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دراسات اكلينيكية على تخمرات الدم ومعدلات النمو في عجول الابقار والجاموس باستخدام طريقة الفطام المبكر

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أجريت تجربة للفطام المبكر باستعمال بديل اللبن الألماني على عدد ٨ ، ١٠من عجول الجاموس والأبقار لدراسة صورة مستويات الدم الاكلينيكية ومقارنتها بتلكالمتبع معها نظام الرضاعة الطبيعية السائد في المزرعة.

قسمت عجول الجاموس الى مجموعتين كل مجموعة تكونت من ٤ حيوانات.

قسمت أيضا عجول الابقار الى مجموعتين كل مجموعة تكونت من ٥ حيوانات.

حصلت كل الحيوانات على اللبن الطبيعي لمدة عشرة أيام. أما الحيوانات المستخدمة في البحث فقد أعطيت بديل اللبن الذي استمر حتى الفطام وبداية من الاسبوع الرابع اضيف بادىء ودريس.، بينما اتبع نظام الرضاعة الطبيعية السائد في المزرعة على حيوانات مجموعة الضوابط.

أسفرت النتائج التي توصل اليها البحث عن تحسين معنوي في نمو الجسم والزيادة اليومية في الوزن خلال فترة المعاملة في مجموعتي بديل اللبن من عجول الابقار والجاموس.

كما اسفرت نتائج الصورة الدموية الى أن التعدد الكلي للخلايا الدموية الحمراء والخلايا الدموية البيضاء وقيمة الهيموجلوبين الكلية وكذلك قيمة النسبة المئوية لحجم الخلايا المصمت كانت في مستواها الطبيعي المعروف الا أنه لوحظ بعض التغيرات الغير معنوية التي ترجع الى تأثير العوامل الفسيولوجية على تلك القيم خلال هذه الفترة من العمر.

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CLINICO - HAEMATOLOGICAL AND GROWTH RATES STUDIES ON BUFFALOE AND CATTLE CALVES REARED ON MILK REPLACER IN AN EARLY WEANING SYSTM

(With 5 Tables & 4 Figs.)

By
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(Received at 18/2/1987)

SUMMARY

A total of 8 buffaloe calves and 10 dairy calves aged 10 days were used to study the effect of milk replacer (Kalbilactal, Fa. Schaumann W. Germany) on the clinico-haematological picture of calves in comparison to those conventionally fed one. Buffaloe calves were divided into two groups, each one consisted of 4 animals. Dairy claves were divided also into two groups, each one consisted of 5 animals. All animals received whole milk for 10 days. The experimental groups received milk replacer alone up to 4 weeks then followed by milk replacer, starter and hay up to the end of the experiment. Control group reared on whole milk according to the conventional system.

The obtained results revealed that use of milk replacer in rearing calves improved the growth rates in both buffaloe and dairy calves and increase the daily body gain.

Haematological picture which include the Total Erythrothytic count, Total Leykocytic count, Haematocrit and Haemoglobin values were within the normal levels of both species. However, there were some variations which are atributed to the physiological factors affect these parameters at this period of age.

INTRODUCTION

Elimination of milk feeding calves by replacing it with milk replacers was being attempted due to the increased demands to milk for human consumption.

From the economical point of view, the use of milk replacers will save a great amount of whole milk which was used for newly born calves feeding.

Little informations were available about feeding milk replacers to native buffaloe and cow calves (EL-ASHRY, et al. 1975).

The relation between feeding system and haematological picture in calves was discussed by REECE (1984). The study of the blood picture of calves fed milk replacers was atempted by BREUKINK, et al. (1984). They reported that the values of Haemoglobin, Haematocrit and

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total Leukocytic count were within the normal values of their species. However, REECE (1980) recorded that the blood Haemoglobin and Haematocrit values were decreased in calves fed milk replacer if compared with conventionally fed one. However, no significant differences between milk fed and conventionally fed calves were recorded by BRADLEY, et al. (1982) in the values of PCV and Haemoglobin. Mean Leukocytic count was not affected by treatment but milk fed calves had a smaller percentage of neutrophils and a large percentage of Lymphocytes. PCV and Haemoglobin values in milk fed group were typical to those raised solely on milk or milk replacers and recieving no supplemental feed. REECE (1984) attributed the significant variations in erythrocytic variables to the stage of claves age.

The control of the development of health condition in calves and especially that of metabolic disorders by clinical methods of examination is very difficult. Often, even impossible, since these disorders usually are of subclinical character. For this reason, the present study was carried out to evaluate the haematological values of blood of buffaloe and dairy calves fed on milk replacer in comparison with those conventionally reared one.

MATERIAL and METHODS

1- Animals:

Newly born buffaloe and cow calves one day age with a total number of 8 buffaloe calves and 10 dairy calves were used for the exprimental work.

Buffaloe calves were divided into two groups (each one consisted of 4 animals) as well as (Jersey crosses dairy calves with native cattle) were also divided in to two groups (every one consisted of 5 calves).

Male and female ratio was equal inboth groups of each species. The 1st group of each species was used for experiment and the 2nd group was used as a control.

All experimental animals were kept under complete hygienic measures with closed clinical observation in the Animal Production Experimental Farm, Faculty of Agriculture, Assiut University. They were housed in a closed barns and were kept on a concrete-slatted floors with a straw bedding. All experimental animals were allowed to exercise frequently and exposed daily to sunshine in an open yards.

All calves were left to suckle colostrum for 4 days then whole milk up to 10 days. The experimental groups were fed milk replacer (Kalbi lactal, Fa. Schaumann W. Germany) up to 4 weeks then followed by milk replacer, starter and clover (Trifolium alexandrinum) hay, and water were freely offered up to the weaning time. All calves were gradually changed from one feeding system to another. The minimum time needed for adaptation was 3 days to assure desired consumption of the diet and to avoid digestive disturbances.

Both control groups were fed on natural whole milk feeding system up to the 4th week when they changed gradually to the starter feeding. The weaning weights of both experimental and control group were around the expected weaning weight (90 kg for buffaloe and 80 Kg for cattle calves respectively).

All animals were weighed at the begining of the experiment and successively every 10 days. All calves were clinically healthy during the period fo experiment.

2- Feeding system:

Milk replacer (Kalbi lactal, Fa. Schaumann W. Germany) was prepared by dissolving 125 gm of milk replacer in one litre of warm water (45°C) for dairy calves and 140 gm/litre

for buffaloe calves. Each animal recieved 1.5 litre/d of the mixture at (38°C). This amounts were increased gradually every 3 days to reach 6 lit./d. at the 10th week. Milk replacer was fed to the calves indivdually by bucket twice daily at 8 a.m. and 4 p.m. Calves were fed a starter (16% protein) and hay was offered ad libitum.

Chemical composition of milk replacer was recorded by the manufucturer Tab. (1) and the percentage of the ingredients of the calf starter Tab. (2).

3- Samples:

Blood samples were obtained from all calves 2-3 hours after morning feeding. First sample was taken after 4 weeks and before offering the starter. And 3 blood samples were taken during the rest period every 21 days interval.

Haematological estimations:

Total Erythrocytic (TRBCs) and Total leukocytic (TWBCs) count, Haemoglobin (Hb) and Haematocrit (PCV) were carried out according to Schalm (1975).

The data were analysed statistically according to SNEDEVOR and COCHRAN (1967). Using t-test and analysis of variance with Duncan's multiple range test.

a) Body gain:

It was observed that the mean weights of the third month by buffalo-calves were significantly increased overall the other two months (P/ 1%). The difference in the second and in the first month was also significant. Asignificant difference between treatment and control were also observed in the third month Table (3), Fig. (2).

Regarding cow-calves, highly significant differences in bod weight gain were also observed (P/ 1%) between months of treatment as well as the interactions between months and treatment (Table. 3, Fig. 1).

b) Haematological picture:

Mean values of the haematological picture of buffaloes and dairy calves were represented in (Table 4,5 and Graphs 2,3).

DISCUSSION

It is of importance to say that the use of milk replacer for feeding of young calves in Egypt is restricted to certain governmental farms. The majority of feeding systems depend on the natural rearing of newly born, especially in narrow scale breeding farms or in individual breeding scattered allover the country. A great amount of milk is yearly lost in youngs rearing. So, most owners remove male buffalo calves before 40 days of age to save milk. Consequently a great economical losses in meat production were occured due to the slaughtering of young buffaloe calves.

Daily gain (Tab. 2 and Fig. 2) obtained in the present study were encouraged. The values achieved a highly significant improvement in both buffaloe and dairy calves reared on milk replacers. The improvement in body gain of dairy calves were superior than those of buffaloe calves. These results were coincied with those obtained by EL-ASHRY, et al. (1975). ALLAM (1986) mentioned that the analysis of variance showed no significant differences between treatment for buffaloe calves, while there are significant differences (P/ 0.01) between months of age. Concerning dairy claves data, the analysis of variance showed significant (P/ 0.01) differences between treatment and months of age.

When evaluating haematological values of calves it is necessary to take into acount the physiological particularities in connection with development and growth of calves (BOUDA and JAGOS, 1984). Homoestasis in calves may be disturbed also by the immaturity of enzymatic system (BOUDA, 1975).

Haematological picture of dairy calves revealed a significant decrease ($P/\_ 0.05$) in Erythrocytic count in some individuals in experimental group if compared with the control one at 7 weeks age. However, the mean values were still within the normal levels of their species (Table 4, Fig. 3). A highly significant increase ($P/\_ 0.01$) in total Erythrocytic count was achieved at 13 weeks of age.

Regarding the TRBCs in buffaloe calves recorded a significant ($P/\_ 0.05$) decrease in comparison with the control group, however, the values were still in the normal range (Table 5, Fig. 4).

Haemoglobin levels (Table 5, Fig. 4) recorded no significant variation along the term of experiment in buffaloe calves, but a significant elevation was observed in dairy calves at 7 weeks of age. However, this variation was within the normal mean values.

Haematocrit recorded no significant variation in both dairy and buffaloe calves (Table 4,5 & Fig. 3,4).

Generally the variations in Erythrocytes, Haemoglobin and Haematocrit were within the normal ranges in both dairy and buffaloe calves if compared with those obtained by BOUDA and JAGOS (1984) in cattle calves and SCHARMA, et al. (1985) in buffaloe calves. However, BRADELY, et al. (1982) recorded that in milk fed calves Haemoglobin and PCV were decreased if compared with conventionally fed calves. In respect to the results obtained by KATUNGUKA, et al. (1985) recorded that PCV and Haemoglobin concentration were declined up to 7 weeks of age while TRBCs count increased up to 10 weeks of age in Friesian blood and Limousine calves under conventionally feeding systems. Total Leukocytes recorded no significant variation between cattle calves milk replacer fed and control one. However, buffaloe recorded a highly significant increase in TWBCs fed milk replacer when compared with control one. The increase in total leukocytic count did not accompanied by any clinical signs of infection. It could be interpreted on the fact that, an elevation in circulating TWBCs under healthy conditions is a physiological status called "Physiological Leukocytosis". This case could be explained on the bases of redistribution of Leukocytes sequestered in collapsed capillary beds during periods of relative inactivity (SCHALM, et al. 1975). REECE (1980) reported that the overall mean leukocytic count was not affected by feeding calves on milk replacers. REECE (1984) recorded that there were no significant difference due to sex or age in TWBcs in calves from one week age up to 15 weeks.

It could be concluded that the use of milk replacer in the feeding of buffalo and dairy calves is recommended for two facts. Firstly, it saves a great amount of whole milk which could be used for human consumption. Secondly, it increase the daily body gain and inhance the growth rates of young calves. At the same time it has no side effects on the animal health if it is used under strict hygienic conditions. We consider that our obtained results is a priliminary studies and need more investigations in the use of milk replacer for early weaning system.

ACKNOWLEDGEMENT

The authors would like to express their gratitude to Fa. Schaumann, W. Germany which participated by milk replacers as a gift.

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Table (1)

Chemical composition of milk replacer "Kalbi lactal, Fa. Schaumann, W. Germany

Item	%	Item	%
Crude protein	27.0%	Lysine	1.98%
Crude fat	5.0%	Calcium	1.0%
Crude fibre	1.0%	Phosphor	1.0%
Crude ash	8.5%	Na-	0.4%
Additives/kg milk replacer:			
Vitamin A	100.000 I.U.	Vitamin E	100 mg
Vitamin D_3	10.000 I.U.	Spiramycin	80 mg
This milk replacer contains:			
Skin milk powder	80.0%	Lactose	10.0%
Animal fat (raffiniet)	4.4%	Wheat bran (mehl)	3.5%
Plant fat (raffiniet)	1.1%	Premix (Vitamins, trace elements and growth stimulating substances)	1.0%

Table (2)
Composition of the calf starter (°)

Ingredients	%	Ingredients	%
Ground Soybean	40.0%	Wheat bran	17.0%
Ground maize	40.0%	Limestone	2.0%
	Salt	1.0%	

(°) The constituents of the calf starter can be altered according to the availability of the ingredients in the country. Soybean protein is attractive for two reasons, firstly its high nutritive value and secondly its availability as a by-product of oil industries.
Crude protein in clover 12.0% (El-Ashry, et al. 1975).

Table (3)
Body weight during the first three months of age for calves fed milk replacer, starter and hay (group A) and whole milk fed calves (Group B)

Item		MONTHS OF AGE I	II	III	Average daily gain
I. Buffaloe calves:					
No.of animals	11*				
No. of animals weaned	8				
Group A		45.58	53.40	73.42	47.0
Group B		45.33	55.83	67.00	360.5
II. Cow calves:					
No. of Animals	10				
No. of Animal weaned	10				
Group A		37.53_{b}^{d}	54.13_{e}^{b}	74.47_{c}^{a}	604.1
Group B		25.87_{b}^{d}	33.20_{e}^{b}	45.20_{c}^{a}	321.1

a,b,c,d,e Means with different subscripts are significantly different P/1%

Means followed by the same letter are not significant at 1% level of probability:

* 3 Buffaloe calves were eacluded from this experiment as they died as a result of failure of blood circulation.

CALVES REARED ON MILK REPLACER

Table (4)
Maematological mean vlaues of cattle calves

Time of sample	Group	TRBcs $x10^6$/cm	TWBcs $x10^3$/cm	Haemoglobin gm/dl	P.C.V. %
4 weeks	Exp. R	(4.6-11.6)	(6.0-12.2)	(6.3-11.2)	(28-34)
	X SE	8.3±1.7	8.05±1.7	9.1±1.2	30.8±1.4
	Control	(8.8-13.6)	(12.2-12.4)	(8.8-14.4)	(30.0-41.0)
		11.1±0.51	12.3±0.08	11.4±0.2	36.7±4.1
7 weeks	Exp. R	(3.6-7.6)**	(5.7-11.4)	(10.7-15.3)	(37-46)
	X SE	5.8±1.0	8.35±1.5	13.9±1.2	40.8±2.3
	Control	(10.7-14.4)	(7.8-13.6)	(7.6-9.98)	(36-44)
		12.03±1.5	9.9±2.3	8.6±0.9	39.3±2.4
10 weeks	Exp. R	(8.4-10.5)	(5.6-15.2)	(10.2-15.2)	(33-37)
	X SE	9.4±0.4	10.85±2.2	13.54±1.1	34.5±0.9
	Control	(9.5-13.7)	(10.5-13.9)	(9.2-11.3)	(32-36)
		11.1±1.3	12.3±0.99	10.0±0.7	34.3±1.2
13 weeks	Exp. R	(11.4-14.5)	(7.8-31.2)	(9.98-11.4)	(32-52)
	X SE	13.5±0.7**	16.4±5.1	10.2±0.8	43.0±4.1
	Control	(9.8-10.4)	(11.7-12.9)	(8.2-11.2)	(34-36)
		9.5±0.7	12.4±0.4	9.9±0.9	36.0±1.2

Table (5)
Haematological mean values of buffalo calves

Time of sample	Group	TRBcs $x10^6$/cm	TWBcs $x10^3$/cm	Haemoglobin gm/dl	P.C.V. %
4 weeks	Exp. R	(7.0-11.8)	(6.8-12.2)	(10.8-13.64)	(20-37)
	X SE	9.45±1.3	8.9±1.4*	12.1±0.59	31.0±4.3
	Control	(6.9-10.1)	(11.6-13.6)	(7.8-15.2)	(24-40)
		8.38±1.1	12.5±0.7	12.6±2.9	31.3±5.7
7 weeks	Exp. R	(6.25-8.8)	(6.4-13.8)	(7.6-14.0)	(26-37)
	X SE	7.5±0.7	9.7±1.9	10.12±1.6	33.5±2.9
	Control	(9.9-12.7)	(8.5-9.6)	(7.6-17.8)	(34-43)
		10.1±1.8	9.23±0.4	13.99±3.9	39.0±3.2
10 weeks	Exp. R	(5.3-9.4)	(6.4-12.9)	(9.0-15.2)	(26-36)
	X SE	7.4±1.0*	10.3±1.6	11.9±1.6	32.3±2.5
	Control	(9.8-10.6)	(12.3-13.8)	(13.2-14.3)	(34-44)
		10.2±0.3	13.2±3.8	14.1±0.6	39.3±3.6
13 weeks	Exp. R	(12.3-14.4)	(20.3-22.4)	(10.8-15.9)	(43-54)
	X SE	13.6±0.6	21.6±0.5**	12.8±1.3	48.0±2.9
	Control	(8.2-10.4)	(11.8-13.3)	(7.9-9.1)	(31-33)
		9.3±0.8	12.4±0.6	8.6±0.4	32.0±0.7

** Highly significant (P/ 0.01)
* Significant (P/ 0.05)

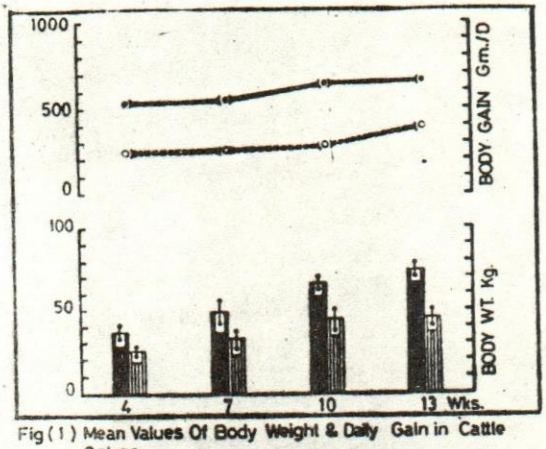

Fig (1) Mean Values Of Body Weight & Daily Gain in Cattle Calves.

Exp gr. Cont. gr. S.E.

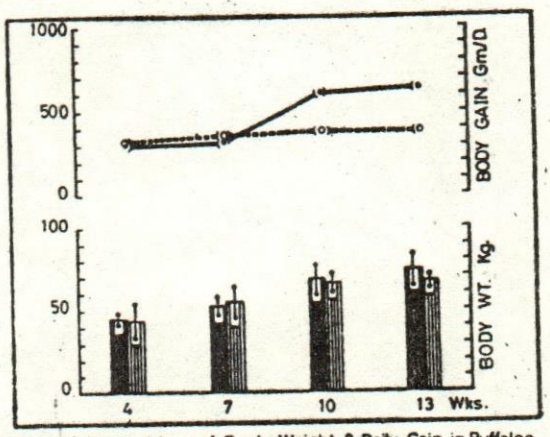

Fig.(2) Mean Values of Body Weight & Daily Gain in Buffaloe Calves.

Exp gr Cont gr. SE.

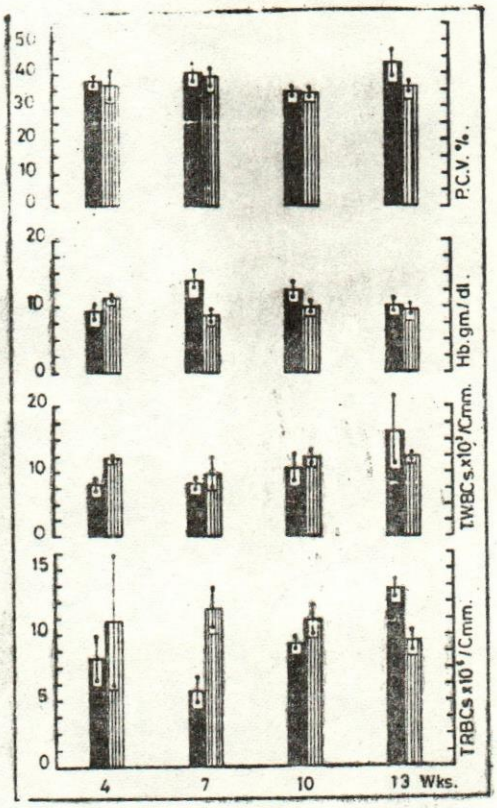

Fig.(3) Haemogram of cattle calves

Exp. group Control gr. S.E.

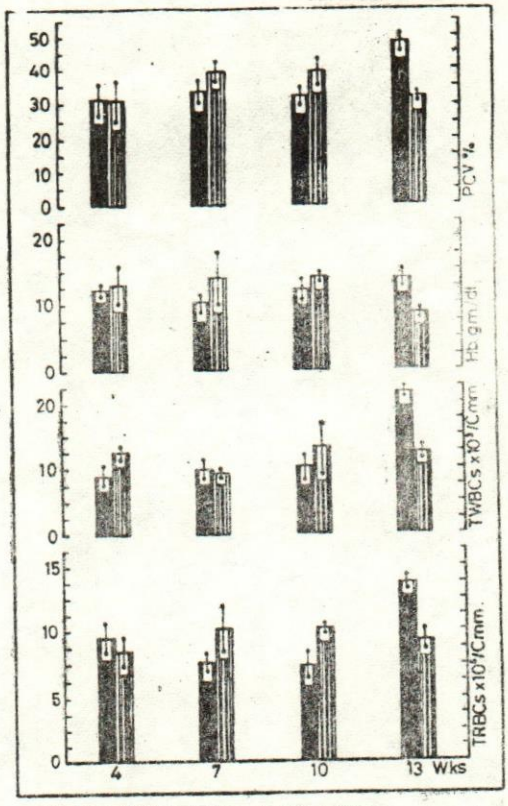

Fig. (4) Haemogram of buff. calves

Exp. gr. Cont. gr. S.E.