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Rearing Buffalo Calves on Imported and Locally Formed Milk Replacers

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A NUMBER of 35 newly born buffalo calves were divided into three groups to compare the effect of local milk replacer "Shohlab" (group I) and the imported milk replacer "Focamil" (group II) to feeding on natural buffalo's milk (group III). The weight of calves was recorded weekly until weaning at 90-95 kg. live weight , as well as post weaning until reaching a final weight of 185-190 kg. The results revealed the following:

a- Suckling period

1. The average daily weight gain was 669, 714 and 748 g for groups, I, II and III respectively. However, the differences in growth rate between calves raised on natural milk, imported and local milk replacer were, not significant.

2. Cost of gain (replacer + starter) was 350, 798 and 1339 mill/kg gain for groups I, II and III respectively.

3. Feed efficiency (for dry matter and crude protein) were higher for group III followed by II and lower for group I.

b. *Post weaning*

1. The average daily weight gain was almost the same; being 648, 650 and 662 for groups, I, II and III respectively.

2. Average age on reaching final weight of (185-190 kg) were similar; being 226, 224 and 222 days for groups I, II and III respectively.

In general, local milk replacer "Shohlab" could be safely recommended to replace both the natural buffalo milk and the imported milk replacer on both biological and economical basis.

In Egypt, the problem of meat shortage was found to be affected by the high price and shortage of natural milk. About 500 thousands heads of buffalo calves, 60—80 kg weight each, are slaughtered yearly at such small weight and early life in order to save the utmost quantity of milk from suckling and turn it to human consumption.

For this reason the Ministry of Agriculture and the General Organization for Meat and Milk imported several kinds of milk replacers and used them for suckling buffalo calves. Studies were also directed towards the production of local milk replacers (Lasheen, 1976 ; El-Bassiony, 1977 ; Abd-Allah, 1978 ; Ragab, 1978 ; Lasheen, 1980 and Helali *et al.*, 1981).

Farmers usually use natural suckling in rearing their calves. This is rather costly since it was reported by Badr-El Din(1955)that each increase of 1 kg in body live weight during the suckling period needs 9 kg of milk, which appears to be rather expensive. Also, the natural rearing of buffalo calves may not be safe enough to keep the suckled animals in the best of their health Asker and El-Itriby, 1957). Therefore, comparison between the different methods of suckling used for rearing the buffalo calves was found to be necessary. In this investigation, calves were reared on local milk replacer, imported milk replacer and natural milk, the effect of the three methods were compared.

Material and Methods

A number of 35 newly born buffalo calves were divided into three groups. After seven days of suckling colostrum from their dams the calves were separated. The first group (I, 14 calves) received the local milk replacer "Shohlab" the second group (II, 14 calves) was fed on the imported milk replacer "Focamil" while the third group (III, 7 calves) was raised upon nutral buffalo milk.

The calves were weighed weekly and the weaning weight was 90-95 kg. Feeding schedule is given in Table 1 and the composition of calf starter is presented in Table 2. Local and imported milk replacers as well as the natural buffalo milk were analysed for moisture, ether extract, protein, crude fiber and ash using the methods recommended by the A.O.A.C. (1975). The chemical composition of feeding fluids used for feeding buffalo calves were also calculated. Milk replacers were prepared at the rate of 180 g/litre warm water (38°) before used for suckling buffalo calves.

Post weaning calves were kept on feeds used by the General Organization for Meat and Milk (Table 3). Calves were weighed monthly and consumed feeds were recorded to calculate the feed efficiency.

Results and Discussion

1. *Chemical composition of milk replacers and natural milk*

The results in Table 4 show the chemical composition of local and imported milk replacers as well as the natural buffalo milk.

From Table 4, it could be noticed that local milk replacer powder showed lower protein content than the imported milk replacer powder. Nevertheless, after dissolving in water, local milk replacer contained similar level of protein as that of the natural buffalo milk, both were lower in protein than dissolved imported milk replacer.

The ether extract content of the imported milk replacer powder before and after dissolving in water was higher than that of the local milk replacer.

The lack of developed mixing machines which markedly reduce the diameter of fat globules made it impossible to increase the fat content in the local milk replacer. Although the ether extract content in both dissolved milk replacers is low (0.65 and 1.45 for local and imported replacers) compared to that of the natural milk (6.62%), yet increasing this content in the replacers to more than these percentages caused cases of diarrhea. It seems that diarrhea is caused not mainly by increasing the fat percentage but also by the size of fat globules.

The crude fiber content before and after dissolving in water was lower for the imported than the local milk replacer. It is possible that in the imported milk replacer the source of protein was the product of protein isolates which are usually low in fibers than in the natural plant sources. It is worth mentioning that natural buffalo milk was free from fibers (Table 4).

The ash content was similar in the imported and local milk replacers ; both replacers after dissolving in water showed somewhat higher ash content than the natural buffalo milk (Table 4).

Carbohydrates were the highest for the dissolved local milk replacer (8.26%), intermediate for the dissolved imported milk replacer (7.38%); the lowest was that for the natural buffalo milk (5.39%) (Table 4).

2. *The effect of milk replacers and natural milk on the suckling buffalo calves*

From Table 5 it could be noticed that the average daily gain was higher in group III than the other two groups. Moreover, no mortality cases were recorded for group III which showed the lowest average birth weight.

Average total and daily gains were the highest for calves receiving the natural buffalo milk, intermediate for group II (imported milk replacer), while were relatively lower for group I (local milk replacer). It seems that differences of fat % were responsible for this result since protein percentages of 4.06, 4.02, were 4.41, almost similar in content in the three groups (1, 2 and 3 respectively).

Feed efficiency was parallel to the average daily gain and was better for group III compared to groups II and I being 1.843, 1.958 and 2.177 kg dry matter/kg gain and 0.436, 0.540 and 0.544 kg crude protein/kg gain respectively (Table 5).

From the economic point of view the daily gain should not be the only criterion to the superiority of a feeding system. Cost of gain should be considered. It could be observed that the cost of gain (replacer + starter) was 1339, 798 and 530 mill/kg gain for groups III, II and I respectively. This indicates

that the economic aspects were much better for the local milk replacer which showed the lowest daily gain. The results in Table 5 indicated that feeding on natural milk, compared with the local milk replacer, increased the cost of one kg gain by 2.53 folds while the daily gain increased by 1.12 folds only. Similarly feeding on natural milk, compared with the imported milk replacer, increased the cost on one kg gain by 1.66 folds while it increased the daily gain by 1.05 folds only. Moreover, feeding on imported milk replacer, when compared with the local milk replacer, increased the cost on one kg gain by 1.51 folds, while increased the daily gain by 1.07 folds only. These results showed that feeding on local milk replacers is the cheapest system, specially that its mortality rate was similar to that of the imported milk replacer and natural milk being 7.1% for both. The mortality rate was zero for group III (natural milk), nevertheless, mortality rate for the local milk replacers was markedly low (7.1%). Higher mortality rate (33%) was given by Asker and El-Itriby (1957) for buffalo calves receiving the natural buffalo milk from their dams, being 33%

Moreover, the results showed that the quality of the local milk replacer was not markedly lower than that of the imported milk replacer especially when the cost of gain was considered.

3. *Post weaning stage*

The results in Table 6 present the post weaning data for calves fed on natural buffalo milk, imported and local milk replacers.

Post weaning studies showed that the average daily gain was almost the same for the three groups being 648,650 and 662 for groups I, II and III respctively (Table 6). Moreover, the average age at the end weight of 185-187/kg was also similar ; being 226-224 and 222 days for the three groups respectively, indicating that the local milk replacer could easily replace the natural milk and the imported milk replacer at the period of suckling specially when the feed efficiency after weaning was considered. From Table 6 it could be noticed that the feed efficiency was almost the same for the three groups being 8.384, 8.366 and 8.200 kg dry matter/kg gain ; 0.649, 0.647 and 0·632 kg digestable protein per kg gain and 3·852, 3·844 and 3·755 kg starch equiv./ kg gain for groups I, II and III respectively. The average final weight for the local milk replacer group was higher (87.0 kg)by 2 kg than that of the imported milk replacer and natural milk treatments (85.0 kg for both) while the average age at the final weight (226 days) was higher by only 2-4 days when compared to the imported milk replacer group (224 days)and natural milk group (222 days).

From the above mentioned results and discussion, local milk replacer could be recommended for rearing calves soundly and cheaply.

TABLE 1. **Feeding schedule from birth to weaning.**

Age in weeks	Milk replacer (g)	Warm water 38° (liter)	Starter g/day	Hay
1 — 2	Colostrum			
	360	2	—	
2 — 3	540	3	—	
3 — 4	1080	6	100	
4 — 5	1440	8	200	
5 — 6	1440	8	300	
6 — 7	1080	6	500	ad — Libitum
7 — 8	1080	6	700	
8 — 9	720	4	1000	
9 — 10	720	4	1250	
10 — 11	540	3	1500	
11 — to weaning	360	2	1500	

TABLE 2. **Composition of the calf starter.**

Ingredients	%
Ground maize	24
Decorticated cotton seed meal	15
Lin seed cake	15
Rice bran	15
Beans meal	10
Wheat bran	14
Dried clover meal	4
Mineral salts	2
Limestone powder	1
Crude protein (gm/kg)*	230
Digestion protein (mg/kg)	173
Starch value (gm/kg)	723
Fiber (gm/kg)	66.5

* Calculated according to Ghoneim, A. (1967).

TABLE 3. **Composition of feed-stuffs used for calves post weaning (90 — 150 kg. life weight).**

Ingredients %	
Cotton seed cake	
(corticated and finely)	35
Ground maize	20
Wheat bran	30
Rice bran	7.0
Rice germ	5.0
Ca — chloride	2.0
Sod. Chloride	1.0
Crude protein . . . . . (g/kg)*	156
Digestion protein . . . . . .(gikg)	103
Starch value . . . . . .(g/kg) .	566

* Calculated according to Agric. Bull. Ministry of Agric. Animal Nutrition (1968).

TABLE 4. **Chemical composition of milk replacers and buffalo milk.**

Components %	I Local milk replacer		II Imported milk replacer		III Natural Buffalo milk
	Powder	After dis solving	Powder	After dis-solving	
Moisture	6.53	85.74	5.72	85.62	83.17
Dry matter . . .	93.47	14.25	94.28	14.38	16.83
Total protein . . .	26.35	4.02	28.94	4.41	4.06
Ether extract . . .	4.25	0.65	9.53	1.45	6.62
Crude fiber	3.01	0.46	1.76	0.27	0.00
Ash	5.70	0.87	5.65	0.86	0.76
Carbohydrates . . .	54.16	8.26	48.40	7.38	5.39

TABLE 5. Average daily gain, consumed replacers, costs of feeding and feed efficiency.

Item	I Local milk replacer	II Imported milk replacer	III Natural Buffalo milk.
Number of calves	14	14	7
Number of weaned calves	13	13	7
Mortality rate (%)	7.1	7.1	0.6
Av. birth weight, kg	39.0	33.0	30.0
Av. weaning weight, kg	93.0	93.4	94.57
Av. total gain, kg	54.0	60.0	64.28
Av. age at weaning, days	81.0	83.0	86.0
Av. daily gain,	669	714	748
Consumed natural milk, kg	18.0	18.0	401
Cons. milk replacer powder, kg	69.80	71.21	—
Cons. starter, kg	48.55	47.55	51.26
Cost milk replacer powder, mill/kg	330	600	—
Cost milk replacer solution, mill/kg	60	109	—
Cost natural buffalo milk, mill/kg	—	—	200
Cost starter, mill /kg	115	115	115
Cost gain (replacer + starter) mill/kg gain	530	798	1339
Feed efficiency			
Kg dry mattter/kg gain	2.177	1.958	1.843
Kg crude protein/kg gain	0.544	0.540	0.436

TABLE 6. Average daily weight gain and feed efficiency after weaning.

Item	I Local M.R.	II Imported M.R.	III Natural Buffalo milk
Number of calves	13	13	7
Av. weaning weight, kg	93.0	93.4	94.57
Av. end weight, kg	187.0	185.0	185.0
Av. total gain, kg	94.0	91.6	90.43
Av. age at weaning, days	81.0	83.0	86.0
Av. days required	145	141	136
Av. age at end weight, days	226	224	222
Av. daily weight gain,	648	650	662
Feed efficiency			
kg. dry matter/kg. gain	8.384	8.366	8.200
kg. digest. protein/kg gain	0.649	0.647	0.632
kg. starch equ./kg. gain	5.852	3.844	3.755

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رضاعة عجـول الجاموسى على بديل اللبن المجلى والمستورد

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تهدف هذه الدراسة الى تقييم تأثير استخدام بديل اللبن المجلى « شـهلاب » وبديل اللبن المستوردة « فوكاميل » مقارنة مع استخدام اللبن الطبيعى فى تغذية عجول الجاموس حديثة الميلاد ٠

استخدم عدد ٣٥ عجل جاموس حديث الميلاد وقسمت الى ثلاث مجموعات : يتم تسجيل الوزن الأسبوعى للعجول حتى الفطام على وزن ٩٠ ـ ٩٥ كجم وزن حى ثم تستمر متابعة العجول ووزنها شهريا حتى الوصول الى وزن ١٨٥ ـ ١٩٠ كجم وزن حى وتتلخص النتائج فيما يلى :

١ ـ مرحلة الرضاعة :

١ ـ كان معدل النمو اليومى ٦٦٩ ، ٧١٤ ، ٧٤٨ جم لمجموعات البديل المحلى ، البديل المستورد ثم اللبن الطبيعى وهى مجموعات ١ ، ٢ ، ٣ على الترتيب ٠

٢ ـ كان متوسط تكلفة كيلو النمو من التغذية على البديل والبادىء معا هى ٥٣٠ ، ٧٩٨ ، ١٣٣٩ جم للمجموعات ١ ، ٢ ، ٣ على الترتيب ٠

٣ ـ لوحظ ارتفاع معدل الكفاءة الغذائية للمادة الجافة والبروتين الخام فى المجموعة الثالثة (اللبن الطبيعى) يليها مجموعة بديل اللبن المستورد ثم بديل اللبن المحلى ٠

ب ـ مرحلة بعد الفطام :

١ ـ كان معدل النمو اليومى متقارب جدا خلال هذه المرحلة وحتى الوصول الى وزن ١٨٥ ـ ١٩٠ كجم حيث كان ٦٤٨ ، ٦٥٠ ، ٦٦٢ جم/يوم للمجموعات ١ ، ٣ ، ٢ على الترتيب ٠

٢ ـ كان متوسط العمر باليوم عند الوصول الى الوزن النهائى (١٨٥ ـ ١٩٠ كجم) هو ٢٢٦ ، ٢٢٤ ، ٢٢٢ يوم للمجموعات ١ ، ٢ ، ٣ على الترتيب ٠

وعموما فقد أوضحت النتائج أنه يمكن استخدام بديل اللبن المحلى لرضاعة عجول الجاموس المصرى بدلا من الأعتماد على أستيراد بديل لبن من الخارج بالعملات الصعبة وكذلك بدلا من الرضاعة على اللبن الطبيعى المرتفع الثمن والذى يشتد عليه الطلب للاستهلاك الادمى ، بالاضافة الى أن استخدام بديل اللبن المحلى يعطى معدلا من النمو اليومى مقبول مع الانخفاض الواضح فى الأقتصادية لكل كيلوجرام نمو ٠