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THE NUTRITIVE VALUE OF THE PINTO BEAN IN THE DIET OF MEXICAN CHILDREN*

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In an earlier study concerning the nutritional condition and diet of Mexican children Mrs. Wilkins found that the children were below normal height and that their average gain in height per year was below the average yearly gain for both boys and girls. Also, the children were underweight, the average for the group being about 6 per cent below the standard aver-

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age weight. There were in addition many other signs of a poor nutritional condition.

In order to see what relationship there was between the nutritional condition and the diet, a survey of the dietary habits of the children was made. Pinto beans were found to be an important article of diet, in most cases being the only vegetable eaten. One-fourth of the children ate them at least twice in one day. Over two-thirds of the children ate them daily.

Because the children were under average height and weight and because the pinto bean was an important article of their diet, Mrs. Wilkins decided to investigate its vitamin A content, which is concerned with growth. Young white rats, as soon as weaned, were placed on a vitamin A free diet, one complete in every other way for the rat's nutrition, a diet suggested by Sherman. The rats were kept on this diet until their body stores of vitamin A were depleted, an average of 34 days. Evidence of this condition was the appearance of xerophthalmia and cessation of growth. Then, the rats were placed in cages in groups of two; one group of negative controls that were continued on the basal vitamin A free diet; one group of positive controls that were fed, in addition to the basal diet, 82 milligrams of butter fat daily in the case of Experiments I and II and 34 milligrams of butter fat daily for Experiment III; and three groups of experimental animals fed 1, 3 and 5 grams respectively of the cooked pinto beans in addition to the basal diet. The beans thus formed the only possible source of vitamin A. In each case there were two animals to the group. There were three sets of experiments. Experiments I and II were run simultaneously while Experiment III was carried out later.

RESULTS

The usual length of such experiments is five to eight weeks. In Experiment I, one animal fed 5 grams of beans plus the basal diet died after three and one-half weeks on the diet and all but one were dead by the end of the seventh week. One animal fed 3 grams of beans lived 62 days on the experimental diet. All of the experimental animals lost weight almost every week until death. At the end of the experimental period the positive controls were in excellent condition. In Experiments II and III, as in Expriment I the experimental animals all lost weight rapidly and died, in Experiment II by the end of the seventh week and in Experiment III by the end of the eighth week.

The amount of beans fed did not have a very great effect. In Experiments I and II adding beans to the diet did not cause any greater length of life. In fact there was a decrease in a few cases. In Experiment III the animals fed beans lived longer than the negative controls. Also, increasing the beans in the diet caused a slight increase in the length of life. The averages for the negative controls and all of the experimental animals show that the negative controls did not live as long as the experimental animals and that increasing the beans slightly increased the length of life of the animals.

So far as weight is concerned, the amount of beans fed was not especially significant. In a few cases the animals fed large quantities did not lose weight so rapidly as the others, but the results were too irregular to point to any definite conclusions. The loss per week, except in Experiment III, was greater when the animals were fed beans than in the case of the negative controls.

Other factors noted were that all of the animals some time during the experiment developed an eye infection. In the case of the positive controls, this condition cleared up 12 days after the butter fat was added to the basal diet. All animals except the positive controls showed evidence of kidney trouble. Nine out of 22 experimental animals had infected

bladders, four had pus bags on the lungs, several had spots on the lungs and abnormal conditions in the intestinal tract and liver, and 10 had pus formations at the root of the tongue. The beans were thus unsatisfactory for growth and maintenance of life, and also were ineffective in preventing infections usually present when the diet is lacking in vitamin A. Apparently it was impossible to feed enough of the pinto beans to cause normal growth and adequate nutrition in the rat.

It was calculated that one gram of the beans, the smallest amount fed, would correspond to one cup of beans in the diet of a Mexican child. Five grams would thus represent five cups, more than one child would eat in one day. While the results show that the beans may possibly contain a slight amount of vitamin A, in that the length of life is inconsiderably increased in a few cases, but is not sufficient to provide enough vitamin A for adequate growth and satisfactory nutritional condition. Because the pinto beans occupy an important place in the diet of the Mexican child, they are possibly partially responsible for the underweight, underheight and low nutritional condition of the Mexican children studied.

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