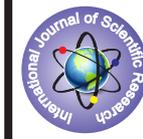


## Intake, growth, carcass characteristics and performance of Male Holstein Calves fed milk replacer with and without reject laban



### Veterinary Science

**KEYWORDS:** Veal calves , milk replacers, reject laban

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### ABSTRACT

Feeding of veal calves with milk replacer is expensive. The cost can be reduced by using reject laban (fermented milk). In suckling period, Eighty Male Holstein calves with an initial average weight of 49.4 kg. were under a randomized complete block design allocated to 4 groups (each group, 20 calves) based on body weight and were assigned at random to either milk replacer or milk replacer with reject laban. Group (1):- (Control) received pure milk replacer 100%, Group (2):- received (50% milk replacer + 50% reject laban), Group (3):- received (40% milk replacer + 60% reject laban) and Group (4):- received (30% milk replacer + 70% reject laban). The calves were fed as per schedule twice daily. Calves were housed in individual hutches with water available free choice from the day received. A high quality, commercial calf starter and alfalfa was available free choice, beginning at day 5 – Weight was recorded every 2 weeks for a 60 - day trial. In weaning period, the same calves were used after, but each group of 20 veal calves was divided into 2 equal sub groups (each sub group, 10 calves) with an initial average weight of 96.9 Kg. based on body weight and were assigned at random to either (beef starter + alfalfa) or complete feed. Weight was recorded every 2 weeks for a 90-day trial. In fattening period, the some sub groups of calves thereafter weaning period were used with an initial average weight of 204.9 kg for beef finisher + Rhodes (replaced of beef starter + alfalfa), but the sub group of complete feed continued. In suckling period, mean daily intake of calf starter did not differ significantly among groups, but was lower for group (1). Average daily intake per calf was 0.792, 0.969, 0.883 and 0.949 kg, for group 1, 2, 3 and 4 respectively average daily gain per calf was 0.810, 0.822, 0.825 and 0.834 kg, for the groups respectively. In weaning period, there were no significant differences ( $P > 0.05$ ) among groups 1, 2, 3 and 4 of beef starter + alfalfa with average daily intake per calf of 3.72, 3.64, 3.65 and 3.86 kg, respectively and for complete feed 3.70, 3.90, 4.30 and 4.10 kg, respectively. There were significant ( $P < 0.05$ ) among groups 1, 2, 3 and 4 of complete feed with average daily gain per calf as 0.92, 0.96, 1.22 and 1.13 kg, respectively) but for beef starter + alfalfa groups did not differ ( $P > 0.05$ ) with average daily gain per calf (1.25, 1.15, 1.21 and 1.20 kg, respectively). In fattening period, there were statistically significant ( $P < 0.05$ ) differences between groups of (beef finisher + Rhodes) and complete feed. The average daily intake per calf (7.4, 7.3, 7.1 and 7.4 kg, respectively) of (beef finisher + Rhodes) and for complete feed (8.2, 8.5, 8.6 and 8.4 kg, respectively). There were no significant difference ( $P > 0.05$ ) among groups of complete feed with average daily gain of 1.34, 1.31, 1.33 and 1.35 kg, respectively. There was no difference ( $P > 0.05$ ) among groups of beef finisher + Rhodes with an average daily gain of 1.36, 1.44, 1.39 and 1.36 kg, respectively. It was concluded that veal production with or milk replacer pure 50% milk replacer + 50% reject laban and either fed beef starter or finisher gave better production performance of calves than those fed complete feed in terms of weight gain.

### INTRODUCTION

Veal calf production is an important sector of animal husbandry, closely related to dairy production. Milk replacers are a very good source of liquid feed for calves. There are economical and, in many situations, are more easily adopted to the labor and facility needs of calf-raising operations than either whole or waste milk (Fowler, 1993 and Heinrichs, *et al* 1995). Veal calves are given a milk replacer diet to obtain the so-called white meat laban is the fermented milk constituted from milk powder and rejected before its expiry day.

Calf starter is very important to healthy rumen development, good body growth and successful weaning of the calf. Calf starter is to transition the calf from the milk feeding period to the dry feeding period. At higher rates of milk or milk replacer feeding, intake of starter decreases (Hodgson, 1971 and Huber, *et al.*, 1984).

#### The objectives of these trials were to:

1. Evaluate the effects on performance of different levels of reject laban, added to the milk replacer diet of veal calves
2. Determine the effects of (beef starter + alfalfa), (beef finisher + Rhodes) and complete feed on intake, growth and carcass characteristics of veal calves
3. Compare the performance, and meat quality of veal calves fed various diets.

### MATERIAL AND METHODS

#### Animals:

Eighty Male Holstein Calves more than one week of age were used in suckling period. Calves were weighed with electronic scale individual. The initial live weight was recorded on the first day of arrival, then were weighed every two weeks until 60-days of age. The average live weight of the calves was 49.4 kg. All calves were housed in individual calf hutches with water free choice from the day received.

Calves were grouped by weight into four groups of twenty calves per group. In weaning period, the same calves were used, but each group of twenty calves were divided into two equal sub groups (each sub group, ten calves) with an initial average weight 96.9 kg.. Calves were sub grouped by weight into eight groups of ten calves per group. Water was available free choice. Calves were weighed every two weeks until 90 days (150 days of age). In the fattening period, the same calves were used by the same sub groups with an initial average weight of 204.9 kg. The sub groups of beef starter + alfalfa, were replaced by beef finisher + Rhodes. The subgroup on complete feed was continued. Water was available free choice. Calves were weighed every two weeks until 75 days (225 days of age).

#### Diets:

In suckling period, four rations were used (100% milk replacer; 50% milk replacer + 50% reject laban; 40% milk replacer + 60% reject laban and 30% milk replacer + 70% reject laban) for group 1, 2, 3 and 4, respectively. A high quality, commercial calf starter and alfalfa available free choice was offered at day five.

In weaning period, two rations were used (beef starter + alfalfa) for sub groups 1, 2, 3 and 4, respectively and (complete feed) for sub groups 1, 2, 3 and 4, respectively. In fattening period, two rations were contained (beef finisher + Rhodes) for sub groups 1, 2, 3 and 4, respectively and complete feed was continued (unchanged).

#### Feeding and Management:

In suckling period, calves were housed in individual calf hutches. They were offered ad libitum alfalfa, but feed and returned feed of calf starter were weighed daily for each calf. Milk replacer with and without reject laban was given as per schedule as below

Calf age/ week	2	3	4	5
Meals / liter / day	2	3	4	5
	6	7	8	
	5	5	6	

In weaning period, they were offered ad libitum alfalfa, but feed and returned feed of beef starter and complete feed were weighed daily for each sub group. In fattening period, they were offered ad libitum Rhodes , but feed and returned feed of beef finisher and complete feed were weighed daily for each sub group. The feed was provided in equal amounts twice daily in the morning and afternoon for all periods. The feed offered was calculated according to the intake of the previous days as follows:

- If the returned feed was less than 10% amount of feed offered, then 100, 200 and 300gms., were added in suckling, weaning and fattening periods, respectively
- If the returned feed was more than 20% amount of feed offered, then 100, 200 and 300gms., were reduced in suckling, weaning and fattening periods, respectively;
- If the returned feed was between 10 A R a n d o m i z e d Complete Block Design was used, in which each diet was allocated at random to one calf per hutch and the data was analyzed by Orthogonal analysis (Steel and Torrie, 1980).

**Ingredients of calf starter and beef starter:**

Soybean meal, Grains, Vegetable oil, DCP, Lime Stone, Salt, Molasses, Minerals and Vitamins.

**Ingredients of Beef finisher:**

Soybean meal, Grains, Fat, Vitamins, Minerals, Lime Stone, Molasses and Salt.

**Ingredients of Complete feed:**

Cereals, Wheat bran, Molasses, Alfalfa, Vitamins and Minerals.

**RESULTS**

The proximate analysis of all feeds were determined by the method adopted by AOAC (1980) the chemical composition of (a) milk replacer, (b) reject laban (c) forages and (d) concentrate is shown in Table(1)below

**Table (1)** the chemical composition of the feeds used in the experiment

<b>(a) milk replacer</b>									
Item	Prot ein%	Fat%	Ash %	CF%	Humid ity %	Lysin %	Methion in+ Cystin%	Ca%	P%
Analys is	20.5	18	9	0.3	3	1.6	0.7	0.7	0.65

**(b) Reject laban;**

Item	protein	Fat	Carbohydr ate	Energy	Calcium	Vitamin D3
Analysis	3.1gm/100ml	3.3gm/100ml	4.7gm/100ml	62 Kcal	119mg/100ml	40/U

**(C) Forages:**

Item	DM	CP	Fat	CF	NDF	ADF	Ca	P	TDN
Alfalfa	90	18	3.4	19.8	36	26.1	1.4	0.3	57
Rhodes	89	12.5	1.9	26.7	57.8	29.4	0.3	0.2	52.5

**(d) Concentrates;**

Item	Calf Starter	Beef Starter	Beef Finisher	Complete Feed
Crude Protein	18%	18%	16%	14. %
Crude Fat	2.5%	2.5%	3%	3%
Crude Fibre	4%	4%	5%	10%

**Table (2):** Body weight gain and dry matter intake of suckling calves fed calf starter with different levels of milk replacer and reject laban;

Group	1	2	3	4
No. of Animals	20	20	20	20
Period days	60	60	60	60
Initial Weight (kg)	46.10	49.08	46.65	48.15
Final Weight (kg)	94.75	98.40	96.15	98.20
Total Gain (kg)	48.65	49.32	49.50	50.05
Average daily gain (kg)	0.810a	0.822a	0.825a	0.834a
Average daily intake (kg)	0.792a	0.969a	0.883a	0.949a

A value within the same row bearing the same superscripts are not significantly different at (P>0.05).

Table (2) shows mean dry matter intake of calf starter and average daily gain for each group during the suckling period. The mean dry matter intake of calf starter was increased at the three different levels of reject laban, added to milk replacer. These means were 0.792, 0.969, 0.883 and 0.949 kg for groups 1,2,3 and 4, respectively. There were no significant difference (P>0.05) between the groups.

However the Control group (group, 1) recorded less intake than the other three groups.

Mean daily weight of veal Calves was 0.810, 0.822, 0.825 and 0.834 kg for groups 1,2,3 and 4, respectively. However ,there was no significant difference (P<0.05) between all groups. The average daily gain on all groups was good.

**Table (3):** Body weight gain and dry matter intake of weaning calves fed beef starter and complete feed with different levels of milk replacer and reject laban;

Parameter	Beef starter groups				Complete feed groups			
	1	2	3	4	1	2	3	4
No. of Animal	10	10	10	10	10	10	10	10
Period days	90	90	90	90	90	90	90	90
Initial Weight (kg)	94.8	98.4	96.2	98.2	95.0	97.8	96.6	98.2
Final Weight (kg)	207.0	201.8	204.8	205.9	177.4	184.6	206.7	199.7
Total gain (kg)	112.2	103.4	108.6	107.7	82.4	86.8	110.1	101.5
Average daily gain (kg)	1.25 <sup>a</sup>	1.15 <sup>a</sup>	1.21 <sup>a</sup>	1.20 <sup>a</sup>	0.92 <sup>b</sup>	0.96 <sup>b</sup>	1.22 <sup>a</sup>	1.13 <sup>a</sup>
Average daily intake (kg)	3.72 <sup>a</sup>	3.64 <sup>a</sup>	3.65 <sup>a</sup>	3.86 <sup>a</sup>	3.70 <sup>a</sup>	3.90 <sup>a</sup>	4.30 <sup>a</sup>	4.10 <sup>a</sup>

Means in the same row with different superscripts are significantly different (P<0.05).

The mean dry matter intake of beef starter and complete feed together with average daily gain for each group during weaning period are given in Table (3). Voluntary feed intake of complete feed was higher but not significant if compared with beef starter. There were no significant difference (P>0.05) among groups 1,2,3 and 4 in both beef starter or complete feed. However groups 3 and 4 of complete feed had a higher intake than that of the others two groups and four groups of beef starter.

There were a loss of weight for group 1 of complete feed. The calves fed beef starter gained significantly (P<0.05) more weight than calves fed complete feed.

**Table (4):** Body weight gain and dry matter intake of fattening calves fed beef finisher and complete feed with different levels of milk replacer and reject laban;

Parameter	Beef finisher groups				Complete feed groups			
	1	2	3	4	1	2	3	4
No. of Animal	10	10	10	10	10	10	10	10
Period days	75	75	75	75	75	75	75	75
Initial Weight (kg)	207.0	201.8	204.8	205.9	177.4	184.6	206.7	199.7
Final Weight (kg)	308.9	309.5	309.3	307.6	278.1	283.1	306.6	301.1
Total gain (kg)	101.9	107.7	104.5	101.7	100.7	98.5	99.9	101.4
Average daily gain (kg)	1.36a	1.44a	1.39a	1.36a	1.34a	1.31a	1.33a	1.35a
Average daily intake (kg)	7.4a	7.3a	7.1a	7.4a	8.2b	8.5b	8.6b	8.4b

Means in the same row with different superscripts are significantly (P≤.0.05).

Table (4) shows the mean dry matter intake of beef finisher and complete feed and average daily gain for each group during fattening period. During the fattening period, the mean intake of beef finisher was 7.4, 7.3, 7.1 and 7.4 kg and for complete feed was 8.2, 8.5, 8.6 and 8.4 kg for groups 1,2,3 and 4 for each feed groups, respectively. Groups of calves fed complete feed had a higher intake than groups of calves fed beef finisher. There was a significant difference (P<0.05) among finisher groups and complete feed groups, but there were no significant difference (P>0.05) among the same feed groups.

There was no significant differences (P>0.05) among both groups of feed. Still there were a loss of weight for group 1 and 2 of complete feed. The calves fed beef finisher gained a little higher but not significant weight

**Table (5):** Mean Weights (kg) of different carcass components and the effect of beef starter, beef finisher and complete feed on calves;

Parameter	Beef (starter + finisher groups)				Complete feed groups			
	1	2	3	4	1	2	3	4
Live weight/Kg	266	293	284	299	247	276	257	291
Carcass weight	134	149	143	150	118	133	124	144
Right front quarter	34	37	35	38	30	33	31	37

Left front quarter	34	38	36	38	30	33	30	37
Right back quarter	32	38	37	38	28	33	31	33
Left back quarter	34	36	35	36	30	34	32	37
Liver	4.5	5.0	5.0	4.5	4.5	6.0	5.0	5.0
Heart	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.0
Kidney	1.0	1.5	1.5	1.5	1.5	1.5	1.0	2.0
Fat distribution	Norm							
Color of meat	White							
% live weight	50.4a	50.9a	50.4a	50.2a	47.8b	48.2b	48.2b	49.5b

Means in the same row with different superscripts are significantly different (P<0.05).

Mean changes in the carcass components of the veal calves after being slaughtered are given in Table (5). There were significant differences (P<0.05) in average carcass weight percentage among the two groups of feed either beef (starter + finisher) or complete feed, but was no significant difference (P>0.05) among the same groups of feed. Calves fed beef (starter + finisher) gave better carcass weight than calves fed complete feed.

**DISCUSSION**

During the suckling period, the mean daily intake of the calf starter was affected by different levels of reject laban. These differences were not significant. This might be attributed to the relationship between milk replacer and reject laban in chemical composition.

This finding agrees with Quigley and Bernerd (1996) who found that the composition of the milk replacer had no effect on weekly body weight gain, intake of milk replacer or calf starter, efficiency of body weight gain or fecal scores. Mean daily intake of calf starter in group, 1 (control group) was lower than other three groups. This decrease may be attributed to the milk replacer which was pure and more palatable. At higher rates of milk replacer, The intake of starter decreased (Hodgson, 1971 and Huber et-al-, 1984).

These was a little (not significant) difference in average daily gain among groups,. Control group (1) had a lower weight than other three groups. This appeared to be due to the milk replacer. This finding agrees with Quigley and Bernerd (1996).

In the weaning period, feed intake showed no significant difference in both, either beef starter or complete feed, but it was a higher in groups 3 and 4 of complete feed. This could be explained by the difference in protein and fat content of the diets et-al Abdalla et al(1988) found that Holstein calves fed a low-protein diet during early growth exhibited compensatory growth during the finishing period. The average daily gain of calves fed beef starter was significantly greater than calves fed complete feed. This was probably due to the higher protein content of the beef starter.

The finding agrees with Gerritset-al-(1996) who reported that efficiency of dietary protein use for body protein gain is highest in young calves and decreases with body size. In fattening period, the voluntary feed intake of complete feed was significantly higher than beef finisher in all groups. This could not be fully explained, but it could be partly due to the protein and fibre content of the diets. This agrees to the findings of Abdallaet-al- (1988) found that Holstein calves fed a low-protein diet during early growth exhibited compensatory growth during the finishing period. No difference recorded in average daily gain of all groups either for beef finisher or

complete feed, but still these was a low find weight a group 1 and 2 of complete feed. This could possibly be due to the low protein content of the complete feed (Table 4) which agrees with Abdala et-al (1988).

### CONCLUSIONS

It was concluded that veal production with beef (starter + finisher) gave better production performance than with complete feed in terms weight gain and carcass weight. Half milk replacer plus half reject laban gave a higher gain. Hence reject laban could be an economical alternative to milk replacer.

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