EFFECT OF CASTRATION AND VITAMIN A SUPPLEMENTATION ON WEIGHT GAIN AND FEED EFFICIENCY IN CALVES

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The effect of castration and vitamin A supplementation on body weight gain and feed efficiency were studied in young male calves. Half of the calves were castrated while the others were left as bulls. Both the groups were fed on an all-concentrate ration containing dried beet pulp, 45 parts; barley, 25 parts; wheat bran, 20 parts; peanut oil meal (50% protein), 10 parts and salt and lime, 0.5 part each. One group was injected five million I.U. of vitamin A, whereas the other group was given half as much at monthly intervals. The average daily weight gain in steers was 2.29± 0.44 pounds as compared with 2.56± 0.51 pounds in bulls over a period of 268 days. This difference was, however, statistically non-significant. The average pounds of feed required per pound of gain was 6.49 for the steer and 5.20 for the bulls. The average daily gain of steers and bulls on high and low levels of vitamin A was also compared. Steers on the high vitamin A level gained 2.38 pounds as compared with 2.18 pounds for steers on the low vitamin A level. Bulls on high vitamin A had an average daily gain of 2.47 pounds as compared with 2.67 pounds for bulls on low vitamin A. No clinical symptom of vitamin A deficiency was observed and it appeared that 250,000 I.U. of vitamin A were sufficient for satisfactory growth during the experimental period.

INTRODUCTION

In certain parts of the world, concentrate feeds constitute the mainstay of livestock since the supply of irrigation water and the climate are not conducive for the regular supply of green forage throughout the year. Predominantly, concentrates are fed to high yielding dairy cattle to improve the efficiency of production. They are also used for fattening the bulls and steers for beef production. Since such rations containing grains and oilseeds are low in carotene contents, it is likely that such animals may develop deficiency of vitamin A. Thus a study was planned on young male calves at Agricultural Research and Experimental Centre, American University of Beirut, Lebanon to investigate the effect of castration and vitamin A supplementation on body weight gains in male calves.

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REVIEW OF LITERATURE

Several experiments have been reported in the literature on fattening beef cattle on all-concentrate rations. Some research workers have used barley as the main ingredient of ration while others have used other cereal grains. Dry molasses beet pulp has not widely been used as other feed stuffs.

Ivanov and Zaharieve (1962) reported trials comparing the performance of bulls and bullocks (steers). Fifty animals of each group were fattened for 240 days; the initial weight was 291 Kg. and approximate age 285 days. The average daily gains of bulls was 1058 gms. and bullocks 952 gms. Bulls required 6.46 feed units per Kg. gains and bullocks 7.20. Bullocks laid down more abdominal fat than bulls. Kercher and Bishop (1963) studied the influence of an all-concentrate ration on the growth characteristics of beef cattle. Fifty-one yearling Hereford steers were fed steam rolled barley, steam rolled oats, steam rolled milo or beet pulp pellets as single grains in addition to a supplement of alfalfa pellets (12.5% of the ration). Average daily gain and feed efficiency were 2.9, 7.15; 3.0, 7.80; 3.1, 7.47; and 2.0, 9.91 for steers fed barley, oats, milo or beet pulp respectively. These differences were statistically non-significant. Preston (1963) fed beef animals a ration consisting of 85% rolled barley and 15% of supplement containing 30% protein. Very satisfactory gains were obtained. However, bloat, acidosis, kidney necrosis and liver abscesses were observed in some animals. Ross and Knodt (1948) studied the effect of vitamin A supplementation on weight gains. Twenty-eight Holstein heifers divided into two groups were given two levels 114,000 U.S.P. and 243,400 U.S.P. units vitamin A daily. Average gain in body weight for low level was 187.6 pounds while in second group it was 235.9 pounds over a period of 18 weeks.

MATERIALS AND METHODS

The plan of the experiment included the use of 24 animals, but only 22 male calves of almost same age and weight were available for this study. They were randomly assigned to two groups designated as group A and group B. The calves in group A were castrated while those in group B were left as bulls. The animals of both of these groups were housed in two separate pens with concrete floors each with an approximate area of 30 ft. × 20 ft. A wooden manger (2ft. × 8ft.) and one automatic waterer were provided in each pen. The pens were partly roofed for protection against sun and rains. Both the groups were fed an all-concentrate ration containing dried beet pulp, 45 parts; barley, 25 parts; wheat bran, 20 parts; peanut oil meal (50% protein), 10 parts; salt and limestone, 0.5 parts each. The proximate analysis of the ration revealed that it contained 14.80% crude protein, 14.77% crude fibre, 1.68% ether extract

and 53.37% nitrogen-free extract. During the last 32 days of the experiment, peanut oil meal was not available and had to be substituted by linseed oil meal. Thus barley was reduced from 25 to 20 parts and 15 parts linseed oil meal was added to maintain crude protein at the same level. Feed was offered every morning and the amount was adjusted daily so that no or little amount of feed was left. They were fed experimental ration for a period of about 267 days when they attained an average weight of about 867 lb.

RESULTS AND DISCUSSIONS

The average daily weight gain in steers was 2.29 ± 0.44 lb. as compared with 2.56 ± 0.51 lb. in bulls when all the animals were included in the analysis. This difference was non-significant. Two of the steers suffered from chronic bloat and two of the bulls suffered from severe lameness during the experimental period. After discarding the data of these animals the average daily gain for steers was 2.45 ± 0.25 lb. and for bulls 2.75 ± 0.33 lb. but the difference was again non-significant. The average daily gain in both groups were higher than the value of 2.0 lb. reported by Kercher and Bishop (1963) for steers fed beet pulp and alfalfa hay. The gains were also somewhat higher than those of Ivanov and Zaharieve (1962) who reported average daily gain of 2.09 and 2.33 lb. in steers and bulls respectively.

When the effect of castration and vitamin A supplementation were considered together, the data presented unequal subclass numbers and was analysed by the method of unweighted means. It revealed non-significant differences between castrated and non-castrated groups or groups with high or low levels of vitamin A supplementation as shown in Table I.

TABLE I.—*Analysis of weight gains.*

Source of variation	D.F.	S.S.	M.S.	F. Ratio
Between sex ..	1	0.1031	0.1031	0.5178 NS
Between level ..	1	0.0090	0.0090	0.0452 NS
Sex into level Interaction ..	1	0.0437	0.0437	0.2195 NS
Error ..	14	..	0.1991	

NS means non-significant.

The average pounds of feed required per pound of gain were 6.49 for the steers and 5.20 for the bulls. The main reason for the better feed efficiency for bulls than for steers is partially due to larger proportion of feed required for the maintenance of the latter group during the experimental period because of their slower weight gains and partly because steers put on more fat than the bulls. This fact was supported on the evaluation of their carcasses. Since the production of fat is more costly caloric-wise than the production of lean meat, the feed efficiency drops when the proportion of fat in the gain is increased. The feed efficiency obtained for both groups is better than reported by Kercher and Bishop (1963) for steers fed beet pulp and alfalfa (9.91) but much higher than 4.76, the value obtained by Preston (1963) for barley fed cattle.

The average daily gain of steers and bulls on high and low levels of vitamin A was also compared. Steers on the high vitamin A gained 2.38 lb. as compared with the 2.18 lb. for steers on the low vitamin A levels. Bulls on high vitamin A had an average daily gain of 2.47 lb. as compared with 2.67 lb. for bulls on low vitamin A. These findings differ from that of Ross and Knodt (1948) who reported higher gain in animals receiving 243, 400 I.U. of vitamin A daily in the feed than animals receiving only 114,000 I.U. The two groups had a daily gain of 1.87 and 1.48 pounds respectively.

No clinical symptoms of vitamin A deficiency were observed and it appeared that 250,000 I.U. of vitamin A were sufficient for satisfactory growth during the experimental period.

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