

citrated, salted, hirudinized, filtered plasma, etc.).¹ We have now observed that sterile filtrates of the above mentioned dissolved cultures of staphylococci possess the same property.

110 (1692)

On the preparation of a soluble protein extract from soy beans.

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The average protein content of the soy bean is 36.5 per cent. while that of the soy bean cake is about 41 per cent. The protein of the soy bean has all the amino acids necessary for nutrition and it is claimed to be as valuable as the casein of milk. The proteins of the soy bean, unlike those of other leguminous plants thus far investigated, were found, by Osborne and Mendel, to be adequate for promoting normal growth. In addition to the high protein content, the soy bean is found to contain an adequate amount of water-soluble vitamines and some essential fat-soluble vitamines. These factors combined with low cost make the soy bean of unique significance as a food.

In working with proteolytic enzymes of fungi, the author found some organisms that are able to develop active enzymes which readily hydrolize the soy bean proteins and make them soluble. By using the ground soy bean cake as a substratum for the growth of the proteolytic fungus, then, at the end of the proper incubation period, which is usually about 36 hours, adding water to the mass and allowing the enzyme present in the mycelium to act upon the soy bean proteins, over 50 per cent of the proteins are found to go into solution. This solution when concentrated gives a material containing 45 or more per cent of soluble proteins and protein degradation products and is quite rich in vitamines. This extract can be very cheaply prepared and it may take the place, when properly modified by the addition of necessary salts, of meat extract and other digested meats in infant feeding and, since the

¹ *Compt. rend. Soc. Biol.*, 1919, lxxxii, 1245, 1247, 1393; 1920, lxxxiii, 649, 584, 585, 649.

soy bean contains very little carbohydrate and even the small amounts present are used up by the fungus, in the process of development, for energy purposes, the extract is practically free from sugars and can be introduced into diabetic cookery.

III (1693)

Specific immunological reactions of Bence-Jones proteins.

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A Bence-Jones protein which crystallized spontaneously from the urine of a patient (R.) at the Mayo Clinic in 1920 furnished material unusually well suited to the investigation of some of the problems associated with Bence-Jones proteinuria. With this specimen of the protein, which was purified by recrystallization, immunological studies were undertaken to discover, if possible, (1) a difference between various specimens of Bence-Jones protein, and (2) a difference between Bence-Jones protein and the proteins of human blood serum.

In the past, the few immunological studies on Bence-Jones protein have been directed solely toward the differentiation of human serum proteins from Bence-Jones protein. With the exception of Massini (1911), who was able to show by complement fixation tests specific distinctions between human serum and Bence-Jones protein in different zones of dilution, these investigations have apparently indicated that Bence-Jones protein and human serum proteins are immunologically indistinguishable. As in Abderhalden's (1905) experiment, these results have been attributable undoubtedly to the use of mixtures of proteins. Recently, Hektoen (1921) has published a preliminary note on his experiments which prove that by the absorption of precipitins specific reactions can be obtained even when mixtures are used, which sharply differentiate Bence-Jones protein from the proteins of human blood serum.

The work to be reported here was completed before the appearance of Hektoen's paper.