

**PREPARATION FOR SUPPLEMENTING A
BEVERAGE AND METHOD FOR
ENRICHING A BEVERAGE IN CALCIUM
AND MAGNESIUM**

The present invention relates to a supplementation preparation for drinks which makes it possible to enrich said drinks with assimilable calcium and magnesium.

It also relates to a process for enriching drinks with calcium and magnesium using said preparation.

In the case of calcium, a consensus exists on the importance of this element in forming bony reserves in young people and in preventing osteoporosis in elderly people. Current recommendations are to achieve a consumption close to 1 g/day in adults. In order to satisfy such a high requirement, it is necessary to consume calcium-rich foods and in particular dairy products. However, the consumption of animal products of this type has the disadvantage of enriching the food with saturated fatty acids, which increases the cardiovascular risk. The other foods comprising calcium are various plant products; furthermore, some highly mineralized waters are not insignificant sources of calcium and magnesium.

Generally, out of 1 gram of calcium taken daily, only 200–250 mg are absorbed by the intestinal wall, the remainder being eliminated in the feces. This means that only a part of the calcium in food is effectively dissolved and/or absorbed. To satisfy the calcium requirements of the body, it is consequently sufficient for only a small amount of calcium (200–250 mg/day) to be assimilated, hence the advantage of having available very soluble and well absorbed salts.

Calcium in water present in the sulfate form is well absorbed. However, anions of this type also promote urinary losses of calcium.

Just as for calcium, the supply of magnesium is insufficient in the commonest western diets.

Furthermore, there exist numerous antagonisms and synergies between calcium and magnesium, so much so that it is desirable for these two elements to be introduced with a Ca/Mg physiological ratio of between 1 and 6, advantageously between 3 and 6. As with calcium, only a portion of the Mg ingested is absorbed by the intestines. It is therefore necessary to have available a bioavailable Mg.

As regards the drinks commonly consumed currently, in particular by the young generations, they are all deficient in calcium and magnesium ions.

This is the reason why proposals have been made for a long time to enrich drinks with calcium and magnesium ions.

Patent EP-B-571,653 discloses a drink enriched with minerals, such as calcium and magnesium.

European Patent EP-B-507,157 also discloses an isotonic drink enriched with mineral substances by addition of tri-potassium citrate, calcium lactate or ferrous gluconate.

U.S. Pat. No. 5,270,897 relates to a composition based on fructose and glucose which is supplemented with magnesium in the form of an amino acid chelate.

Patent Application EP-A-205,634 relates to a drink based on fructose, on vitamin C and on quinine for accelerating the reduction in the content of alcohol in the blood. Although this document mentions that the drink can comprise magnesium carbonate and/or calcium carbonate, it should be pointed out that the doses of these two salts are very low in the examples: 0.01 mg/l of magnesium and 0.0168 mg/l of calcium, which could not result in a drink enriched with calcium or magnesium, as is the case in the present invention.

The document DE 32 17 833 discloses the use of a composition composed, on the one hand, of calcium carbonate and magnesium carbonate and, on the other hand, of sodium hydrogencarbonate and potassium hydrogencarbonate.

The description indicates that the ratio by weight of the calcium carbonate to the magnesium carbonate is equal to 936.5/63.5, which results in a Ca/Mg ratio of approximately 20.

Furthermore, in the case of lemonades, fizzy drinks acidified with citric acid or fruit juices, such as orange juice, lemon juice or grapefruit juice, it seems obvious to add the mineral components intended to the enrich drinks, such as calcium and magnesium, via citrate anions.

In point of fact, such a use does not lead to the hoped-for result, as citrate salts are not easily soluble in these drinks.

Citric acid comprises three carboxyl functional groups, some of which are neutralized when citric acid is dissolved in the drink. For calcium citrate to be soluble, it is necessary that only a portion of the carboxyl functional groups should be bonded to calcium. The addition of calcium citrate (in fact tricalcium dicitrate) or magnesium citrate to a citric acid medium ought to have resulted in an exchange of cations. In fact, this is not the case and it is difficult to manage to dissolve the equivalent of 0.2 g of calcium per liter.

Furthermore, organic calcium salts, such as gluconate or lactate, are relatively expensive and magnesium lactate is not readily available.

The document WO-A-96/29890 discloses a drink enriched with mineral substances, such as calcium and magnesium. This document recommends the addition of magnesium sulfate. In point of fact, the sulfates have the disadvantage of being poorly absorbed (in the case of magnesium) or of promoting removal in the urine (in the case of calcium).

Furthermore, it is known that the chlorides have a very bad taste, particularly calcium chloride, which furthermore has an aggressive nature with regard to the mucous membranes.

The drinkable solution "Nicalcium", comprising 500 mg of calcium gluconate and 100 mg of magnesium chloride, is also known.

Finally, it is known that there exist effervescent tablets based on calcium carbonate and on citric acid. These tablets are not intended to enrich acidic drinks.

The object of the present invention is to provide a novel preparation for supplementation with mineral substances for acidic drinks which makes it possible to retain a balanced ratio of the magnesium cation to the calcium cation.

Another object of the present invention is to provide a novel preparation for supplementation with mineral substances for drinks which makes it possible to incorporate calcium and magnesium in soluble form in drinks acidified with citric or phosphoric acid, whether these drinks are naturally acidic or whether they have been acidified by the addition of acid.

The present invention consists in incorporating, in drinks acidified with citric acid and/or phosphoric acid, a preparation comprising calcium carbonate of formula CaCO_3 and basic magnesium carbonate of formula $(\text{MgCO}_3)_4 \cdot \text{Mg}(\text{OH})_2 \cdot 5\text{H}_2\text{O}$.

The invention thus applies to a very great variety of synthetic acidic drinks with citric acid or phosphoric acid, indeed even other acids, as acidifying agent but also to natural drinks of the fruit juice type. When the acidifying agent is citric acid, this leads to the formation, in the resulting drink, of Ca and Mg citrate salts, which are the most assimilable salts.