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FOODSTUFFS COMPRISING SOFT-SHELLED TURTLES AND
MANUFACTURE THEREOF

The present invention relates to foodstuffs comprising soft-shelled turtles and manufacture thereof
5 and in particular to enriched nutritious food and/or feed comprising powder made from soft-shelled turtles.

Since ancient times, in China and in Japan, soft-shelled turtles have been served as food of the highest quality, providing a healthy source of energy, and also
10 as foodstuffs for physical strength, beauty or for people suffering from illness. Moreover, as this food contains various kinds of nutritious components which are described hereinafter, this food is also quite useful as feed for domestic animals such as for example race horses or dogs.

15 In particular, race horses are often forced to race beyond the limit of their normal physical ability, therefore this enriched nutritious food and/or feed will contribute effectively to control their physical condition, in particular by promoting physical strength and fatigue
20 recovery.

However, according to present marketing systems,

they have to consume soft-shelled turtles as living bodies and/or as canned soup, therefore this food and/or feed cannot be used generally.

Recently, milled pastes of animal bodies or cultures thereof have been sold. However, with these pastes, there are difficult problems in maintaining quality due to decay of the paste or the changing of colour of the paste. Therefore, a pure (100%) powder of soft-shelled turtles which may be used in various applications has not previously been contemplated.

The purpose of the present invention is to provide enriched nutritious food and/or feed comprising powder made from soft-shelled turtles and also a method for the manufacture thereof.

The food of the present invention can be taken alone, or, by adding to and mixing with other foods, can also be used as a raw material for other processed foods.

And, as for nations not being accustomed to eating animals such as soft-shelled turtles, the food of the present invention is useful for feed for domestic animals.

The present invention accordingly provides a method of manufacturing a powder of soft-shelled turtles including a pasteurizing step and a drying step characterized in that the method further includes a comminuting step at a temperature of equal to or less than - 50

degrees centigrade.

Hereinafter, there is described preferred embodiments of the present invention.

Preferably, living soft-shelled turtles are cleaned,
5 the turtles having not been fed for at least 2 days previous
to the cleaning process. Then in a crushing process, they
are rapidly cooled so as to be completely frozen,
for example by immersion in liquid nitrogen. All of the
frozen bodies are then crushed so as to be small masses,
10 by means of a coarse crusher.

After the crushing process, the small masses are
pasteurized by a known pasteurizing means, in a pasteurizing process.

After the pasteurizing process, said small masses of
15 soft-shelled turtles are dried by any known drying means
in a drying process.

After pasteurizing and drying processes, in a
grinding process, said small masses are again rapidly
cooled so as to be completely frozen for example by
20 immersion in liquid nitrogen and are then ground down so
as to be a fine powder. The temperature at
which the grinding is carried out is equal to or below
-50 degrees centigrade.

However, in an alternative method, the above
25 pasteurizing and drying processes can be carried out

after the grinding process.

Preferably the enriched nutritious food and/or feed made by the method of the present invention are manufactured from raw materials consisting mainly of fine powder made from soft-shelled turtles by the manufacturing method described hereinbefore.

In accordance with a preferred method of the present invention initially, after cleaning substantially all the surface of living bodies of soft-shelled turtles which had not been fed for at least the previous 2 days, the living turtles are immersed in liquid nitrogen having a maximum temperature of -196 degrees centigrade. The turtles are all frozen completely, and immediately after this immersion the frozen bodies are crushed up by a coarse crusher to the form of small masses having size of approximately 1 cm. When immersed in the liquid nitrogen, living bodies of soft-shelled turtles become very brittle due to low temperature brittleness, thereby allowing their frozen bodies to be crushed minutely and easily and speedily.

Hereinbefore, it has not been practical to crush them without applying the liquid nitrogen, and it is not preferable to crush them by means of freezing them to a temperature of -40 degree centigrade by an ordinary freezing method, because the low temperature brittleness which is required will not be present at that temperature.

Only by employing a super-low temperature freezing method with, for example, liquid nitrogen, can the above crushing process be carried out.

After crushing, said small masses made from soft-shelled turtles are sterilized by high-pressure flash pasteurization. This pasteurization is an indispensable process because soft-shelled turtles have various kinds of bacteria. Hereinbefore, the primary fat contained in soft-shelled turtles has been oxidized quite easily before pasteurization, and so in the present invention, before pasteurizing it is preferable to add a given percentage of vitamin E in order to prevent oxidization. After pasteurization, said small masses are dried by means of a known freeze drying process so that the water content may be below 4 percent by weight.

In this dried condition, the dried masses consist of dark brown solid bodies of bone, shell and meat about 1 cm in size each having a flavour proper to soft-shelled turtles.

Then, the dried masses are frozen by immersing them in liquid nitrogen having a temperature of at most -196 degrees centigrade, and after immersion the frozen masses including all of the components are ground down to a fine powder of the grade equal to or finer than 200 mesh in an atmosphere of nitrogen gas with the temperature being at most -50 degrees centigrade.

The resulting fine powder has a beautiful dark brown colour, being high in quality and safety with a good flavour proper to soft-shelled turtles.

Preferably, liquid nitrogen is used in the present invention for the following reasons. The dried masses typically have a primary fat content of over 17 percent by weight, which fat is easily oxidized, and so therefore the dried masses have to be ground at a low temperature equal to or below -50 degrees centigrade.

In addition, it is difficult to crush said masses of bones and shells completely at normal temperature, therefore they have to be crushed at low temperatures so as to be ground down uniformly so as to result in a fine powder of a grade equal to or finer than 200 mesh.

However, it is also possible to carry out the pasteurizing and drying processes after the grinding process.

That is, after freezing and coarsely crushing the soft-shelled turtles down to small masses, these small masses are ground down to fine powder in a nitrogen atmosphere having a temperature equal to or below -50 degrees centigrade, and after that grinding process the powder is subsequently pasteurized and dried well.

After pasteurizing, the powder made from soft-shelled turtles becomes a cooked fine powder of a dark

brown colour, but in the case when blood removal has been carried out previously and pasteurization has not been carried out, a raw beautiful fine white powder can be obtained.

5 Hereinafter is described the characteristics of the powder made by the above manufacturing method and preferred embodiments of enriched nutritious food and/or feed consisting mainly of the fine powder made from soft-shelled turtles according to the present invention.

10 The powder contains various kinds of useful nutritious components if oxidation thereof has not occurred and also gelatine and fat if they have not been lost by effusion. In addition the fine powder of the grade equal or smaller than 200 mesh has taste, flavour and nutritious
15 components associated with soft-shelled turtles.

 The fine powder is quite convenient to be dealt with, and is easily blended with various raw materials. Also the powder is very useful as a raw material for processed foods, having high nutritional value.

20 Moreover, the fine powder is rich in many kinds of high quality proteins, amino acids, minerals, vitamins and fats containing the same unsaturated fatty acids as those found in plants, and therefore said powder can be employed as food and/or feed for the health of people and/or
25 animals respectively.

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Here, the general analytical value of said powder is shown in the following table 1.

Table 1

		% by weight
5	water (drying at normal pressure)	2.8%
	protein (coefficient 6.25)	53.3%
	fat (Soxhlet extracting method)	24.9%
	fibre	0.2%
	mineral	16.6%
10	sugar	2.2%
	calories per 100 g	447 cal

As for the complete hygienic analytical value of the powder, the number of general raw bacteria is below 300/g, and colon bacillus group is negative, and the peroxide value is 26.8 meg/kg.

The powder is rich in such amino acids as arginine, lysine, leucine, alanine, glycine, proline, glutamic acid, serine, asparaginic acid and other amino acids. The powder is also rich in such vitamins as retinol, vitamin B1, vitamin B2, vitamin B6, vitamin B12, vitamin E, choline, niacin, folic acid, pantothenic acid, biotin and inositol, and in addition is rich in such minerals as calcium, potassium, iron, zinc and lead.

Thus, the fine powder made from soft-shelled turtles

contains many more kinds of nutritious components than those found in ordinary medicines for health.

Additionally, the powder is very valuable as an additional raw material for various kinds of food and/or feed and

5 drinks, and also as auxiliary nutritious food for seasoning and flavouring, and also as a raw material for medicinal uses.

Hereinafter, there is described preferred embodiments of said enriched nutritious food.

10 (1) A first embodiment of enriched nutritious food and/or feed consists of pure fine powder made from soft-shelled turtles by means of said manufacturing method. The enriched food and/or feed can be utilized as a nutritious and tonic food and/or feed for health of people and/or
15 animals (for example, race horses, dogs, etc.), also as auxiliary additional food for seasoning and flavouring, and also as additional raw material for health food, drinks and Chinese medicines.

(2) A second embodiment is enriched nutritious capsules
20 made by the following procedure. First of all, the fine powder constituting between 30 to 20% by weight of the resultant mixture is added to natural vitamin E constituting between 20 to 30% by weight of the resultant mixture, and next this mixture is mixed into wheat germ
25 oil constituting approximately 50% by weight of the

resultant mixture and after that said mixture is contained in gelatine capsules.

The reason for adding vitamin E is to prevent oxidation and also to enrich the powder in vitamin E.

5 The reason for mixing the powder/vitamin E mixture with wheat germ oil is because of convenience of capsuling and at the same time adding various kinds of vitamins and thereby preventing oxidizing and making long storage possible.

10 The enriched nutritious capsules can be taken alone, and also can be utilized as an additional food for seasoning and flavouring in cooking.

(3) A third embodiment is enriched nutritious granules made by the following procedure. First of all, after
15 mixing uniformly the fine powder constituting 40% of the final weight with lactose (about 46%) as an excipient, pickled-plum powder (about 3%), bone powder (about 2%), sea-tangle powder (about 2%), others (about 3%) as spice, and ester (about 4%) as a decay stimulator, the mixture
20 of powders is supplied and kneaded with water and alcohol, and after that the resultant paste is formed into granules by a granulating machine. Hereinbefore, the weight percentages described above for many components are arranged for a granular product of a health food, and if
25 necessary, seasoning may have to be added.

However, it is also preferable to manufacture tablet products by processing nearly the same mixed paste as described above by means of a tablet-forming machine.

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CLAIMS:

1. A method of manufacturing a powder of soft-shelled turtles including a pasteurizing step and a drying step characterized in that the method further includes a comminuting step at a temperature of equal to or less than -50 degrees centigrade.
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2. A method as claimed in Claim 1 wherein the comminuting step is carried out subsequent to the pasteurizing step and the drying step.
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3. A method as claimed in Claim 1 or Claim 2 wherein a comminuting step is carried out both before the pasteurizing step and after the drying step.
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4. A method as claimed in any one of the preceding claims wherein the or each comminuting step is performed after immersion in liquid nitrogen.
- 20 5. A method as claimed in any one of the preceding claims wherein the or both comminuting steps are carried out in an atmosphere of nitrogen gas.
- 25 6. A method of manufacturing a powder of soft-shelled turtles substantially as hereinbefore described.



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7. A powder when manufactured by the method of any one of the preceding claims.

8. An edible foodstuff comprising a powder, when
5 manufactured by the method of any one of the preceding claims, the powder being admixed with at least one of spices and excipients.

9. Edible foodstuff as claimed in Claim 8 wherein
10 the foodstuff is formed as a granular product.

10. Edible foodstuff as claimed in Claim 8 wherein the foodstuff is formed as a tablet product.

15 11. Gelatine capsules containing powder as claimed in Claim 7, wheat germ oil and vitamin E.

12. An edible foodstuff substantially as hereinbefore described.

