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PATENT SPECIFICATION

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(54) ENCAPSULATED FOOD STUFFS AND PROCESS FOR THE PRODUCTION OF SAME

(71) I, YOSHIHO TANAKA, a Japanese citizen of 40 Banchi Mitono-cho, Gifu-shi, Gifu-ken, Japan, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to an encapsulated food stuff and to a process for its production.

Materials such as garlic, ginseng and American aloe are widely believed to be effective in the promotion of human health. They are, however, generally used only in very limited amounts for seasoning purposes since they have very strong odours and a disagreeable taste when used in any substantial amount. There have been proposals to remove their undesirable odour and taste but none has been particularly successful.

The present invention provides an extremely nutritious food stuff which does not impart a nasty smell nor does it have a disagreeable taste. In accordance with the present invention there is provided an encapsulated food stuff containing, as encapsulated material, a mixture of (A) a freeze-dried extract of *Chlorella* algae, (B) one or more of garlic oil, a freeze-dried extract of garlic, a freeze-dried extract of ginseng and a freeze-dried extract of American aloe and (C) one or more vegetable oil.

The encapsulated food stuff of the invention can be conveniently used as a seasoning and also as a nutritious food stuff which does not have the disagreeable odours and taste usually associated with the ingredient (B).

The invention also provides a process for preparing the encapsulated food stuff, which process comprises mixing ingredients (A) and (B) together, subsequently adding ingredient (C) and then encapsulating the resulting mixture in a water-soluble, digestible (by humans), encapsulating material.

Chlorella algae grow in water and are single celled algae. In recent years it has been ascertained that *Chlorella* is rich in protein

of high quality and contains the so-called *Chlorella* Growth Factor (abbreviated as C.G.F.). Its contents typically are about 55% of protein, about 15% of fat, about 20% of carbohydrate, about 6% of various minerals and about 4% of moisture. There have been various proposals to use *Chlorella* not only for preparing a nutritious food stuff but also for preparing a food additive. However, no proposal has ever been made acceptable as a practical matter because *Chlorella* either as a powder of the cells or as an aqueous extract is difficult to handle and to preserve. The *Chlorella* extracts previously used contained moisture and quickly deteriorated both chemically and physically. When, however, a freeze-dried extract of *Chlorella* algae is prepared the resulting powder can easily be handled and can be preserved for a long time without deterioration.

When a freeze-dried extract of *Chlorella* algae is mixed with an ingredient (B), sometimes referred to as a "Chinese food stuff", its storage stability is further improved and the odour and taste of the Chinese food stuff are well masked. When at least one vegetable oil is added to a mixture of ingredients (A) and (B) an oil layer is formed on the surface of the particles of the mixture and this oil layer prevents the ingredients (A) and (B) from being contacted with air and the disagreeable odour of the Chinese food stuff is further hidden. Encapsulation of the mixture of ingredients (A), (B) and (C) in a water-soluble and digestible encapsulating material provides a food stuff which is very useful not only as a food additive to season foods but also as part of a daily nourishing diet.

The encapsulating products are, when used as a seasoning, most effective when they are applied to foods while being cooked because the capsules enclosing the mixture of ingredients (A), (B) and (C) are easily cleaved by the action of water or heat so that the mixture is released and spreads over the foods which are therefore effectively seasoned.

The freeze-dried extract of *Chlorella* algae which is used in accordance with the pre-

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sent invention can be prepared by suspending about 1 part by weight of dried cells of *Chlorella* algae in about 10 parts by weight of water, boiling the aqueous mixture at about 100°C until the total volume has been reduced by about one-third, filtering the product under pressure and freeze-drying the filtrate to obtain a powder. In general about 20 g of powdered extract will be obtained per about 1 Kg of the filtrate.

The extracts of Chinese food stuffs, i.e. garlic, ginseng and American aloe, which are used in the present invention, preferably are prepared as follows:

Garlic oil is prepared by crushing garlic cloves into small particles, compressing the small particles and filtering the resulting liquid.

A powdered extract of garlic is prepared by compressing garlic cloves to obtain a liquid (i.e. garlic oil) which is then freeze-dried to provide a powder of garlic.

The powdered extracts of ginseng and American aloe are prepared by crushing ginseng or American aloe into small particles which are dispersed in water (preferably about ten times the amount of ginseng or American aloe) boiling the aqueous mixture at about 100°C until the total volume has been reduced by one-fifth or one-tenth, filtering the product under pressure and freeze-drying the filtrate to obtain a powder. The vegetable oils which are employed in the present invention preferably are peanut oil, coconut oil or soybean lecithin, with peanut oil being the most-preferred.

The proportions of (A) extract of *Chlorella* algae, (B) extract of Chinese food stuff and (C) vegetable oil in the encapsulated material suitably are (A) 5 to 10 percent by weight, (B) 3 to 6 percent by weight, and (C) 60 to 70 percent by weight, with the remaining proportions being satisfied by other appropriate food stuffs or additives such as chemical seasonings, honey wax or vitamins. The material which is used for encapsulating the encapsulated material (mixture of (A), (B) and (C)) can be any commercially available material which is water-soluble and digestible by humans, for example starch. The volume of the capsules preferably is such that they contain 270 to 300 mg of the encapsulated material.

The following Examples will serve to illustrate the present invention.

EXAMPLE 1

35 mg of a freeze-dried extract of *Chlorella* algae was mixed with 6 mg of a freeze-dried extract of ginseng and 4 mg of garlic oil.

To the mixture 225 mg of peanut oil and 10 mg of soybean lecithin were added and then 20 mg of purified honey wax was added.

The product thus obtained was encapsulated in a starch capsule of 300 mg capacity.

This encapsulated product was useful for seasoning a Chinese dish when it was applied thereto during its cooking. This encapsulated product was willingly taken as a nourishing diet stuff without disagreeable odour or taste.

EXAMPLE 2

45 mg of a freeze-dried extract of *Chlorella* algae was mixed with 25 mg of a freeze-dried extract of ginseng and 15 mg of a freeze-dried extract of garlic. To the mixture 215 mg of peanut oil was added. The product thus obtained was encapsulated in a starch capsule of 300 mg capacity.

This encapsulated product could be preserved for six months in a store room at room temperature without any change in the contents.

Thereafter it was effective to season dishes. It could be also taken as a nourishing diet without disagreeable odour or taste.

EXAMPLE 3

45 mg of a freeze-dried extract of *Chlorella* algae was mixed with 55 mg of a freeze-dried extract of ginseng. To the mixture 50 mg of coconut oil, 50 mg of soybean lecithin and 100 mg of peanut oil were added and the resulting product was shaken well so that the contents were well mixed. The product was then encapsulated in a capsule of 330 mg capacity.

This encapsulated product could be preserved at 30°C for three months without any change in the contents. Thereafter it was very effective as a seasoning for soups.

EXAMPLE 4

40 mg of a freeze-dried extract of *Chlorella* algae was mixed with 20 mg of garlic oil and 40 mg of a freeze-dried extract of garlic. To the mixture 80 mg of soybean lecithin and 120 mg of peanut oil were added and the resulting mixture was well shaken.

The product was then encapsulated in a capsule of 300 mg capacity.

This encapsulated product could be preserved at 35°C for eighty days without any change in the contents.

Thereafter it was very effective to season a meat dish when cooked.

WHAT I CLAIM IS:—

1. An encapsulated food stuff containing, as encapsulated material, a mixture of (A) a freeze-dried extract of *Chlorella* algae, (B) one or more of garlic oil, a freeze-dried extract of garlic, a freeze-dried extract of ginseng and a freeze-dried extract of American aloe, and (C) one or more vegetable oil.

2. An encapsulated food stuff according to claim 1 containing garlic oil which has been prepared by crushing cloves into small particles, compressing the small particles and filtering the resulting liquid.

sent invention can be prepared by suspending about 1 part by weight of dried cells of *Chlorella* algae in about 10 parts by weight of water, boiling the aqueous mixture at about 100°C until the total volume has been reduced by about one-third, filtering the product under pressure and freeze-drying the filtrate to obtain a powder. In general about 20 g of powdered extract will be obtained per about 1 Kg of the filtrate.

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2. An encapsulated food stuff according to claim 1 containing garlic oil which has been prepared by crushing cloves into small particles, compressing the small particles and filtering the resulting liquid.



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3. An encapsulated food stuff according to claim 1 containing an extract of garlic which has been prepared by crushing garlic cloves into small particles, compressing the small particles, filtering the resulting liquid and freeze-drying the resulting filtrate. 5
4. An encapsulated food stuff according to claim 1, 2 or 3 wherein the vegetable oil is at least one of peanut oil, coconut oil and soybean lecithin. 10
5. An encapsulated food stuff according to any one of the preceding claims wherein the encapsulating material is starch.
6. An encapsulated food stuff according to claim 1 substantially as described in any one of the Examples. 15
7. A process for preparing an encapsulated food stuff as claimed in any one of the preceding claims which process comprises mixing ingredients (A) and (B) together, subsequently adding ingredient (C) and then encapsulating the resulting mixture in a water-soluble, digestible, encapsulating material. 20
8. A process according to claim 7 substantially as described in any one of the Examples. 25

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