D. **Mineral and Vitamins**—These are thought to diffuse directly from the blood into the secretory tissue of the gland, although the concentration of some compounds (e.g. - Calcium) is much greater in milk than blood. Kamal and Cragle (1962) found that Ca45 and P32 injected into the veins was the source of milk calcium and phosphorus as found in the plasma ultrafiltrable fraction.

E. **Energy**—Where does the energy for milk synthesis come from? Barry (1959) believes it is from the oxidation of acetate in the tricarboxylic acid cycle. There is evidence that the ruminant can not change glucose to acetyl-Coenzyme A and oxidize it in the tricarboxylic acid cycle.

Glucose is slowly oxidized by tissues, suggesting the pentose phosphate cycle, (Glock and McLean, 1958). In rats glucose is so oxidized via acetyl-Co A through the tricarboxylic acid cycle, but must of it is oxidized via the pentose phosphate cycle.

Summary

Milk synthesis is a complex process, but many questions have been answered. The precursors and the sites of milk nutrient synthesis are fairly well known. It is still a mystery how the tiny milk secreting cells of the udder can synthesize milk components from such diverse precursors.

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Concentrates and Roughages

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Recent reports by Geurin, **et al,** (1959); Anthony, **et al,** (1960). Wise, **et al,** (1961); Richardson **et al,** (1961); McCroskey **et al,** (1961), and many others have pompted many tials and much discussion as to the proper levels of concentrates and roughages in the diets of fattening cattle. These trials were conducted to determine the desirable lebel of hay to include with other ingredients of the typical California cattle fattening mixture.

PROCEDURE

TRIAL I. One hundred and twenty-seven Hereford steers were placed on pasture February 20, 1960. At this time one-half of the steers were implanted with a half dose of Synovex. The animals ran together on pasture until June 5, when they were brought into the feedlot. The steers were all implanted with Synovex and were started on the test mixtures on June 25. The steers that had been implanted on pasture were sorted and placed in the odd numbered pens and the steers being implanted for the first time were put in the even numbered pens. The 127 steers were divided into ten pens of twelve or thirteen animals each; four pens were placed on a 70% concentrate mixture, four pens on an 85% concentrate ration, and two pens were fed a 95% concentrate diet. The only difference in the mixture was the amount of hay included in the ground, mixed rations. (See Table I for feed mixture used.)

TABLE 1.
BEEF CATTLE TRAIL SUMMARY JUNE 25—OCTOBER 10, 1960 (107 DAYS)

Pen	Treatment (% Concentrates)	Animals	Average Wt. Initial	Average Wt. Final	A.D.G. lbs	Feed/Day lbs.	Feed/lb. Gain	Carcass Data Yield	Carcass Data Grade
1		13	803.0	1108.5	2.86	29.0	10.1	59.3	13 C.
2		13	756.9	1059.6	2.82	28.1	10.0	59.3	13 G.
4	70% 8,500 I.U. Vit. A.	13	768.0	1051.2	2.65	28.0	10.6	59.8	16 C.
8		13	758.7	1068.4	2.89	28.5	9.9	59.8	10 G.
5	85%	13	865.0	1220.3	3.32	28.8	8.7	61.5	24 C.
6	85%	12	816.8	1173.7	3.34	27.9	8.4	61.5	1 G.
7	95%	12	894.4	1254.4	3.36	27.7	8.2	61.8	23 C.
8	95%	13	859.2	1199.9	3.18	27.0	8.5	61.8	2 G.
9	85%	13	723.7	1015.8	3.00	24.3	8.1	60.4	19 C.
10	85%	12	767.6	1074.3	3.10	25.5	8.2	60.4	6 G.

All weights taken between 6:00 and 7:00 A.M. before feeding and a 5% shrink taken. Animals in odd numbered pens were implanted with Synovex February 20, when turend on pasture. All animals were implanted with Synoverex when started in feedlot June 25.

Concentrate mixture used: Steam rooled barley 71%, Steam rolled milo 5%, Dried beet pulp 9%, Cottonseed meal 5%, Dehy. alfalfa meal 1%, Oyster shell 5%, Salt 0.5%, and Molasses 8%. The roughage portion of the diet was Oat and Vetch hay. Steam bone meal and salt were fed free choice.

TRIAL II. One hundred and fifty-one yearling Hereford steers were taken off pasture May 15, 1961, divided into twelve groups of twelve or thirteen animals each, and placed in the feedlot. All animals were implanted with Synovex when placed in the feedlot. Eight groups of steers were started on an 85% concentrate mixture and the other four groups were fed a 100% concentrate diet. After 30 days on the 100% concenerate ration the four groups were changed to 95% in an effort to improve feed consumption and gains. The feed mixtures used were similar to those used in Trial I. (See Table II.)

The animals in both trials were fed morning and evening and checked at noon. Feed was kept before the steers at all times. The animals were weighed every 15 days to check rate of gain, feed efficiency, and cost of gains. The weighings were made between 6:00 and 7:00 A.M. before feeding, and a 5% shrink was taken. The animals were sold on the same basis at the end of the tests.

RESULTS AND DISCUSSION

The summary of Trial I is given in Table 1. The rate of gain, feed efficiency, and cost of gains were very uniform throughout the trial for the various treatments. There was a consistent improvement in gains and lowering in feed required per pound of gain in the 85% and 95% concentrate diets over the 70% concentrate mixes. As a result, the cost of gains were more expensive in the 70% concentrate rations. When slaughtered at the end of 107 days on feed, the lowest energy groups had a 59% yield and only 50% of them graded choice. There appeared to be no difference between the other two energy level groups. They had a dressing percent of 61% and about 90% of them graded choice. No difficulty was experienced during the trial on any of the mixtures with bloat, founder, or animals going off feed. Feed consumption was good with the higher energy level groups consuming less pounds of feed per day. There was no improvement in pens 3 and 4 over pens 1 and 2, due to the addition of 8,500 I.U. of Vitamin A per animal per day. The steers implanted on pasture and again in the feedlot gained as well or better than those not implanted on pasture.

In Trial II the animals receiving the 85% concentrate diets ate and gained extremenly well throughout the test, as can be seen from Table 2. The pens of animals on the higher concentrate level did not eat as well and did not gain as well for the first two weigh periods. At this time 5% hay was added to the mixture for these steers and it was continued through the remainder of the test. There was no bloating problem with any of the steers but three of the animals on the higher concentrate level showed some stiffness during the trial and they did not gain as well as the other groups. There was no improvement in the cattle due to adding the commercial protein supplement to groups 9 and 10 when compared to groups 11 and 12. The animals were slaughtered after 140 days feeding. There was no apparent difference in dressing percent, however the higher concentrate level steers were not as well finished and had less desirable carcasses, as is shown by the data in Table 2.

TABLE 2.

BEEF CATTLE FEEDING TRIAL SUMMARY JUNE 1—OCTOBER 18, 1961 (140 days)

Pen	Treatment (% Concentrates)	Animals	Average Wt. Initial	Average Wt. Final	A.D.G. lbs	Feed/Day lbs.	Feed/lb. Gain	Carcass Data Yield	Carcass Data Grade
1	85%	12	752.0	1193.8	3.11	26.0	8.2	62.0	21 C.
2	85%	13	741.8	1102.2	3.24	25.1	7.8	62.0	4 G.
3	85%	12	694.6	1167.3	3.33	25.0	7.6	62.0	20 C.
4	85%	13	748.3	1217.4	3.31	26.8	8.0	62.0	5 G.
5	85%	13	716.2	1142.1	3.23	22.3	7.1	60.8	21 C.
6	85%	13	644.2	1037.6	2.81	21.8	7.8	61.6	5 G.
7	85%	12	767.8	1127.5	3.22	24.1	7.5	61.7	21 C.
8	85%	13	683.7	1093.6	2.92	23.1	7.9	61.7	4 G.
9	100%* + Fatena	12	683.2	1049.8	2.80	21.1	7.5	61.4	18 C.
10	100%* + Fatena	13	652.5	1016.3	2.90	20.2	7.0	61.4	7 G.
11	100% No Fatena	12	665.0	1059.6	3.0	22.0	7.3	61.7	19 C.
12	100% No Fatena	13	692.8	1117.0	3.26	23.3	7.2	61.7	6 G.

* These groups changed to a 95% concentrate mixture after 30 days on trial. All animals were weighed between 6:00 and 7:00 A.M. and a 5% shrink was taken.

Feed mixture used. **85% concentrate.** Steamed rolled barley 62%, Dried beet pulp 5%, Cottonseed meal 6%, Dehy alfalfa meal 1%, Molasses 5%, Oyster shell .5%, Salt.5%, Oat and Vetch hay 15%. Steam bone meal and salt were fed free choice.

SUMMARY

Two trials were conducted using concentrate levels of 70%, 85% and 100% in fattening yearling steers. In these tests the 85% and 95% concentrate levels were the most desirable using rate of gain, feed efficiency, costs of gain, and carcass yield and grade as measures. There was no apparent difference between the 85% and 95% levels when used through the entire feeding period. The animals started on the 100% concentrate rations did not gain as well, gains were more expensive, and some developed stiffness in their legs. There was no advantage in adding a commercial supplement to the regular diet in the high concentrate mixes. The addition of 8,500 I.U. of Vitamin A per animal per day to the basal diet made no apparent difference.

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NEWS ITEMS

Willis J. Hudleston, Director of Agriculture at Tennessee Tech suffered a heart attack in November and is reported to be recovering nicely. We wish for him a speedy and complete recovery.

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