fore it has been demonstrated that the adrenotrophic hormone of the pituitary gland augments the ability of tissue to synthesize acetylcholine.

14731 P

Fractions Derived from Soy Beans and Navy Beans Which Retard Tryptic Digestion of Casein.

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During recent studies observations were made regarding certain factors of navy and soy beans which influence digestion. While following the digestive availability of the starch of navy beans as influenced by various methods of treatment it was observed that a certain fraction of navy and soy beans retards the *in vitro* digestion of milk casein by trypsin. In view of the rather low biological value of the proteins of raw soy[1,2] and navy beans[3] and the increasing interest in their dietary use a preliminary account of some of these findings may be of interest.

Methods. In this particular work, aqueous extracts of the beans or grain in question were prepared from 1% aqueous suspensions of the finely ground materials. After centrifuging the supernatant solutions were employed in digestion experiments or were further fractionated as described.

Ten cc of such extracts or fractions prepared from this volume were added to 10 cc of a 1.52% solution of casein. Following incubation with 2 cc of 0.5% pancreatin and 2 cc of 0.8 M phosphate buffer (pH 7) for 1.5 hours the undigested protein was precipitated with trichloracetic acid and was estimated by nitrogen determination.

Results. The data of Table I represent typical findings. It will be observed that the original aqueous extracts prepared from navy and soy beans considerably retard the digestion of casein under the conditions employed while comparable extracts prepared from wheat and corn have little influence. Each value in the table represents the average of 6 determinations. The retarded digestion caused by the extracts of both types of beans becomes even more apparent when the undigested fraction is expressed in each case in terms of the percent of the total casein which is not digested as the specific result of interference by the extract. In the present series these values are 84, 51, 0.7, and 2.5 respectively for the extracts of navy beans, soy beans, wheat, and corn.

After discarding the proteins which precipitate from the original aqueous extracts of both soy and navy beans at pH 4, the filtrates obtained were found to contain nearly all of the retarding fraction. The protein content of 10 cc of such filtrates is equivalent to approximately 1 mg. Comparing this value with those in Table I it would appear that the retarding influence of the original aqueous extracts of the beans is not a function of their total protein content.

The digestion-retarding fraction can be very largely precipitated from the pH 4 filtrate of the navy bean extract with 90% acetone or ethyl alcohol. A similar precipitation of the soy bean factor may be obtained with acetone but a large part is lost with alcohol. Fractional precipitation further concentrates the material in question to a considerable degree, a small amount serving to retard the digestion of a relatively large amount of casein.

Boiling the supernatant solution of the

1 Osborne, T. B., and Mendel, L. B., *J. Biol. Chem.*, 1917, **32**, 369.

2 Hayward, J. W., Steenbock, H., and Bohstedt, G., *J. Nutrition*, 1936, **11**, 219.

3 Johns, C. O., and Finks, A. J., *J. Biol. Chem.*, 1920, **41**, 379.

TABLE I.
Influence of Aqueous Extracts of Beans, Wheat, and Corn on the Digestion of Casein.

Extract employed	Casein employed, mg	Protein added in extract, mg	Total protein of substrate, mg	Undigested protein if extract digested alone, mg	Total undigested protein, mg	% of total protein undigested
Casein control	152	0	152	—	9.36	6.1
Navy Bean	152	20.3	173	13.1	151	87
Soy Bean	152	34.7	187	20	107	57
Wheat	152	5.6	158	2.1	12.7	8
Corn	152	1.3	154	1.3	14.4	9.4

original aqueous extract of navy beans at pH 4 and that of soy beans at pH 4 to 5 for 15 minutes decreases the activities of the inhibiting fraction to about one-fourth of the original values. Smaller degrees of inactivation were observed from pH 1 to 7 with a secondary point of increased inactivation at pH 1.

Preliminary observations indicate that bacterial proteolysis is also retarded by this substance.

In view of the behavior of this material and its heat labile properties it is of particular interest to again note the observations of Osborne and Mendel,[1] Hayward, Steenbock, and Bohstedt[2] and others who have called attention to the low nutritive value of the proteins of raw soy beans as compared with other proteins and the marked improvement in their biological value with cooking or heating. Johns and Finks[3] have made similar observations with the proteins of navy beans. The relations between these findings and those of the present report warrants additional attention. Further studies on the characteristics of this factor are in progress.

Summary. Aqueous extracts of soy beans or navy beans contain a fraction which inhibits the *in vitro* digestion of milk casein by trypsin. The fraction can be precipitated with acetone. It is partially heat labile at pH 4. Its presence may account for the low nutritive value of raw soy and navy beans.

14732

Specific Agglutination of Murine Erythrocytes by a Pneumonitis Virus in Mice.

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Horsfall and Hahn[1,2] reported the isolation of a pneumonia virus from the lungs of normal Swiss mice. This virus is readily identified by means of neutralization tests with specific anti-sera. It has been isolated from several colonies of Swiss mice by the above authors and by later investigators.

We have recently isolated a virus similar to, if not identical with the mouse pneumonia virus of Horsfall and Hahn. The virus in question was encountered during the course of successive mouse-passages of material derived from a human pneumonic lung. It cannot be determined at the present time whether the virus isolated was present in the original human lung or whether it was derived

1 Horsfall, F. L., and Hahn, R. G., PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 684.

2 Horsfall, F. L., and Hahn, R. G., *J. Exp. Med.*, 1940, **71**, 391.