

FEEDING MILK REPLACEMENT TO DAIRY CALVES

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SUMMARY

Two groups of six cross-bred Friesian × Demiate calves were put in comparative feeding trial. After 3 days on colostrum group 1 received 802 lb. whole milk for 15 weeks, and group 2 received about 68 kg. reconstituted milk replacer powder for 12 weeks. Beside the fluid diet clover or hay and a concentrate mixture were given at about the fourth week of age, and wheat straw at the 16th week. The whole milk fed group has exceeded the milk replacement group in gaining more weight at earlier age, but later the rate of gain for the latter group was accelerated, and it reached about the same weight as that of the whole milk group at the 26th week of age. This was associated with a reduction of about 30% of the feeding cost for milk replacement group.

INTRODUCTION

Feeding milk replacement is widely used throughout the world nowadays by the aim of saving milk for fresh consumption and dairy industry. The cheap prices of milk replacements makes it economical and more beneficial than using natural milk in rearing calves. Also, it has the advantages of being easier to transport and adequately stored. Much work has been done abroad on the use of milk replacements (1,3,4,5,6) and it has been found that all or a great part of the natural milk, could be saved in calf rearing when milk replacements are used.

In Egypt, as it is well known, the farmer gets rid of his young buffalo male calf by slaughtering at an age of 40 days at most. This practice is quite common in this country, in the sake of saving fresh milk for human consumption. On the other hand, this country suffers much from the "Meat Shortage Problem". So it has been seen that much work should be done to save fresh milk, and to try meantime, to keep the calves especially buffalo male calves for older age, to earn more meat.

The present study is carried out to investigate the practice of using milk replacements in regard to growth performance and economic expenditure.

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MATERIALS AND METHODS

Animals

In Animal Breeding Farm at Gimmeza, 12 newly born cross-bred Friesian × Demiate calves, were chosen at random. They were divided into two equal groups of six calves each.

Feeding

All the animals were fed 3 days on colostrum. One group was fed according to the farm usual system, i.e., bucket feeding of 802 lb. whole fresh milk during the 15 weeks suckling period. Clover and a concentrate mixture were offered from the fourth week (Table 1). This group was taken as control. The second group was also bucket fed milk replacement according to the producers schedule for 12 weeks. The milk replacement was reconstituted with warm water daily for the morning and afternoon meals at the rate of 1:8; 1 part of powder + 7 parts of water. The actual consumption of the milk replacement was recorded individually for all calves. All calves of both the two groups received the same assigned amounts of clover or hay and calf concentrate mixture twice daily during the period from the 12th till the 26th week of age. The residues were weighed, and the actual consumption was registered to each group separately (Table 1).

Weighing

Individual Body weights were recorded at birth and then every two weeks up to 6 months old.

RESULTS AND DISCUSSION

Absolute weights of growing calves

Growth performance of the whole milk fed group and milk replacement fed group was shown in Table 2. The whole milk group has exceeded the milk replacement group in gaining more weight during the first 22 weeks but later the milk replacement group compensates for the earlier slower gain rate and almost amounted to the same weight of the control group at 26 weeks of age. The slower rate of weight gain in the milk replacement group during the early weeks may be due to the inadequate consumption of milk replacement given.

Live weight percentage relative to birth weight

The change in weight was expressed in terms of body weight as percentage of birth weight by the aim of eliminating the initial difference in average birth weights of the two groups.

It can be seen also from Table 2 that the control group has doubled its birth weight at about the 11th week, while milk replacement group has reached that doubling later in ca. the 13th week. As for tripling the birth weight the control group reached that weight around the 18th week old, while milk replacement group reached the same level 2 weeks later, i.e., 20th week of age. At the end of the experiment which lasted 26th week, the final body weight of the control group was 3.568 times more than that of their birth weight, the milk replacement group recorded a slightly higher figure reaching 3.708 times more than their birth weight.

Relative Growth rate percentage.

The relative growth rate percentage for certain period of age is calculated as follows :

$$\frac{\text{Weight in this period} - \text{Weight in the preceding period}}{\text{Weight in the preceding period}} \times 100$$

At early age from birth till about 12th week of age, it can be observed that the control group exerted a higher rate of gain than the milk replacement group. This can be the reason for attaining a heavy body weight for the control group at earlier age, then after weaning and during the following ca.6 weeks, the two groups showed almost the same rate of growth. Then later, the milk replacement group remarkably exceeded the control group in the rate of growth and that is why the difference in body weight between the two groups was diminishing at older ages till the 26th week at which they reached almost the same weight. The rapid increase in weight which follows the slow growing period may be due to the increase of weight of the cells which were developed and yet had been not reflected in any increase in weight in the slow growing period caused by insufficiency of feed intake, as explained by Maynard (2).

From economical stand point, it was found that the cost of 1 kg. increase in liveweight in the control group was 179 millimes (151-212 millimes), while it was 141 millimes (123-162) only in the milk replacement group being 127.7% of the cost for milk replacement group (Table 3). This indicates that ca. 278 grams could be produced more with the same cost of producing every kilogram in liveweight gain of animals by using the milk replacement system.

Further studies on similar lines with both buffaloe and cow calves and with different formulae of milk replacements appear to be important.

TABLE 1.—Average daily feed consumption per calf for the whole milk fed and milk replacement groups during the first 26 weeks of age

Age in weeks	Whole Milk Fed Group*				Milk Replacement Fed Group			
	Whole Milk	Clover	Straw	Concentrates	Milk Replacer Powder	Clover	Straw	Concentrates
	Ib.	kg.	kg.	kg.	grams	Ib.	kg.	kg.
1 {	1-3 days. Colostrum	—	—	—	Colostrum { whole milk } 8 lbs }	—	—	—
	4-7 days. 8	—	—	—		—	—	—
2	9	—	—	—	250	—	—	—
3	10	—	—	—	550	—	—	—
4	11	0.5	—	0.100	850	—	—	—
5	12	1.0	—	0.250	1150	—	—	—
6	11	2.0	—	0.250	1400	—	—	—
7	10	2.0	—	0.500	1400	0.5	—	—
8	9	3.0	—	0.500	1350	1.0	—	0.250
9	8	3.0	—	0.750	1100	1.0	—	0.250
10	7	4.0	—	0.750	850	2.0	—	0.500
11	6	4.0	—	1.000	550	3.0	—	0.750
12	5	5.0	—	1.000	200	5.0	—	1.000
13	5	5.0	—	1.250	—	5.0	—	1.250
14	4	6.0	—	1.250	—	6.0	—	1.250
15	3	6.0	—	1.250	—	6.0	—	1.500
16 - 19. . .	—	8.0	0.50	1.500	—	8.0	0.50	1.500
20 - 23. . .	—	9.0	0.75	1.750	—	9.0	0.75	1.750
24 - 26. . .	—	10.0	1.00	2.000	—	10.0	1.00	2.000

* The concentrate mixture consists of corticated cotton seed cake 25%, rice bran 25%, wheat bran 20%, Barly 15%, linseed cake 12%, Lime stone 2% and salt 1%.

TABLE 2.—Growth of calves fed whole milk and that fed milk replacer at 2 Weeks intervals up to the age of weeks.

Age in week	Whole Milk Fed Group			Milk Replacer Fed Group		
	Weight kg.	Relative Growth* rate%	Live weight relative to birth weight	Weight kg.	relative growth rate %	Live weight relative to birth weight
0	31.0	—	100.0	28.8	—	100.0
2	33.8	9.0	109.0	31.5	9.4	109.4
4	38.5	13.9*	124.2	35.5	12.7	123.3
6	46.2	20.0	149.0	39.8	12.1	138.2
8	53.2	15.2	171.6	44.0	10.6	152.8
10	60.3	13.3	194.5	49.5	12.5	171.9
12	69.0	14.4	222.6	56.2	13.5	195.1
14	76.0	10.0	245.2	62.0	10.3	215.3
16	86.3	13.6	278.4	70.8	14.2	245.8
18	95.7	10.9	308.7	78.2	10.5	271.5
20	98.8	3.2	318.7	86.8	11.0	301.4
22	101.8	3.0	328.4	93.2	7.4	323.6
24	106.0	4.1	341.9	99.8	7.1	346.5
26	110.6	4.3	356.8	106.8	7.0	370.8

* Example : The relative growth rate percentage at the age of 4 weeks within the preceding interval = $\frac{(38.5 - 33.8)}{33.8} \times 100 = 13.9$

TABLE 3.—Comparison of Feeding cost in Whole Milk and Milk Replacement Fed Groups *

Item	Increment in Wt. in 26 Wks.	Cost of Feeding in 26 Wks	Cost of 1 kg. of live wt. increase
	kg.	L.E.	m/ms.
1. Control group **:			
Calf no. 1	94	14.225	151
2	84	14.225	169
3	67	14.225	212
4	77	14.225	185
5	77	14.225	185
Average	80.4	14.225	180
2. Milk Replacement fed Group †			
Calf No. 1	85	11.985	141
2	71	11.474	162
3	77	10.241	133
4	82	10.115	123
5	76	11.138	147
Average	78.2	10.991	141

* 1 lb. whole cow's milk = 12 millimes, 1 kg. from milk replacer, clover wheat straw and calf concentrate mixture = 100, 1, 5 and 17 millimes respectively.

** One calf was slaughtered on 25th week.

† One calf was slaughtered on 14th week.

ACKNOWLEDGEMENT

The authors wish to express their gratitude to Dr. A. A. El-Itriby General Director, Animal Production Department, Ministry of Agriculture, Cairo, for his deep interest in the subject and encouragement during the course of this investigation. Thanks are also due to Dr. M. K. Hathout for cooperation to S.A. Amber, Manager of Gimmeza Breeding Farm for furnishing facilities and to Provimi N.V. Co. Veerlaan 17-23 Rotterdam, Holland for furnishing the milk replacement.

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(Printed in 1966)

تغذية العجول الرضيعة على بديلات اللبن

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المخلص

استخدمت في هذه الدراسة مجموعتين من العجول الخليطة (فريزيان مع دمياطى) كل مجموعة ٦ عجول غذيت جميعها على السرسوب لمدة ثلاثة أيام ثم أعطيت المجموعة الأولى ٨.٢ رطلا من اللبن الكامل في مدة ١٥ أسبوعا ، بينما أعطيت المجموعة الثانية ٦٨ كيلو جراما من مسحوق بديل اللبن لمدة ١٢ أسبوعا مع البرسيم أو الدريس وعليقة مركزة للعجول الرضيعة ابتداء من الأسبوع الرابع . واستخدم تبين القمح اعتبارا من الأسبوع السادس عشر .

وقد دلت النتائج على أن متوسط الوزن الحى لمجموعة اللبن الكامل في عمر ١٥ أسبوعا كان أكبر من متوسط وزن أفراد المجموعة التى غذيت على بديل اللبن . كما أمكن لعجول المجموعة التى غذيت على بديل اللبن أن تعوض وزنها بعد ذلك حتى وصلت الى نفس الوزن في عمر ٢٦ أسبوعا مما خفض تكاليف تغذية هذه العجول الى حوالى ٣٠٪ .