

Purification of Bovin G-Actin and the Formation of Its Polymer

J. J. Guenther

Experimental material consisted of bovine longissimus dorsi muscle from which the myofibrillar protein, Myosin, had been previously extracted. Following a series of washings of this minced muscle residue with NaHCO_3 , distilled water, and n-butanol an acetone-dried muscle powder was obtained. Aliquots of the dried muscle powder were extracted with 2×10^{-4} M ATP solution. The resulting extract, which contained crude G-Actin, was clarified via high speed centrifugation (spinco model L, No. 30 rotor, 10,000 rpm., 60 min.). The G-Actin was then transformed into its polymer, F-Actin, by adding 2M KCl. After a series of washes with the ATP solution, each followed by ultracentrifugation (30,000 rpm. for 3 hours), purification was effected. G-Actin was recovered by depolymerizing the purified F-Actin. This was accomplished by dialyzing the F-Actin against aqueous ATP solution.

Sedimentation patterns obtained on the G-Actin preparation showed a single, sharp peak, indicating purity and molecular homogeneity. Chromatographic separation on Bio-Rad P-100 gel also suggested purity of the G-Actin preparation. Electropherograms, obtained on polyacrylamide gels, showed the G- and F-Actin preparations to consist of 9 and 8 electronegative components, respectively. Electrophoretically, G-Actin differed from its polymer only in that it contained an additional highly mobile, anionic component.

Beef Feeding

Improving the Nutritive Value of Milo for Fattening Beef Cattle

D. G. Wagner

Although milo and corn have quite similar chemical compositions, milo has only about 85 percent the feeding value of corn for fattening beef cattle. The lower efficiency appears to be due in part to a lower availability of the carbohydrate fraction in milo. It has now been demon-

strated that processing methods such as steam flaking, reconstitution, high moisture harvesting, and others are beneficial for improving the nutritive value of milo. Both feedlot and laboratory studies are currently in progress to determine the influence of processing factors on the nutritive characteristics of milo and to more fully elucidate the manner in which processing factors improve nutrient utilization.

Publications

The following articles have been published from this project during the past year:

- Franks, Larry G. 1969. The effect of milo processing method and type of grain on VFA production and feedlot performance. M.S. Thesis.
- White, Dennis. 1969. Feedlot performance, net energy and carcass merit as affected by high moisture vs. dry methods of processing milo. M.S. Thesis.
- White, Dennis, Robert Renbarger, James Newsom, Vincent Newhaus and Robert Totusek. 1969. High moisture and dry methods of processing sorghum grain. J. Animal Sci. 29:175. (Abstract)
- Newhaus, Vincent and Robert Totusek. 1969. Factors affecting *in vitro* digestibility of high moisture sorghum grain. J. Animal Sci. 29:167. (Abstract)

A Study of the Effect of Previous Plane of Nutrition and Compensatory Gain Upon Energetic Efficiency of Beef Steers Using Respiration Calorimetry

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In order to get a critical measure of the effects of previous plane of nutrition and subsequent compensatory gain upon efficiency of energy utilization, respiration calorimetry is being employed to measure all of the losses of energy and energy stored in the body of steers. Twenty-four Hereford steer calves were divided into three equal groups on the basis of weight and are being fed a high energy ration in individual stalls. One group (Lot 1) will be full-fed for maximum gain to slaughter weight. Lot 2 will be fed to gain one pound per head per day for approximately 200 days then will be full-fed for the remainder of the

feeding period. Lot 3 will be fed at a maintenance level for approximately 200 days then will be put on full-feed.

Four steers in each lot will be brought in to the metabolism room at pre-determined time intervals and placed in open-circuit respiration chambers for digestion and energy balance trials to partition energy losses and energy gain.

The steers were started on trial in December, 1969 and the trial will be completed sometime in 1970. Results of the study will be presented in the 1971 Research Report.

Swine

Preparation of Milo and Wheat for Growing-Finishing Swine

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The objective of Project 1420 is to evaluate various methods of preparation of milo and wheat fed to growing-finishing swine as related to daily gain, feed utilization, feed intake and certain carcass measurements.

Most grain utilization studies in the past with swine have involved corn. However, corn is not a major crop in Oklahoma and, therefore, is not used extensively as a feed for swine. Traditionally milo has been the chief feed for swine in Oklahoma. In recent years wheat has been competitively priced with other cereal grains to suggest its use as a feed for swine. Trials will be conducted to study methods of preparation to improve the feeding value of both these grains.

Previous research in this project has shown that wheat will tend to support similar gains as milo especially when equal amounts of supplemental protein were used. However, significantly more feed was required per pound of gain when wheat replaced all the milo. When only 50 percent of the milo was replaced with wheat, feed utilization was not appreciably affected.

The results obtained from 2 trials conducted to study the effect of particle size of grind and dry rolling of wheat and milo for growing-finishing swine is reported in this publication. No appreciable differences