

most of these, if not all, were cases of sporotrichosis(5). The clinical signs are characteristic and lack of them would tend to eliminate this possibility in the case in question. Da Rocha Lima(6) first made the interesting observation that the parasitic yeast cells of *Cryptococcus farciminosus* and *H. capsulatum*

are very similar. Comparison of the two fungi in tissue culture might establish significant differences.

Summary. Intracellular organisms resembling *Histoplasma capsulatum* have been observed in apparently normal amnio-allantoic membrane and adult horse spleen maintained in tissue culture.

The significance of this finding and comparison with another fungus *Cryptococcus farciminosus* is discussed.

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Improvement of Protein Quality of Whole Wheat.* (19100)

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In the course of experiments designed to study the suitability of shredded wheat materials in low sodium diets some interesting observations on the improvement of the biological value of the protein of whole wheat have been made.

Experimental. The biological value of whole wheat products was assayed by the growth response of weanling albino rats fed a standard diet of the following composition: Wheat products: 86%, corn oil 8%, cod liver oil 2%, salt mixture(1) 4%, choline 0.1% and contained per kilo of diet, thiamine 4 mg, riboflavin 8 mg, nicotinic acid 40 mg, calcium pantothenate 40 mg, pyridoxine 4 mg, biotin 1 mg, folic acid 0.5 mg, α -tocopherol 40 mg, and meradione (vit. K) 4 mg. On this diet the only variable element was the protein component (wheat product). Five groups of eight weanling albino rats, comparable as to weight, were put on the following diets: Control group: whole wheat; assay groups: whole wheat cooked; whole wheat cooked and fan dried; whole wheat cooked, fan dried, shred-

ded, baked and oven-dried—commonly known as “shredded wheat”; comparison group: white flour. All of these wheat preparations were fed at a level of nitrogen such that they furnished 8.6% protein. Slight variations in the per cent of wheat product in the diet as a result of varying nitrogen content were equalized by the addition of the proper percentage of glucose. The rats were housed in individual cages and fed the above diets and water *ad libitum* for a period of five weeks. Records were kept of the daily food intake and the animals were weighed twice a week. The essential details of the heat treatment of the whole wheat are as follows: cooked, the whole wheat is cooked in boiling water for 38 minutes; fan dried, the cooked product is dried in a rapidly moving current of air at a tempera-

TABLE I. Average Gain of Wt of Weanling Rats Fed Wheat Products at Various Stages of Processing.

Basal diet with the following sources of protein, all fed at a level of nitrogen to give 8.6% protein	Avg gain in wt, g
Whole wheat	15.4
“ “ cooked	40.8
“ “ “ and fan dried	24.8
“ “ “ “ “ “ “	
shredded, baked and oven dried ==	
shredded wheat	30.5
White flour	10.4

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TABLE II. Statistical Analysis of the Biological Value of Wheat Protein.

Comparison of the diets	Degrees of freedom	Observed "t"	Probability*
Whole wheat vs. whole wheat cooked	11	3.52	<.01
" " cooked vs. shredded wheat	12	1.38	.2
" " " and fan dried vs. shredded wheat	14	1.16	.3 -.2
" " vs. white flour	13	2.96	.02-.01

* When the probability of getting a "t" value at least as large as the observed "t" is .05 or less, the difference in wt gain is considered significant.

ture of 28°C for 12 hours; shredded, the fan dried material is shredded, baked in an oven at 250°C for 18 minutes and then dried to a moisture content of 5% by holding at 150°C for approximately 65 minutes.

Results. The average gain of weight for each of the groups at the end of this experiment is given in Table I. These results were compared and analyzed and the "t" test was used as a measure of significance(2).

It can be seen from Tables I and II that: (a) as is well known, whole wheat has a biological value which is significantly superior to that of white flour; (b) there is a further significant improvement in the biological value of the protein of the whole wheat when this whole wheat is subjected to cooking in boiling water; (c) there is no significant alteration of the biological value of the protein of cooked whole wheat when it is made into shredded wheat biscuits.

Discussion. Heat processing is known to affect the nutritive value of proteins in various ways. The adverse effects of heat on dietary proteins have been reviewed in a recent publication(3). While it is well known that in addition to soy beans(4) many other leguminous proteins improve in nutritive value after the application of moist heat, the same effect has not been reported in the case of cereals. It is a generally accepted view, however, that when cereals are properly cooked no undesirable changes in the protein component occur and their nutritive value appears to be equal

to that of the unheated protein(5).

This study indicates that the cooking of whole wheat grain in the commercial preparation of shredded wheat results in a significant improvement of its original growth promoting value. This marked increase in nutritive value is not altered to any significant degree in the final processing of the product. So far as we are aware, this effect of moist heat on whole wheat has never been reported. The reason for this increase in nutritive value is not known.

In the case of legumes where similar phenomena have been observed various hypotheses have been advanced: removal of a trypsin inhibitor, elimination of toxic substance, or direct action on the protein making certain amino acids more available.

Shredded wheat has a sodium content of 2 mg per 100 g, which is the same as that of polished and coated rice(6). Because of its low sodium content, the high quality of the protein of shredded wheat, its richness in minerals and vitamins of the B complex, it should be a useful food in introducing variety in low sodium diets.

Summary. Experiments are reported showing that the cooking of whole wheat as in the preparation of shredded wheat results in a significant improvement in the nutritional value of the whole wheat. This improvement is not lost when the material is fan-dried or oven-dried in the preparation of shredded wheat.

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