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## A Fortified Liquid Seasoning for Food

### Field of the invention

The present invention relates to liquid seasoning for enhancing the flavour of food. In particular, the present invention relates to a fortified liquid seasoning  
5 and a method of preparation of such fortified liquid seasoning for stabilising and maintaining the organoleptic properties of the fortified liquid seasoning.

### Background of the invention

Liquid seasoning are primarily used to enhance the flavour and colour of food. In particular, soy sauce is a traditional Asian seasoning widely used in Japan,  
10 China and Korea in the preparation of food and for dipping or adding to food at the table. (Luh *et al.*, 1995)

Since liquid seasoning is widely used and in particular, soy sauce is widely used in Asian cuisine, it is increasingly common to fortify liquid seasoning with additives so as to enhance the quality and organoleptic properties of such liquid  
15 seasoning.

However, the addition of substances to fortify liquid seasoning can affect the overall stability of the product, leading also to a decline in the organoleptic properties. Accordingly, it is desirable to fortify such liquid seasoning while maintaining stability and organoleptic properties.

### Summary of the invention

According to a first aspect, the present invention provides a fortified liquid seasoning for food comprising liquid seasoning and at least one ethanol-water extract of at least one herb. In particular, the fortified liquid seasoning comprises  
25 liquid seasoning, for example but not limited to, soy sauce, fish sauce, teriyaki



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sauce, barbecue (BBQ) sauce or marinade sauce. The person skilled in the art would understand that any commercially available sauce may be fortified.

In particular, liquid seasoning may be soy sauce. The fortified liquid seasoning may be prepared by a method as described herein.

5 According to another aspect, the present invention provides a method for fortifying, stabilising and/or maintaining the organoleptic properties of a liquid seasoning comprising the steps of:

- (i) providing at least one liquid seasoning;
- (ii) providing at least one ethanol-water extract of at least one herb; and
- 10 (iii) adding the ethanol-water extract(s) to the liquid seasoning.

In particular, the ethanol-water used to extract the herb comprises 70 to 90 % v/v ethanol-water. The ethanol-water extract from the herb may be vacuum dried or freeze-dried before adding to the liquid seasoning to fortify it. The final concentration of the extract from the herb in the fortified liquid seasoning may  
15 be 0.1 to 3.5 % w/w.

The herb may be a traditional Chinese herb with medicinal value, such as improving health and immunity. The herb may be selected from the group consisting of *Panax ginseng* (ginseng), *Panax quinquefolius* (American ginseng), *Lonicera* (honeysuckle) flower, *Angelica* root, *Curcuma longa* (turmeric), *Citrus* spp (tangerine) peel, *Radix astragali* (Membraneous  
20 milkvetch) root and *Discorea* spp (Chinese Yam).

### Definitions

Accelerated shelf-life test refers to a method for predicting the shelf-life of a product at conventional storage conditions (temperature, humidity and other  
25 conditions) and may be performed by storing the product at higher than normal temperatures or through computer-based models.

Fortify, as used in food preparation, refers to the addition of material for strengthening and/or enriching food.

Liquid seasoning (or liquid condiment), as used herein refers to a substance in liquid form for imparting savour to food, such as enhancing the taste, flavour,  
5    aroma and colour of food.

Organoleptic, as used herein, refers to any sensory properties of a product, including taste, colour, aroma (odour) and feel.

Soy sauce or soya sauce is a fermented sauce made from soybeans (soya beans), and may include roasted grain, water and/or salt.

10    Detailed description of the invention

The fortified liquid seasoning comprising the herbal extracts, as described herein, in addition to enhancing the flavour of food, may also provide health benefits.

In addition, it was found that the fortified liquid seasoning was stable and  
15    maintained the organoleptic properties. Undesirable deterioration in the appearance of the product, such as separation of aqueous and oily layers and sedimentation of insoluble fractions were not observed, and this suggests stability of the product. Further, the late appearance sedimentation in an accelerated shelf-life test suggests that the organoleptic property of the product  
20    was also maintained, and there is little undesirable change in taste and flavour.

Accordingly, the method of the invention may also stabilise and/or maintain the organoleptic properties of the fortified liquid seasoning.

The ethanol-water extraction process and the concentration of the extract in the liquid seasoning may be modified and optimised, while maintaining the stability  
25    and organoleptic properties of the product. In particular, the ethanol-water used

to extract the herb comprises 70 to 90 % v/v ethanol-water. The ethanol-water extract from the herb may be dried, for example by vacuum drying or freeze-drying, before being added to the liquid seasoning to fortify it. The liquid seasoning may be soy sauce.

- 5 Having now generally described the invention, the same will be more readily understood through reference to the following examples which are provided by way of illustration, and are not intended to be limiting of the present invention.

### EXAMPLES

#### Example 1: Preparation of ginseng-fortified soy sauce.

- 10 The raw ingredient may be a dried preparation of *Panax ginseng* (Ginseng) root. The dried Ginseng root was ground to a powder. 500 g of this ground Ginseng powder was combined with 2500 g of 80% (v/v) ethanol-water solution in a container and sealed. The extraction process was performed in the sealed container for 12 hours with continuous agitation.

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- Following this, the extraction solution from the first extraction was decanted and a second extraction was performed under the same conditions. The first extraction solution was saved and combined with the second extraction solution into a single fraction. This fraction was then subjected to vacuum concentration and vacuum drying to a dry powder form. 125 g of this dried extract was
- 20 dispersed into 5 litres of naturally brewed soy sauce and thoroughly homogenized. The homogenized mixture was heated to 80 °C (a form of pasteurization) and packed and sealed in PET bottles.

- 25 Example 2: Accelerated shelf-life test

In this example, the accelerated shelf-life test was performed by storing the Ginseng-fortified soy sauce preparations at 30 °C and 37 °C, for time periods which are

predicted to be equivalent to several months at room temperature. The time period at the 30 °C and 37 °C correlating to the time period at room temperature for soya sauce was predicted according to the Arrhenius model (Labuza and Riboh, 1992) and is as shown in Table 1.

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**Table 1: Correlation of time periods at 30 °C and 37°C to equivalent time periods at room temperature**

|                                           |   | at 30 °C           |      |      | at 37 °C           |      |      |
|-------------------------------------------|---|--------------------|------|------|--------------------|------|------|
|                                           |   | Acceleration rate: |      | 2.77 | Acceleration rate: |      | 3.23 |
| Period passed (real-time, months)         | 0 | 0.75               | 2    | 4.25 | 5.75               | 7.25 |      |
| Estimated period as at room temp (months) | 0 | 2.08               | 5.54 | 13.7 | 18.6               | 23.5 |      |

The predicted time periods of 0, 2 and 5 months at room temperature were based on shortened time periods at 30 °C while the predicted time periods of 12, 18 and 24 months at room temperature were based on shortened time periods at 37 °C.

Organoleptic evaluations were made by a panel of five members. to determine if there is any difference in taste, aroma and the presence of sedimentation between the samples and the control comprising the ginseng-fortified soy sauce which was kept frozen. For the taste test (and also the aroma test), each of the five members were asked to indicate a score of 1 or 2 and the average of the five scores was determined. For the sedimentation test, the members were asked whether they could detect the presence of sediment in the product.

Table 2 tabulates the data from the accelerated shelf-life test.

**Table 2 Accelerated Shelf Life Test (at 30°C – 37°C) of Ginseng-Fortified Soy Sauce**

| Estimated period at room temp (months) | 0  | 2  | 5  | 12 | 18 | 24    |
|----------------------------------------|----|----|----|----|----|-------|
| Taste                                  | 1  | 1  | 1  | 1  | 1  | 1     |
| Aroma                                  | 1  | 1  | 2  | 2  | 2  | 2     |
| Sedimentation                          | ND | ND | ND | ND | ND | Trace |

Scores for Taste and Aroma: 1. No difference to control at all

2. Detected insignificant difference but considered acceptable

Scores were given by determining the average of the response from a panel of five members

Sedimentation: Not detected (ND)

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The results from Table 1 suggests that the taste of the Ginseng-fortified soy sauce is comparable to the control at the predicted times of 2, 5, 12, 18 and 24 months, as evaluated by the sensory panel. Further, the aroma was maintained at the predicted times of 2 and 5 months and only showed a acceptable difference at the predicted time periods of 5, 12, 18 and 24 months. There was no sedimentation detected up to the predicted time of 18 months and only a trace amount of sedimentation at the predicted time of 24 months.

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### **References**

Labuza, T. P. and Riboh, D. (1982) Theory and application of Arrhenius Kinetics to the prediction of nutrient losses in foods. Food Technology 36:66-74.

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Luh, B. S., Industrial production of soy sauce. Journal of Industrial Microbiology 14:467-471.

## Claims

1. A fortified liquid seasoning for food comprising liquid seasoning and at least one ethanol-water extract of at least one herb.
- 5 2. The fortified liquid seasoning according to claim 1, wherein the herb is selected from the group consisting of *Panax ginseng* (ginseng), *Panax quinquefolius* (American ginseng), *Lonicera* (honeysuckle) flower, *Angelica* root, *Curcuma longa* (turmeric), *Citrus* spp (tangerine) peel, *Radix astragali* (Membraneous milkvetch) root and *Discorea* spp  
10 (Chinese Yam).
3. The fortified liquid seasoning according to any one of the preceding claims, comprising 0.1 to 3.5% w/w of the extract.
- 15 4. The fortified liquid seasoning according to any one of the preceding claims, wherein the liquid seasoning is selected from the group consisting of soy sauce, fish sauce, teriyaki sauce, barbecue BBQ sauce and marinade sauce.
- 20 5. A method for fortifying, stabilising and/or maintaining the organoleptic properties of a liquid seasoning comprising the steps of:
  - (i) providing at least one liquid seasoning;
  - 25 (ii) providing at least one ethanol-water extract of at least one herb; and
  - (iii) adding the ethanol-water extract(s) to the liquid seasoning.

6. The method according to claim 4, wherein the herb is selected from the group consisting of *Panax ginseng* (ginseng), *Panax quinquefolius* (American ginseng), *Lonicera* (honeysuckle) flower, *Angelica* root, *Curcuma longa* (turmeric), *Citrus* spp (tangerine) peel, *Radix astragali* (Membraneous milkvetch) root and *Discorea* spp (Chinese Yam);
7. A method according to claim 5 or 6, wherein step (ii) comprises using 70 to 90 % v/v ethanol-water to extract the herb.
8. A method according to any one of claims 5 to 7, wherein step (ii) further comprises vacuum drying and/or freeze-drying the ethanol-water extract.
9. A method according to any one of claims 5 to 8, wherein step (iii) comprises adding the ethanol-water extract to a final concentration of 0.1 to 3.5 % w/w.
10. A method according to any one of claims 5 to 9, wherein the liquid seasoning is selected from the group consisting of soy sauce, fish sauce, teriyaki sauce, barbecue (BBQ) sauce and marinade sauce.