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SOLUTION OF NUTRITIVE SALTS AND PROCESS OF MAKING THE SAME

Johannes Valmari, deceased, late of Helsinki, Finland, by Mauri Valmari administrator, Helsinki, Finland

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This invention relates to a method of producing a solution of nutritive salts containing the metal components generally comprised in the human blood for the purpose of supplying the same to the body in the peroral way.

As is known, certain acids and bases, which constitute the basic substances of the blood salts, are supplied to the blood from the food partaken of through the metabolism, that is to say through combustion in the cells of the body. That ratio between the blood salt forming acids and bases, which is a primary condition for the health, may be disturbed for instance by the fact that the food is not suitably composed, but contains either too much acid or too much basic substances. To a certain extent the body can separate both an excess of acid and an excess of bases, it is true, but this involves a drawback, inasmuch as the food is utilized less completely thereby. As soon as the limit of the regulating capacity of the body has been exceeded, an excess of acid or base appears in the blood, involving disturbances in the metabolism, which finally may manifest themselves in the form of more or less severe illnesses.

One object of the invention is to provide a solution of nutritive salts capable of supplying to the body such metal components as are capable of preventing illnesses and also to provide a remedy for them. In addition the solution of the nutritive salts effectively at the same time replaces any deficiency of acid in the stomach and also neutralizes any excess of acid.

In accordance with the invention, a mixture of the metal components normally comprised in the human blood is caused, in the form of their non-toxic water-soluble salts, to react in an aqueous solution with so much citric acid and sodium hydroxide that a stable solution is formed, wherein the metal components are contained approximately in the same proportions as they occur in the blood and in the form of complex salts adapted to be absorbed by the digestive apparatus. The metal components, which preferably take the form of water-soluble chlorides, consist of potassium, calcium, magnesium, iron and manganese. The citric acid is supplied to the reaction-solution in a quantity such that the solution obtained will be slightly acid. Thus the pH-value of the solution may be about 3.5. The nutritive salts solution is preferably produced so that a solution of citric acid is first caused to react with a sodium hydroxide solution, whereupon the reaction-liquid obtained is then caused to react with the aqueous solution of the salts of the metal components, such as their chlorides. It is important that the

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nutritive salts solution does not contain any common salt or contains such salt to a small extent only. This is so for the reason that common salt is dissolved in the blood to a concentration of 0.9% and will then fix a large quantity of the water in the blood.

The nutritive salts solution is not detrimental to the mucous membranes even in a non-diluted state. The metal salts contained in the solution are to be found exactly in such compounds and in such relative proportions that they can be absorbed into the blood from the alimentary canal and are thence conveyed further to the cells, primarily the gland cells, for the building materials of which they are intended.

The gastric juice, which neutralizes the hydrochloric acid in the small intestine, alters the disodium citrate of the nutritive salts solution into a slightly alkaline solution, which is absorbed by the blood and thence further by the cells, the same then facilitating the absorption of the waste products collected therein by the blood so as to promote the metabolism in the cells in this way.

Even when the nutritive salts solution is used very amply, it does not cause complications, inasmuch as the substances not needed by the body do not accumulate in the cells but are eliminated in the urine without loading the liver or the kidneys. On the other hand, the disodium citrate transformed by the gastric juice keeps the tissue liquids sufficiently basic.

The nutritive salts solution according to the invention may either be consumed as it is, or may be diluted, for the purpose of improved the taste, for instance in juice, tea, lemon soda, Vichy water and the like. It may also be evaporated to dryness and compressed into the form of tablets. When used, the tablets are dissolved in any of the taste improving liquids just mentioned. In the form of tablets the product keeps indefinitely. Otherwise, that is to say, when the solution is not evaporated, but is to be kept as such for a long time, some preserving substance, such as salicylic acid, is preferably added.

Example

350 grams of citric acid are dissolved per se in about 700 grams of water, 125 grams of sodium hydroxide (NaOH) being also dissolved per se in about 200 grams of water, while 8 grams of potassium chloride (KCl), 10 grams of calcium chloride ($CaCl_2$), 0.5 gram of ferric chloride ($FeCl_3$), 5 grams of magnesium chloride ($MgCl_2$) and 0.25 gram of manganese chloride ($MnCl_2$) are dissolved together in about 100 grams of water. Aft-

er that, the solution of citric acid is mixed with the sodium hydroxide solution and, finally, the reaction liquid resulting therefrom is mixed with the solution of the five remaining salts.

The salts solution produced in this manner is sufficiently durable to permit of its being kept, at the production of 1 liter at a time and with a consumption of two to three dessert-spoonfuls per day, in a bottle closed by an ordinary cork, without deterioration. In manufacturing on a larger scale it is preferable on the other hand, either to add about 2 grams of salicylic acid per liter of the solution produced, or to evaporate the solution to a dry product, which is preferably shaped into tablets.

What is claimed is:

1. The method of preparing a nutritive salts preparation containing metal components as normally comprised in human blood, and adapted to be consumed by mouth, which comprises the step of causing non-toxic, water-soluble salts of these metal components dissolved in water to react in aqueous solution with so much citric acid and sodium hydroxide that a solution is formed containing the metal components in approximately the same relative proportions in which they occur in the blood and in the form of the complex salts thus obtained, and adapted to be absorbed by the digestive tract, the quantity of citric acid being a least substantially sufficient to neutralize the sodium hydroxide.

2. The method as claimed in claim 1, wherein the salts used of the metal components, other than the sodium, are their respective chlorides.

3. The method as claimed in claim 2, wherein the water-soluble chlorides used are those of potassium, calcium, magnesium, iron and manganese.

4. The method as claimed in claim 3, wherein the citric acid is used in a quantity to leave the final solution at least slightly acid.

5. The method as claimed in claim 4, wherein sufficient citric acid is used to leave the final solution with a pH of about 3.5.

6. The method as claimed in claim 1, wherein the citric acid is first caused to react with the sodium hydroxide in aqueous solution and the resulting solution is then caused to react with the aqueous-soluble salts of the other metal components in aqueous solution.

7. The method as claimed in claim 1, wherein the water-soluble salts are those named herein and they are dissolved in the aqueous solution in the respectively indicated concentration per liter of solution, namely, about 350 grams of citric acid and about 125 grams of sodium hydroxide, and about 8 grams of potassium chloride (KCl), about 10 grams of calcium chloride ($CaCl_2$), about 0.5 gram of ferric chloride ($FeCl_3$), about 5 grams of magnesium chloride ($MgCl_2$), and about 0.25 gram of manganous chloride ($MnCl_2$).

8. A nutritive salts preparation for human consumption by mouth, containing the metal components as normally comprised in the human blood, and as the water-soluble complex salts of the interaction in aqueous solution of citric acid and sodium hydroxide and non-toxic, water-soluble salts of the other metal components, and with the metal concentrations therein in approximately the same relative proportions as they occur in the blood, the quantity of citric acid being at least substantially sufficient to neutralize the sodium hydroxide.

9. A nutritive salts preparation as claimed in claim 8, wherein the metals content thereof is in combination with the chlorides of the respective metals.

10. A nutritive salts preparation as claimed in claim 9, wherein the metals content combined as their chlorides are those of potassium, calcium, magnesium, iron and manganese.

11. A nutritive salts preparation as claimed in claim 10, wherein its citric acid content is sufficient for an aqueous solution of the preparation to be at least slightly acid.

12. A nutritive salt preparation as claimed in claim 11, wherein the preparation is an aqueous solution of its salts content and the solution contains sufficient uncombined citric acid to have a pH value of about 3.5.

MAURI VALMARI,
Administrator of the Estate of Johannes Valmari, Deceased.

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