

and dried orange pulp with 85.05 percent dry matter, contained 75.99 and 69.55 percent of total digestible nutrients. The dried grapefruit pulp contained 1.20 percent digestible crude protein and the orange pulp 2.14 percent. They found that grade heifers fed a daily ration of 30 pounds of silage, five pounds of cottonseed meal and 15 pounds dried grapefruit pulp per 1,000 pounds live weight for 120 days were thrifty in appearance and made an average gain of over one pound per day. In this trial 54 percent of the dry matter and 60 percent of the digestible nutrients were furnished by the dried citrus pulp. The digestible nutrients required for 100 pounds gain for the four 30-day periods ranged from 426 to 612 pounds, with an average of 488 pounds. Shealy, Kirk and Crown (7) found that steers fed the same amount of ground snapped corn and cottonseed meal with either Napier grass, sorghum or sugarcane silage, required 630, 616 and 627 pounds of digestible nutrients, respectively, for each 100 pounds gain. Arnold, Becker and Neal (1) found dried citrus pulp a desirable bulky concentrate for dairy cattle.

Citrus molasses was first produced in commercial quantities in 1941. Becker, Arnold, Davis and Fouts (3, 4) estimated that it contained 1.4 percent digestible crude protein and 56.7 percent total digestible nutrients. Although citrus molasses is bitter, cattle soon learn to like it and steers fed at the Range Cattle Station ate an average of 6.5 pounds daily for 120 days.

The value of citrus by-products as feeds has been summarized by Becker, Arnold and Davis (2). Fresh grapefruit pulp, dried citrus pulp and citrus molasses are palatable and good sources of energy, but all are low in protein.

Experimental Procedure

Three dry-lot feeding trials of 120 days each have been completed at the Range Cattle Station. Eight steers were fed in 1945-46 and 10 steers in both 1946-47 and 1947-48. In every trial there was a preliminary feeding period of from seven to 10 days.

Of the 28 animals fed, 19 were yearlings and nine two-year-olds when placed on test. All the steers were at least one-half Brahman, with some Shorthorn, Devon or Hereford blood tracing back to native stock. Weights were taken on three successive days at the beginning and end of each trial and at weekly intervals throughout the trial.

All animals were fed individually and were housed in stalls