milk was warmed by warm water and given to the calves at 37°C. The body development of the calves was followed by weekly weightings weaning weights at the 35th day and live weights at the 60th day were determined.

Survival rate, total food consumption, live weight gain, weaning weight and weights at the 60th day were investigated in the study. The statistical comparison among the groups relating developmental traits were done by the variance analysis method and importance analysis among the groups were done by Duncan-test. GLM (General Linear Model) procedure in SPSS program package was employed for statistical calculations **(12).**

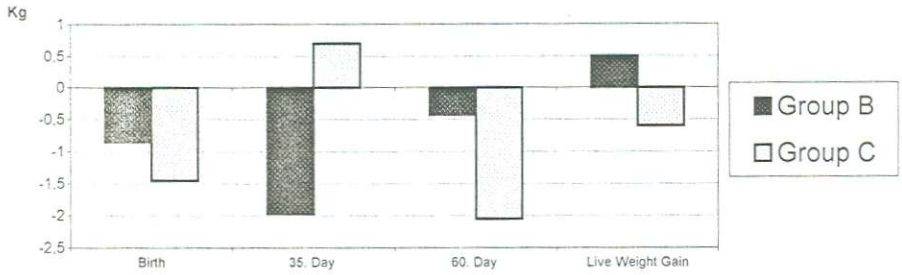
Results and Discussion

In this study where the Holstein calves were reared under an early weaning program, the effect of dry forage addition to the ration at different times on development was investigated. Birth weights of the randomly established A, B and C groups at the beginning of the study were 41.85 kg, 41.00 kg and 40.40 kg respectively. The live weights of the calves at weaning (35th day) were 53.52 kg, 51.55 kg and 54.22 kg respectively, these values were 69.13 kg, 68.70 kg and 67.08 kg at the 60th day. The results of the study are presented in Table 3 and the variations of the other groups compared to Group A are presented in Graphic 1.

Table 3. Developmental traits of Holstein calves started to have dry forage at different periods.

Traits	Group A (n = 20)		Group B (n = 20)		Group C (n = 10)	
	$\overline{X}$	$S_{\overline{X}}$	$\overline{X}$	$S_{\overline{X}}$	$\overline{X}$	$S_{\overline{X}}$
Birth Weight (kg)	41.85	0.765	41.00	0.997	40.40	1.600
Weaning (35 th Day) Weight (kg)	53.52	1.016	51.55	1.043	54.22	1.657
Live Weight at 60 th Day (kg)	69.13	1.432	68.70	1.303	67.08	2.073
Total Live Weight Gain (kg)	27.28	1.210	27.78	0.890	26.68	1.830
Total Food Consumption (kg)	59.90		55.20		53.80	

Graphic 1. Birth weights, 35th day, 60th day live weights and live weight gain variations of group b and group c compared to group A.



No calf has died during the entire study. All calves in the herd were kept under the good manage mental conditions with the study calves especially during their developmental periods, this is why the survival rate results are higher than other studies **(2, 6, 11).**

Differences among the groups in all characteristics investigated during the study were statistically in significant. The birth, weaning (35th day) and 60th day live weight levels of calves in the 3 groups of this study were similar to those reported in various studies **(2, 3, 9, 10, 15, 16).** The difference among the groups in total live weight gain rate was statistically insignificant, however these results were in the limits of other studies carried out on Holstein calves **(12, 16).**

Total concentrated food consumption was higher in Group A calves which did not receive dry hay during 60 days than Group B and Group C and other studies reported **(3, 14).**

Conclusion

The birth, weaning and 60th day live weights, total live weight gain and food consumption of each other with little unimportant variations though they have been started to receive dry hay at different periods. The statistical insignificance of the differences in these groups showed that neglecting dry hay in the ration or starting to give dry hay at the 4th or 35th day made no effect in this study.

Mean food consumption of the calves which did not receive any dry hay during the day (Group A) was 7.85% and 10.18% higher respectively than the calves which were started to receive forage after weaning (35th day) (Group B) and those which always had forage after the 4th day (Group C). Although has no statistical importance, Group A calves had a 0.62% and 2.97% higher live weights than Group B and Group C calves respectively.

Total live weight gain of Group A calves was 1.83% lower than Group B calves and 2.20% higher than Group C calves live weight gain of Group A calves from birth to weaning (35^{th} day) was 11.67 kg, this value was 10.55 kg for Group B and 13.82 kg for Group C. The live weight gain of these groups from weaning to the 60^{th} day was 15.61 kg, 17.15 kg and 12.86 kg respectively. According to these values Group B calves were observed to consume similar amounts of food to Group C calves and less than the Group A calves, however they gained more live weight during the 35^{th} – 60^{th} days period and scored more total live weight gain. The live weights of Group C calves (consumed dry hay from birth) increased fastest at the beginning and slowest at the end. These results showed that calves which received forage after the 5^{th} week (35^{th} day) have been grown up more economically. It is concluded that it will be so convenient to carry out more studies relating the food conversion rate of calves and their total forage consumption needs.

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