

Ajinomoto, an Oriental Product Made from Wheat Flour

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THROUGH the kindness of a Japanese friend, a most interesting product has come into my hands. Ajinomoto is a condiment manufactured from wheat flour, or, more accurately, from gluten made from wheat flour. Its name in Japanese signifies "condensed flavor." It is a white powder of pleasant flavor suggestive of beef tea or slightly salted chicken gravy.

On account of the fact that many Japanese and Chinese are rigid vegetarians, as required by Buddhist and other religions, flavoring materials are in great demand and constitute an important part of the vegetarian diet. Many products of the soy bean, various seaweeds and other materials which seem to Americans more or less unusual are used in the Japanese and Chinese dietaries. Agar-agar is one of these seaweed products which finds considerable use outside of Japan as the basis of jellies used by bacteriologists in the cultivation of bacteria. The soy bean, though imported in large amounts and grown to a considerable extent in this country, is little used as human food, except in very small amounts in the preparation of diabetic foods. It finds use in these foods because of its practical freedom from sugar forming carbohydrates such as starch. Its chief use is as a source of oil, and the high protein residue as a constituent of stock feeds, but several varieties which the writer has grown as a vegetable make very good additions to the table. Some Americans are familiar with soy sauce, a brown, salty flavored product, often used in Chinese restaurants, and there are many other products prepared by fermentations or other processes from this valuable bean. It is largely because of the soy bean with its high protein content that Japanese and Chinese can maintain a vegetarian diet. The proteins from the soy bean, together with rice and other vegetable materials, seem to be able to supply a sufficiency of protein, but the meat flavors which the meat diet supplies are lacking, and it is this lack which seems to be filled by condiments of the nature of soy sauce and especially ajinomoto.

A Chinese chemist has recently published in Industrial and Engineering Chemistry an article which reveals the chemical nature of ajinomoto, showing that it consists largely of monosodium glutamate. One product examined contained 84 per cent of this compound. This article has revealed the process of manufacture by which ajinomoto is prepared, and satisfied a long-standing curiosity which we have felt concerning the reasons for certain chemical analyses required on flours purchased for export to Japan.

The gluten is broken down by acid hydrolysis into its simpler elements, among which glutamic acid is one of the main constituents.

S. Suzuki & Co., of Tokyo, are the largest manufacturers of ajinomoto in Japan. It is also made in

a number of other Japanese factories, and in several Chinese ones.

Widespread Demand in Orient

WE have no statistics regarding the extent of its use in Japan and China, but there appears to be a very widespread demand for it in both of these countries, and it is exported to other eastern countries in large amounts.

The intensive study of the proteins that has been made from the time of Osborne's first researches about 1890 has shown that proteins are built up from about 20 nitrogenous compounds which, because of their general characteristics, are usually spoken of as amino compounds. Glutamic acid, which has been found to constitute the acidic basis of ajinomoto, is present as a constituent of many different proteins of both vegetable and animal origin. It takes its name from gluten, of which it was discovered to be a constituent by Ritthausen in 1866. It constitutes about 37 per cent of wheat gliadin and about 23 per cent of wheat glutenin.

Hordein, the nitrogenous principle of barley, contains 36@41 per cent, and zein of maize contains 18@26 per cent. Glycinin, the nitrogenous element of soy beans, contains 19 per cent. In beef and chicken proteins there is present about 15@16 per cent, and other proteins contain about the same or less amounts of this amino acid. So it will be seen that the proteins of the cereals are by far the richest source of this compound, and because of the fact that wheat flour is the only one of these materials from which a fairly pure nitrogenous product can be separated by mechanical methods, that is, by washing gluten, it is the best source for the manufacture of glutamic acid.

Starch the By-Product

ON account of the limited demand for wheat starch in Japan and China, there is some difficulty in disposing of the starch which, in this case, is the by-product, though amounting to 70 per cent of the flour. Canadian flours, high in their content of the proteins, gliadin and glutenin, are preferred sources, as Manchurian and Chinese wheats have less true gluten.

The product can be manufactured from soy beans, but perhaps we can infer from the preference for wheat gluten that the desired flavor is not obtained when the beans are used.

In the process of digestion, proteins are broken down more or less completely in the stomach and duodenum into their separate amino compounds, then absorbed into the blood. Nature then rebuilds the body proteins from these amino compounds. From this point of view, therefore, ajinomoto can be considered as a predigested food, supplying one of the body's important constructional elements but, as has been shown, the use of this material has grown to its present large proportions, not because it supplies one of a large number of necessary elements in tissue formation, but purely on its merits as a flavoring material. Although the price demanded, which is about \$4 a pound, seems high actually, it is relatively cheap, compared with flavors derived from meats such as chicken, etc. The reason for this is in the high flavoring power possessed by this material. A quart of well-flavored soup, having a meaty taste, can be made from a teaspoonful of the powder. It is said that the product has fifteen times the flavoring power of sugar and seven times the flavoring power of salt, though the flavor of the dry powder does not impress one as being powerful or in the least disagreeable. The manufacture of products of this character, valuable for their flavoring ability as well as for the food elements which they contain, might well be considered by Americans, and it is interesting to speculate on the possibilities of various combinations of prepared flavors and other foods manufactured in powder form which may in the future take the place of what we are inclined to term "natural foods."



Ornamental Toys Made of Wheat Gluten Are Much Loved by the Children of Japan