EFFICIENCY OF FEED UTILIZATION IN FATTENING FRIESIAN CALVES ON RATIONS CONTAINING DIFFERENT SOURCES OF ROUGHAGES

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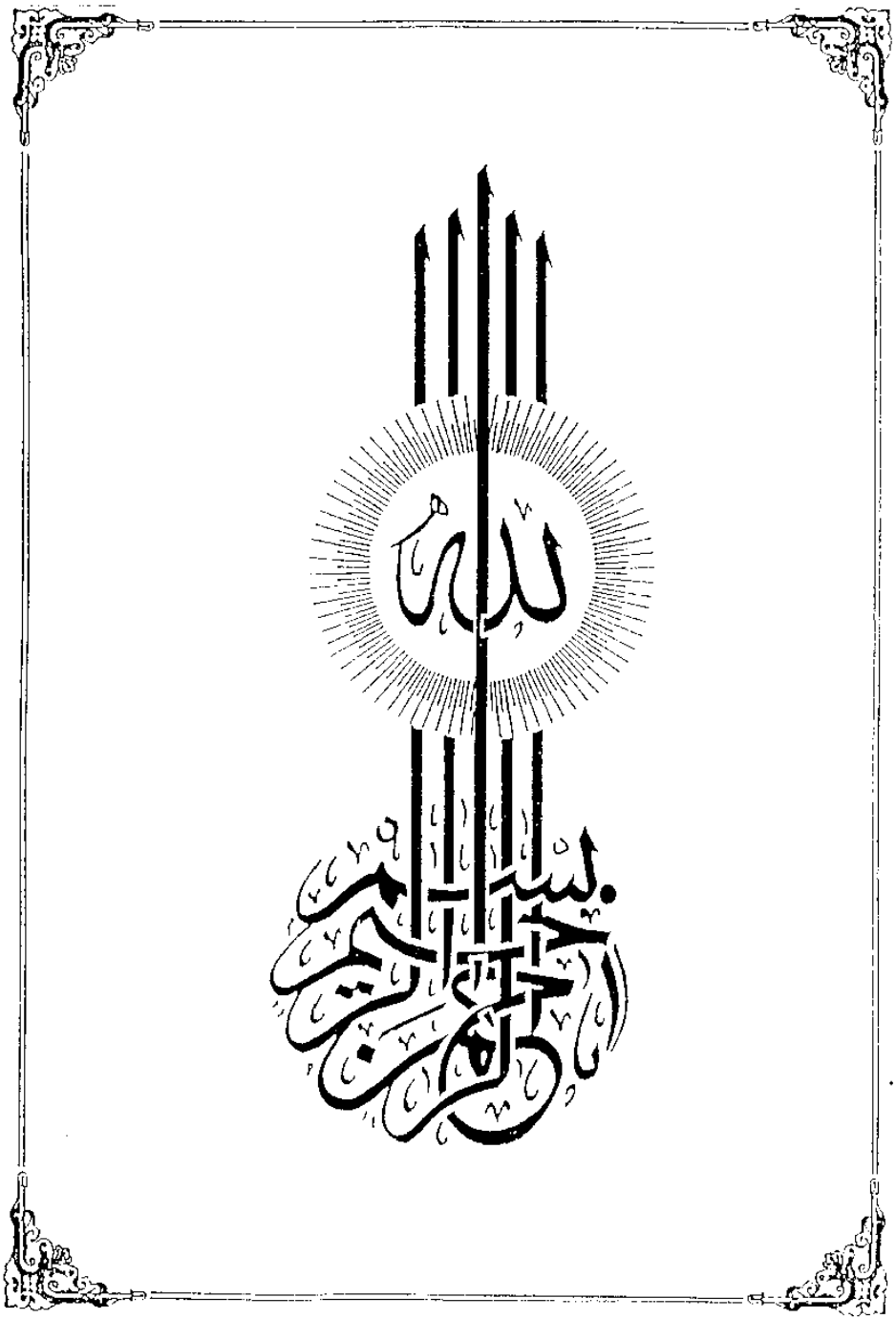

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INTRODUCTION

In Egypt, there is an increasing demand for animal products, especially meat, due to the steady increase in population and the improvement in the living standard. Accordingly, it is of great importance to increase the cattle population, the main source of meat production.

On the other hand, any increase in the number of feeder cattle or stockers suitable for fattening requires more feeds to cover their nutritional needs. The appropriate rations for raising and fattening beef cattle are usually composed of concentrates and roughages at an approximate ratio of 2 : 1.

The main roughage used by practically most of the farmers is wheat straw which is usually very costly, its price may reach or even exeed cotton seed oil cake price. The relatively high price of wheat straw and insufficiency of its production, may contribute a limiting factor in fattening beef cattle.

From the foreign breeds, Friesian cattle proved to be the most adaptable to the Egyptian environment, and therefore, it was recommended to raise them either in pure herds or as crosses with the native cattle.

The objective of this work is to study the efficiency of feed utilisation and the fattening ability of Friesian calves fed isocaloric adequate rations containing different sources of roughage.

Information concerning ruminal activity and function under such nutritional conditions were made available. Total VFA, total nitrogen, ammonia nitrogen, NPN and pH were all determined.

Complementary information concerning the effect of sources of roughage on rumenfill, dressing percentage and carcass boneless meat percentage were also made available from slaughter work applied.

REVIEW OF LITERATURE

Effect of Source and Level of Roughage on Beef Cattle Performance:

1. Growth and fattening:

Weight gain has long been one of the most commonly used criteria of steer response, but is weight gain consistent enough in composition to be a sufficiently reliable measurement, is too much confidence being placed in a measurement that may vary in caloric and protein content, from steer to steer, from treatment to treatment or from experiment to experiment (Meyer et al., 1960).

The observed weight of an animal can, for practical purposes, be considered as the sum of body tissues plus the contents of the digestive tract or fill. Ideaiy, comparisons of animal weights and gains would be based on differences in body tissues. The use of shrunk weights could be more important where comparisons are made between groups of animals fed different rations that may influence the amount of fill the animals contain. The use of average of repeated weights is effective in reducing the errors resulting from fluctuations in fill (Koch et al., 1958)

The influence of the reticulo-rumen fill on initial weight can be minimised by : 1- Allowing a 12-24 h. fasting period from feed and a 12 h. fasting period from water before initial weights are taken. 2- Previously feeding all animals the same ration effects of fill. 3- Recognising that a larg weight gain during the experiment will tend to minimise the effect of initial weight variations (Meyer et al., 1960).

Maymone and Matassino (1962) found that the average daily gain of Dutch Friesian bull calves was 0.89, 1.15 and 1.24 kg. at 3-4, 11-12 and 14-15 months of age, respectively.

In a comparison between beef bred and dairy bred steers, Barton (1968) indicated that daily gain over 381 days fattening period, for about 8 months old steers of, Aberdeen-Angus, Hereford, Friesian, Friesian X Jersey and Charolais X Jersey, averaged 1.01, 1.14, 1.35, 1.22and 1.27 kg., respectively.

Nichols et al. (1964) working with Holstein Friesian calves which were fattened to 600 or to 1000 lb. liveweight, one group as bulls and the other as bullocks to each weight. Bulls gained significantly faster than bullocks to either weight.

Megnwer (1971) found that daily gains for Friesian calves from the beginning of the experiment up to 325 kg. were 0.36, 0.58 and 0.68 kg. for green fadder, 50 %, and 80 % concentrate rations, respectively. The corresponding figuers for native cattle were 0.41, 0.61 and 0.64 kg., while body gains for buffaloes were 0.38, 0.61 and 0.71 kg., respectively.

Swan and Lamming (1967) using yearling Friesian bullocks, found that daily liveweight gain was 7 and 12 % greater with 30 % straw than with 10 and 50 %.

Weiss et al. (1967) found that Hereford X Holstein bullocks fed to appetite on pelleted feeds of dried lucerne meal only or on lucerne meal and concentrates in ratio 6 : 4 or 2 : 8, gained daily 892, 853 and 1088 gm., respectively.

Lister et al. (1968) found that average daily gains were 1.13, 1.12 and 0.99 kg. when Holstein Friesian bullocks were fed on an all-concentrate diet based on barley, or that diet diluted with 20 or 40 % ground hay, respectively. Elliott and Reed (1968) in feeding trials with bullocks fed 5, 20, 35 or 50 % roughage, found that diets with 20 or 35% gave greatest gain.

Ahmed and Tantawy (1954) found that absolute gain per month was higher in buffalo calves than in cow calves during the first two months of age, however the opposite was thereafter.

On Egyptian steers, fattened during summer, Asker and Ragab (1959), reported an average daily gain of 0.64 kg.. An average daily gain of 0.55 kg. was reported by Kamar et al. (1961) when Egyptian steers were fattened from 111.7 to 258 kg. on rations containing 25-40 kg. of Egyptian clover daily with some wheat straw.

An average daily gain of 0.88 kg. in the different fattening seasons was reported by Shehata (1963) on local cattle calves. He, also indicated that the good choice local calves fattened immediately after the green season secured on average daily gain quite comparable with gains of some foreign breeds, namely 0.96 kg.

Ghoneim et al. (1959) reported that the average daily gain for male buffalo calves was 0.46 and 0.61 kg. for the age periods 6-12 and 12-18 months, respectively. However, average daily gains of 0.457, 0.389, 0.553 and 0.445 kg. were reported by Ragab and Abdel-Salam (1963) during the period from 4-6, 6-12, 12-18 and 18-24 months of age, respectively.

On male buffalo calves, Abdel-Malik (1964), stated that average daily gains from 50 days to 6 months, 6-12, 12-18 and 18-24 months of age were 0.64, 0.40, 0.72 and 0.50 kg., respectively. El-Ashry (1968) found that the average daily gain ranged from 761-807 gm., in a fattening trial, on 1.5-2 years old-uncastrated male buffaloes, receiving a ration of poor quality roughage and urea plus moderate amounts of concentrates.

El-Hakim (1971) reported that average daily gains were 0.292, 0.658 and 0.665 kg. for male buffalo calves fed 100 %, 50 % and 20 % roughage rations, respectively.

Ittner et al. (1954) found a significant difference between the gain of steers fed only roughages, and those fed on rations containing roughage plus concentrates. Bacvanski et al. (1969) and Hironaka et al. (1968) reported that higher intake of concentrate permitted greater rates of gain. Similarly, Wagnon et al. (1960) stated that high roughage rations do not permit a high rate of gain or quick finish, especially for young cattle.

De Luca and Pierani (1960) worked on 3 groups of young bulls, one group was fed in the traditional way, on roughage alone until the last three months when concentrates

were given liberally (about 5 kg. daily). The second group was fed on roughage and moderate amounts of concentrates, 1 to 2 kg. throughout rising to 5 kg. at the end. The last group had less roughage and more concentrates, 3 to 5 kg. throughout. The last group gained 1.00 kg. daily, the corresponding values for the traditional and moderate concentrate groups were 0.794 and 0.907 kg., respectively.

Richardson et al. (1961) found that a ratio of 1 : 5 (roughage to concentrate) gave greater gains than the ratios of 1 : 1 and 1 : 3.

Bucy and Bennion (1962) concluded that steers fattened on 70, 85 and 95 % concentrate ration gained 2.8, 3.19 and 3.27 lb., respectively.

Brown et al. (1964) using high roughage mixtures containing up to 30 % grass hay and snapped corn as the major energy source and high energy mixtures having only 8 % alfalfa or 10 % grass hay with shelled corn as the major ingredient. Average daily gains of calves were 2.18 and 2.32 lb. for the high energy and the high roughage mixtures, respectively.

Conrad et al. (1967) compared feed mixtures containing cottonseed hulls, rice hulls, ammoniated rice hulls,

flax shives and alfalfa hay at levels of 10 and 20 % with control mixtures of 100 % concentrates and 10 % polyethylene. Average daily gains were not significantly influenced by the treatments.

Dyer and Ensminger (1967) compared diets containing 30 % roughages; alfalfa and wheat straw, 30.0, 20-10, 10-20 and 0-30 %. The average daily gains were 2.48, 2.61, 2.26 and 2.39 lb., for the four treatments, respectively.

Rovera et al. (1969), with Nellore bulls compared rations containing 15 % rice straw, 75 % maize cobs or rice straw and 40 % maize cobs. Average daily gains were 1300, 217, 740 and 620 gm., respectively.

Harry La Touch and Walter Woods (1968) found that feeding rations with 15 % roughage supported significantly faster gains than did rations containing 2.5 % or 3.5 % of oyster shell and 5 % dehydrated alfalfa.

Matsushima et al. (1968) reported that, rations containing oyster shell as source of roughage did not decrease average daily gain.

Larson et al. (1968) compared an all-concentrate diet, 3 % oyster shell, 3 %, 10 % and 20 % ground alfalfa hay. Average daily gains were 1.30, 1.31, 1.50, 1.52 and 1.50 kg., respectively.

Perry et al. (1968) found that beef calves fed ground corn cobs in its natural ratio to ground shelled corn gained significantly faster than those fed a ration in which 2.5 % of hen sized oyster shell was substituted for ground corn cobs.

Williams et al. (1968) observed that including oyster shell in rations containing ground ear corn or ground shell corn was accompanied by a decrease in the average daily gain.

White and Reynolds (1968) working with beef steers indicated that increasing the level of rice straw from 20 to 40 % caused a decrease in the average daily gain from 1.23 to 1.09 kg., while an increase of the average daily gain from 0.92 to 0.98 kg. was observed when the level of alfalfa hay increased from 20 to 40 %.

The same trend was also observed when the level of rice straw and alfalfa hay increased from 5 to 20 % (white et al., 1969). It was reported by the same investigators that steers receiving the 20 % rice straw rations gained faster than those fed rations of 40 % rice straw, 20 or 40 % alfalfa hay, 20 % rice hulls, 40 % dehydrated sudangrass pellets, 20 % polyethylene and all concentrates.