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EFFECTS OF VARIOUS FACTORS ON THE RACHITOGENIC

ACTIVITY OF ISOLATED SOY PROTEIN

D. J. Arshem<sup>1</sup> and C. W. Carlson<sup>2</sup>

The nature of the rachitogenic activity of isolated soy protein was investigated in fifteen studies. An isolated soybean protein-glucose purified diet was fed to day-old turkey poults housed in stainless steel batteries. Feed and water were provided ad libitum.

Corn, oat hulls, solvent-extracted soybean meal, full-fat extruded soybeans, isolated soybean protein, casein and texturized forms of soy protein were added to the basal diet at various levels. All feedstuffs were added at two particle sizes: natural form of the feedstuff (greater than 250 microns); and ground in a ball mill (less than 250 microns). The effects of autoclaving for 60 minutes at 120° C were also investigated.

Calcium, phosphorus and Vitamin D<sub>3</sub> levels were maintained at or above the National Research Council recommendations in all diets. Parameters used for evaluation of the rachitogenic activity were body weight, percent bone ash to indicate extent of calcification and percent mortality at the end of the four-week trials.

The following conclusions were derived from these investigations:

1. Substitution of corn, oat hulls or solvent-extracted soybean meal at 5% of the basal diet improved the poults' body weight and bone ash. Grinding these natural feedstuffs to less than 350 microns eliminated these beneficial effects.

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2. The addition of 3% feed grade dicalcium phosphate to the isolated soy-glucose basal diets improved the poults' body weight and percent bone ash regardless of the particle size of the product.
3. Grinding a practical turkey starter to less than 250 microns greatly depressed body weight and bone ash of the poults.
4. Autoclaving the isolated soy protein of the basal diet improved the poults' body weight and bone ash. Grinding the autoclaved diet depressed the poults' body weight and bone ash. These responses are different and separable since the order can be reversed. For example, grinding first or autoclaving first followed by the other produces similar results.
5. Soaking and drying either the protein portion or the sugar portion of the diet was not a means of increasing the effective particle size of the diet.
6. Texturized forms of isolated soy protein were not effective means of overcoming the rachitogenic effect of small particle size.
7. Levels of phytic acid comparable to that present in soy protein did not produce any inhibitory effects when added to casein-glucose diets.