



GB 2292314A

(12) **UK Patent Application** (19) **GB** (11) **2 292 314** (13) **A**

(43) Date of A Publication 21.02.1996

(21) Application No **9416570.1**

(22) Date of Filing **16.08.1994**

(71) Applicant(s)  
**East Wellsum Industries (S) Pte. Ltd**  
  
**(Incorporated in Singapore)**  
  
**138 Cecil Street, #09-01 Cecil Court, Singapore**

(72) Inventor(s)  
**Jia Zengshen**

(74) Agent and/or Address for Service  
**Forrester Ketley & Co**  
**Forrester House, 52 Bounds Green Road, LONDON,**  
**N11 2EY, United Kingdom**

(51) INT CL<sup>6</sup>  
**A23L 1/236 , A61K 31/195**

(52) UK CL (Edition O )  
**A5B BJA B180 B20X B20Y B31Y B317 B841**  
**A2B BSS11 B351 B815**  
**U1S S2415 S2416 S2418**

(56) Documents Cited  
**GB 2169601 A EP 0226332 A1 EP 0148680 A1**  
**EP 0122400 A1 WO 88/01861 A1 WO 82/03773 A1**  
**DE 001963736 A FR 002077736 A US 4683233 A**  
**US 4486455 A US 3833745 A**

(58) Field of Search  
**UK CL (Edition M ) A2B BSS11 BSS3 BSS4 BSS9 , A5B**  
**BJA**  
**INT CL<sup>5</sup> A23L 1/236 , A61K 31/195**  
**ONLINE DATABASES: WPI, CAS-ONLINE**

(54) **Sweetening agents with amino acids**

(57) A sweetening composition comprises a sweetening agent such as aspartame or saccharin and glycine and/or L-hydroxyproline. A preferred sweetener composition comprises a sweetening agent, glycine as a bulking agent and at least one of L-proline and L-hydroxyproline. The preferred embodiments comprise both L-proline and L-hydroxyproline.

**GB 2 292 314 A**

**2292314**

- 1 -

**Title: A Sweetening Agent**

**THE PRESENT INVENTION** relates to novel sweetening agents and more particularly to novel sweetening agents comprising L-proline and/or L-hydroxyproline.

Glucose is a very important source of energy for all animals. As such, the sweet taste of glucose is extremely attractive. However, in many human societies in which glucose is plentiful, excessive consumption of glucose can lead to serious health problems such as obesity, tooth decay, high blood pressure and diabetes.

The problems with excessive glucose consumption became apparent, particularly in European and the U.S., following the Second World War when a plentiful supply of sugar lead to a significant proportion of the population suffering from overweight and diabetes. In response to this problem the search was commenced for sweeteners other than glucose, which sweeteners were able to impart sweetness to food products but which did not have the harmful calorific effects of glucose. The first sweetener to be found was saccharine. However, recently, saccharine is rapidly being replaced by the dipeptide aspartame, which does not have the bitter aftertaste of saccharine.

As the public awareness of the need for health and fitness increases, the demand for low calorie sweet foods has become greater. This has lead to the introduction of several different sweeteners, based on either saccharine or aspartame. The formulation of these sweeteners is often different, but in all cases the content of the sweetener itself is relatively low. This is primarily because the sweetness of both aspartame and saccharine is many times

greater than glucose. Accordingly, to produce products that may be used in similar quantities and in a similar manner to glucose, bulking agents must be added to the sweetener to ensure that the final composition has the same sweetness to weight ratio as glucose.

Among the bulking agents which have been known to be used, are tartrate, calcium silicone, various carbohydrates, lactose, phenylalanine, glycine and leucine. Several of these bulking agents have disadvantages, for instance in that they are calorific in themselves or that they are mild laxatives. Accordingly, there still remains a need for new sweetener compositions which at least provide an alternative to those already known and, preferably, provide further advantages over known sweetener compositions.

According to the present invention there is provided a sweetening agent comprising glycine, L-proline, and/or L-hydroxyproline.

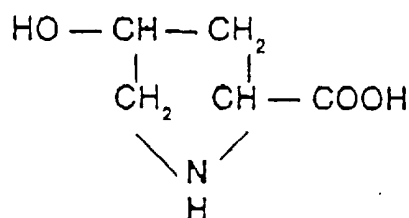
According to the present invention there is provided a sweetener composition comprising a sweetening agent according to the present invention.

According to the present invention there is provided a sweetener composition comprising from  $4/x\%$  to  $12/x\%$  by weight of a sweetener, wherein  $x$  is the sweetness of the sweetener relative to glucose, from 80% to 97.5% by weight of glycine as a first bulking agent, and from 0.01% to 18% by weight of L-hydroxyproline.

L-hydroxyproline is an amino acid of the formula:

## L-Hydroxyproline

L-Trans-4-Hydroxy-Pyrrolidine-2-Formic Acid



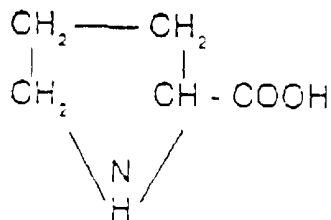
Formula	: C <sub>5</sub> H <sub>9</sub> NO <sub>3</sub>
Molecular Wgt	: 131.13
Nitrogen	: 10.68%

L-hydroxyproline is a natural component of collagen and has been found by the inventors to have several health benefits such as assisting in the digestion of fats, aiding formulation of haemoglobin and globulin, increasing the protection of the gastric wall, improving the absorption of food, increasing the metabolism of skin and improving the circulation of blood beneath the skin. This has the added benefit of reduction of wrinkles, and provides an anti-decrepitude effect.

L-proline is an amino acid with the structure of:

## L - Proline

L-Pyrrolin-2-Formic Acid



Formula	: C <sub>5</sub> H <sub>7</sub> NO <sub>2</sub>
Molecular Wgt	: 115.13
Nitrogen	: 12.17%

which is naturally found as a component of gelatinous tissue. It has been found, by the inventors, to have a substantial anti-oxidation effect as well as aiding

malnutrition and protein deficiency. The inventors have also ascertained that L-proline aids in the healing of intestinal diseases and burns and, further, is suitable for use as a protein supplement following surgery.

In a particularly preferred embodiment of the present invention, the sweetener agent comprises both L-proline and L-hydroxyproline. It has been found that a combination of both these substances in a sweetener composition provide a synergistic effect, over and above the individual effects of the two components. The two components, acting together, provide the effect of improving the flavour of the composition. Glycine has the further advantageous effect of greater stability in which food produces, an effect which is enhanced by the presence of L-proline and/or L-hydroxyproline. The combination of L-proline and L-hydroxyproline also gives rise to memory enhancement of the consumer.

The sweetener itself may be any sweetener such as aspartame or saccharine, but is preferably aspartame.

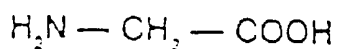
The sweetener is present in the sweetener composition from  $4/x$  to  $12/$  % by weight wherein  $x$  is the sweetness of the sweetener, relative to glucose. Thus, where glucose is taken as having a sweetness of 1, aspartame has a sweetness of 200. Accordingly, if aspartame is the sweetener used, it should be present in an amount from 2 to 6% by weight.

Glycine is used as a bulking agent. Glycine may be used alone or in combination with other bulking agents.

Glycine is a naturally occurring amino acid of the structure:

## Glycine

Food grade



Formula	: $\text{C}_2\text{H}_5\text{NO}_2$
Molecular Wgt	: 75.07
Nitrogen	: 18.66%

and is useful in the treatment of muscle weakness, false hypertrophy of muscles and nerve hyper-acidity. Glycine is also useful in suppression of gastric over-secretion which can result in gastritis.

A particularly preferred sweetener composition according to the present invention comprises from 2% to 6% by weight of aspartame, from 90% to 87.45% by weight of glycine, from 0.5% to 2% by weight of L-proline and from 0.5% to 2% by weight of L-hydroxyproline. This composition has the particular advantage that it comprises only natural amino acids (aspartame being a dipeptide) and further comprises the health benefits of the inclusion of L-hydroxyproline, L-proline and glycine, detailed above, together with the further synergistic advantages of the presence of L-hydroxyproline and L-proline together. This sweetener has about 1:1330th of the calories of normal sugar, and, by virtue of being composed solely of amino acids, is safe for consumption by diabetics and patients with a heat condition.

The composition of the present invention may be formulated in many forms such as granules, tablets, powders or liquid.

The present invention further comprises a method of manufacturing a sweetener agent according to the present invention, which method comprises the mixing of the components in the given proportions.

The present invention further provides the sweetener composition of the present invention for use as a medicament.

According to the present invention there is further provided a composition comprising extract of Tochu and a sweetener agent according to the present invention. Preferably this composition comprises 1.5% to 4% Tochu extract from 85% to 95% by weight of glycine, from 1% to 3% by weight of L-proline and from 2% to 8% by weight of L-hydroxyproline.

Such a composition may be used as a beverage and may be sold in dehydrated form.

Tochu is a traditional and well-known Chinese herb which is greatly valued for its health giving properties. It is known to contain several active ingredients including seventeen separate types of amino acids. Unfortunately, although Tochu is traditionally used in medicine and has now been discovered to have good nutritional properties, this herb, prepared in the traditional way, has a very strong and unpleasant taste. Thus, the amount used medicinally is the minimum necessary to aid in healing a patient, an amount too small for nutritional value to be gained.

The market at present contains many health foods using other Chinese herbs as ingredients. Such health foods have the problems of high sugar content, high calorie content and relatively low protein content as well as, in many cases, the use of artificial preservatives, colouring and flavourings. As such, these are not acceptable as health foods to many people and are unsuitable for consumers with problems such as obesity, dental caries and diabetes.

The beverage according to the present invention comprises the extract of Tochu, containing the active constituents of the herb, combined with the sweetening agent of the present invention, the mixture of glycine, L-proline and L-hydroxyproline. The health drink so produced provides all the benefits of Tochu but with a refreshing sweet taste, giving for the first time, a healthy and palatable way of gaining the benefits of Tochu. Furthermore, the amino acids contained with the beverage act as a unique antioxidant and natural preservative.

The sweetening agent of the present invention, when used in the Tochu drink, do not merely add to the flavour and preservation of the drink. Glycine further provides an amino acid for use in the body, for conversion to other types of amino acids and subsequent protein synthesis and has been known to be able to suppress gastroxynsis by adjusting gastric juice secretion and improving food absorption. Furthermore, in combination with the Tochu extract it is able to induce liver cell multiplication, glycogen synthesis and improved bowel secretion. This allows the drink to be effective in the treatment of chronic hepatitis, cholecystitis, anorexia due to duodenal or stomach ulcers, indigestion, heartburn and abdominal distension.



L-hydroxyproline, in combination with Tochu extract ensures that the drink contains a full set of essential amino acids. L-hydroxyproline is also known to inhibit blood platelet agglomeration thus reducing the viscosity of the blood and lipids in the blood. It is also known to improve digestion by adjusting gastric juice secretion.

Furthermore, L-proline and L-hydroxyproline, in combination, are important components in colloidal proteins in the body allowing the health growth of skin, hair, bones and internal organisms. These two amino acids are relatively rare in the majority of food products and thus provide a beneficial supplement to the diet. Furthermore, the combination of L-proline and L-hydroxyproline improves the function of the central nervous system with many benefits such as memory enhancement. L-proline, in addition to L-hydroxyproline, also inhibits blood platelet agglomeration reducing the viscosity of the blood and the lipid content of the blood. Thus, the beverage of the present invention is useful for treating arterialsclerosis, hypertension, high fat content in the blood and obesity.

Finally, Tochu extract is known to be beneficial in improving the body's immune system. This will work in conjunction with L-hydroxyproline, L-proline and glycine, all of which are known to be useful in combatting streptococcus, colon bacillus and many other bacteria.

Overall, the drink using Tochu extract and the sweetening agent of the present invention is a potent health drink and nutritional aid.

To manufacture the health drink of the present invention, Tochu is first ground into powder and the active components thereof are extracted using several water/organic solvent extractions. After thorough filtration of the extract in solution, L-proline, L-hydroxyproline and glycine are added to the extract in the solution. The resulting mixed solution is dried, re-ground and packed in the form of powder for re-hydration to form the drink.

The present invention will further be described with reference to the following example.

#### EXAMPLE 1

1000g of the sweetener composition according to the present invention were formulated by mixing 10g of L-proline with 1g of L-hydroxyproline. Subsequently 249g of glycine were added and mixed with the L-proline and L-hydroxyproline. Finally, 40g of aspartame were mixed with the other components to provide the sweetener composition, according to the present invention, in the form of a powder.

This sweetener composition, tested on animals, was shown to have an antioxidation effect, be useful for the treatment of malnutrition, protein deficiency, intestinal diseases and burns. The composition further aided fat digestion, formation of haemoglobin and globulin and protected the gastric wall, improved the absorption of food and increased the metabolism of the skin and improved the circulation of blood beneath the skin. Thus the sweetener composition was shown to decrease skin wrinkles and have an anti-decrepitude effect. Furthermore, the sweetener composition was shown to improve memory.

The sweetener composition so produced was also shown to give greater stability in the preservation of taste of hot food to which it is added, particularly when the food had cooled down, in comparison with other sweetener compositions.

The sweetener composition was found to have a calorie content of 0.024 kal per gramme.

**CLAIMS**

1. A sweetening agent comprising glycine, L-proline, and/or L-hydroxyproline.
2. A sweetener composition comprising a sweetening agent according to Claim 1 and a sweetener.
3. A sweetener composition according to Claim 2 comprising from 4/x to 12/x% by weight of a sweetener, wherein x is the sweetness of the sweetener relative to glucose, from 80% to 97.5% by weight of glycine as a first bulking agent and from 0.01% to 18% by weight of L-proline and/or L-hydroxyproline.
4. A composition according to Claim 2 or 3 comprising both L-proline and L-hydroxyproline.
5. A composition according to any one of Claims 2 to 4 further comprising a second bulking agent.
6. A composition according to any one of Claims 2 to 5 wherein the sweetener is aspartame.
7. A composition according to Claim 6 comprising from 2% to 6% by weight of aspartame.
8. A composition according to any one of Claims 2 to 7 comprising from 2% to 6% by weight of aspartame, from 90% to 87.45% by weight of glycine, from 0.5% to 2% by weight of L-proline and from 0.05% to 2% by weight of L-hydroxyproline.
9. A method of manufacturing a composition according to any one of Claims 2 to 8 comprising mixing the components in the given proportions.
10. A composition according to any one of Claims 2 to 8 for use as a medicament.
11. A composition comprising extract of Tochu and a sweetener agent according to Claim 1.
12. A composition according to Claim 11 comprising 1.5% to 4% by weight of Tochu extract, from 85% to 95% by weight of glycine, from 1% to 3% by weight of L-proline and from 2% to 8% by weight of L-hydroxyproline.

13. The composition of Claim 11 or 12 for use as a beverage.

14. The composition of any one of the preceding claims in dehydrated form.

15. A sweetener composition substantially as hereinbefore described.

16. Any novel feature or combination of features described herein.

**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

Application number  
 GB 9416570.1

**Relevant Technical Fields**

(i) UK Cl (Ed.M)     A2B (BSS3, BSS4, BSS9, BSS11) A5B (BJA)  
 (ii) Int Cl (Ed.5)    A23L 1/236, A61K 31/195

**Databases (see below)**  
 (i) UK Patent Office collections of GB, EP, WO and US patent specifications.  
 (ii) ONLINE DATABASES: WPI, CAS-ONLINE

Search Examiner  
 J F JENKINS

Date of completion of Search  
 18 NOVEMBER 1994

Documents considered relevant following a search in respect of Claims :-  
 1 TO 15

**Categories of documents**

- C:** Document indicating lack of novelty or of inventive step.
- P:** Document published on or after the declared priority date but before the filing date of the present application.
- C:** Document indicating lack of inventive step if combined with one or more other documents of the same category.
- E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- A:** Document indicating technological background and/or state of the art.
- &:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2169601 A (TATE & LYLE) see Tables 4 and 5	1, 2 and 9
X	EP 0226332 A1 (BEECHAM) see Examples 1 and 3	1, 2 and 9
X	EP 0148680 A1 (SYNTHELABO) see Examples 3 to 5	1, 2 and 9
X	EP 0122400 A1 (TAKEDA) see Table 2; Example 2	1, 2 and 9
X	WO 88/01861 A1 (BAXTER TRAVENOL) see Tables II and III	1, 2 and 9
X	WO 82/03773 A1 (BAXTER TRAVENOL) see page 8 and Claim 4	1, 2 and 9
X	US 4683233 (SALZBURG ET AL) see Example 46	1 and 2
X	US 4486455 (WOLF ET AL) whole document	1, 2, 5, 6, 9 and 15
X	US 3833745 (LONTZ ET AL) see column 3 lines 39 to 41	1
X	DE 001963736 (SCHEIDE) see Table 2 and Chemical Abstracts 75: 117346	1, 2 and 9
X	FR 002077736 A (CERC) and WPI Acc No 72-07049T/05	1, 2 and 9

**Databases:**The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).