

Patent Literature 1 discloses an oral rehydration solution and other beverages having a sodium concentration of 0.02 to 0.12 % by mass and not comprising a high-sweetness sweetener, characterized in that the beverages comprise fructose, sodium salt and malic acid.

CITATION LIST

PATENT LITERATURE

[0008]

Patent Literature 1: Japanese Patent Application Laid-Open Publication No. 2015-167523

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0009]

The present invention provides novel RTD beverage products suitable for commercial production and long-term storage, and novel methods and apparatuses for producing such beverage products.

SOLUTION TO PROBLEM

[0010]

The present disclosure provides a beverage product comprising a beverage sealed in a container, the beverage comprising, in water, a combination of buffering components selected from (a) citric acid and trisodium citrate, (b) tartaric acid and disodium tartrate, or (c) malic acid and disodium malate, and glucose and sodium chloride, wherein the beverage has a pH of lower than 4.0.

[0011]

The present disclosure provides a method for producing a beverage product, the method comprising: a step of electrolyzing a water containing an electrolyte to obtain an electrolyzed acidic water; a step of adding at least a combination of buffering components selected from (a) citric acid and trisodium citrate, (b) tartaric acid and disodium tartrate, or (c) malic acid and disodium malate to the electrolyzed acidic water to obtain a beverage; and a step of sealing the beverage into a container, wherein the beverage has a pH of lower than 4.0. In another aspect, the present disclosure provides a beverage product comprising an

electrolyzed acidic water obtainable by electrolyzing a water containing an electrolyte.

[0012]

The present disclosure provides an apparatus for producing a beverage product, the apparatus having: an electrolyzing apparatus to electrolyze a water to generate an electrolyzed acidic water; one or more tanks in which at least (a) citric acid and trisodium citrate, (b) tartaric acid and disodium tartrate, or (c) malic acid and disodium malate are added to the electrolyzed acidic water to generate a beverage; and a filling apparatus to seal the beverage into a container.

[0012a] In one aspect, there is provided a Ready-To-Drink Oral Rehydration Solution product comprising an Oral Rehydration Solution in a sealed container, the Oral Rehydration Solution comprising, in an electrolyzed acidic water, : a combination of buffering components consisting of 40 to 80 mM citric acid and 10 to 30 mM trisodium citrate; and glucose and sodium chloride, wherein the Oral Rehydration Solution has a pH of lower than 4.0, wherein the Oral Rehydration Solution comprises sodium at 50 to 90 mEq/L, potassium at 15 to 25 mEq/L, chloride at 50 to 80 mEq/L, glucose at a molar concentration at least equal to that of sodium but not exceeding 111 mmol/L, and no phosphorus, and has a osmolality of 200 to 310 mmol/L, provided that the Oral Rehydration Solution comprises: citric acid and trisodium citrate at a total concentration of 80 mM or lower; 70 to 111 mM glucose, and 35 to 50 mM sodium chloride.

[0012b] In another aspect, there is provided a method of producing the Ready-To-Drink Oral Rehydration Solution product as described herein, the method comprising a step of electrolyzing a water containing an electrolyte to obtain an electrolyzed acidic water having a pH of lower than 4.0; a step of adding: a combination of buffering components consisting of citric acid and trisodium citrate; and glucose and sodium chloride to the electrolyzed acidic water to obtain an Oral Rehydration Solution comprising no phosphorus and having a pH of lower than 4.0; and a step of sealing the Oral Rehydration Solution into a container, wherein the electrolyte contained in the water during the electrolysis comprises: citric acid; or trisodium citrate; or citric acid and trisodium citrate.

[0012c] In another aspect, there is provided an apparatus for producing the Ready-To-Drink Oral Rehydration Solution product as described herein, the apparatus having an electrolyzing apparatus to electrolyze a water containing an electrolyte to generate an electrolyzed acidic

water having a pH of lower than 4.0; one or more tanks in which: a combination of buffering components consisting of citric acid and trisodium citrate; and glucose and sodium chloride are added to the electrolyzed acidic water to generate an Oral Rehydration Solution comprising no phosphorus and having a pH of lower than 4.0; and a filling apparatus to seal the Oral Rehydration Solution into a container, wherein the electrolyzing apparatus is connected to an electrolyte tank to supply an electrolyte to the water to be electrolyzed, wherein the electrolyte supplied to the water to be electrolyzed comprises: citric acid; or trisodium citrate; or citric acid and trisodium citrate.

BRIEF DESCRIPTION OF DRAWINGS

[0013]

[Fig. 1] Fig. 1 is a schematic diagram of the apparatus for producing a beverage product according to one embodiment.

[Fig. 2] Fig. 2 is a schematic diagram showing the equipment of each dissolving tank and the product tank of the apparatus for producing a beverage product according to one embodiment.

DESCRIPTION OF EMBODIMENTS

[0014]

In one aspect of the present disclosure, a beverage product is provided. The beverage product of the present disclosure is most suited for an Oral Rehydration Solution product, but it could be any beverage product such as sports drink and carbonated drink. The beverage in the beverage product of the present embodiment is an aqueous solution based on water as solvent, and is buffered within an acidic range by containing a weak acid and its salt. The combination of the weak acid and its salt may be (a) citric acid and trisodium citrate, (b) tartaric acid and disodium tartrate, or (c) malic acid and disodium malate. In the present disclosure, these components may be referred to as “buffering components”. The beverage in the beverage product of the present embodiment has a pH of lower than 4.0, preferably a pH of 3.0 to 3.8, more preferably a pH of 3.0 to 3.5, and still more preferably a pH of 3.2 to 3.5, for example a pH of 3.2 to 3.25. The pH mentioned in the present disclosure is that measured at 1 atm and 25°C.

[0015]

CLAIMS

1. A Ready-To-Drink Oral Rehydration Solution product comprising an Oral Rehydration Solution in a sealed container, the Oral Rehydration Solution comprising, in an electrolyzed acidic water, :

a combination of buffering components consisting of 40 to 80 mM citric acid and 10 to 30 mM trisodium citrate;

and glucose and sodium chloride,

wherein the Oral Rehydration Solution has a pH of lower than 4.0,

wherein the Oral Rehydration Solution comprises sodium at 50 to 90 mEq/L, potassium at 15 to 25 mEq/L, chloride at 50 to 80 mEq/L, glucose at a molar concentration at least equal to that of sodium but not exceeding 111 mmol/L, and no phosphorus, and has a osmolarity of 200 to 310 mmol/L,

provided that the Oral Rehydration Solution comprises: citric acid and trisodium citrate at a total concentration of 80 mM or lower; 70 to 111 mM glucose, and 35 to 50 mM sodium chloride.

2. The Ready-To-Drink Oral Rehydration Solution product according to claim 1, having a pH stability wherein a pH of lower than 4.0 is maintained when 10.0 mL of 1.05 g/100 mL NaOH aqueous solution is added per 1 L of the Oral Rehydration Solution.

3. The Ready-To-Drink Oral Rehydration Solution product according to claim 1 or 2, wherein sugar content of the Oral Rehydration Solution is 27 g/L or lower, and sodium content of the Oral Rehydration Solution is 0.8 g/L or higher.

4. The Ready-To-Drink Oral Rehydration Solution product according to claim 1 or 2, wherein the Oral Rehydration Solution further comprises one or more of sodium glutamate, sucralose, and a flavoring agent.

5. A method of producing the Ready-To-Drink Oral Rehydration Solution product of claim 1 or 2, the method comprising:

a step of electrolyzing a water containing an electrolyte to obtain an electrolyzed acidic water having a pH of lower than 4.0;

a step of adding: a combination of buffering components consisting of citric acid and trisodium citrate; and glucose and sodium chloride to the electrolyzed acidic water to obtain an Oral Rehydration Solution comprising no phosphorus and having a pH of lower than 4.0; and

a step of sealing the Oral Rehydration Solution into a container,

wherein the electrolyte contained in the water during the electrolysis comprises: citric acid; or trisodium citrate; or citric acid and trisodium citrate.

6. An apparatus for producing the Ready-To-Drink Oral Rehydration Solution product of claim 1 or 2, the apparatus having:

an electrolyzing apparatus to electrolyze a water containing an electrolyte to generate an electrolyzed acidic water having a pH of lower than 4.0;

one or more tanks in which: a combination of buffering components consisting of citric acid and trisodium citrate; and glucose and sodium chloride are added to the electrolyzed acidic water to generate an Oral Rehydration Solution comprising no phosphorus and having a pH of lower than 4.0; and

a filling apparatus to seal the Oral Rehydration Solution into a container,

wherein the electrolyzing apparatus is connected to an electrolyte tank to supply an electrolyte to the water to be electrolyzed, wherein the electrolyte supplied to the water to be electrolyzed comprises: citric acid; or trisodium citrate; or citric acid and trisodium citrate.