

**NUTRITIONAL LIQUID SUPPLEMENT
BEVERAGE AND METHOD OF MAKING
SAME**

TECHNICAL FIELD

The present invention is in the field of oral liquid nutritional supplement beverages. More specially, this invention provides a clear nutritional supplement that possesses a thin texture and a highly acceptable mouth feel. This invention also relates to a specific process for the manufacture of a clear nutritional supplement that contains up to 10% whey protein isolate by weight and has a caloric density of at least 1.0 kcal/ml.

BACKGROUND

Nutritional supplements differ generally from nutritionally complete foods in that they are not intended to provide all the human nutritional requirements, but instead are intended to supplement other nutrition sources.

Taste fatigue is a common problem in patients who require nutritional supplements on a regular basis. In addition, some patients, particularly the elderly and those with cancer, have taste aberrations and aversions to "milky" supplements. The beverage of this invention is a non-milk tasting alternative to the mostly milk-based supplements currently available. It represents an acceptable and refreshing means of supplementing energy, protein, vitamin and mineral intake in those patients who are tired of the milk based alternatives.

The present invention is intended to solve a number of concomitant problems attendant to producing a nutritional supplement drink which provides a substantially complete source of protein and a substantially complete source of carbohydrate at a high caloric density. The beverage of this invention also contains vitamins, trace minerals and ultratrace minerals. The beverage of this invention has a pleasing appearance (clear) and appealing organoleptic properties (a thin texture and good taste).

In providing a desirable level of protein (such as in the form of proteins, peptides and/or amino acids), one of the principal obstacles to be overcome is the poor taste of protein hydrolysates commonly used in such prior art products as Fortjuice, commercially available from Nutricia, and Provide™ protein rich drink commercially available from Fresenius. While easily incorporated into a nutritional supplement beverage, protein hydrolysates have a very objectionable taste that is impossible to mask completely with flavorings. These shortcomings make it difficult to obtain good patient compliance. As an alternative, intact whey protein, generally in the form of isolates or concentrates, can be used to formulate the nutritional supplement beverage. Whey protein isolates, due to their unique functionality, are the preferred source of protein over whey protein concentrates and other protein sources. Although not having the poor taste disadvantage of hydrolyzates, intact whey proteins can be difficult to incorporate into a nutritional supplement beverage so as to provide protein at a most desirable level while also allowing the nutritional supplement beverage to bear the most desirable physical and textural properties. Whey protein isolates are also viewed as nutritionally superior to hydrolyzed vegetable proteins and casein.

U.S. Pat. No. 4,992,282 discloses a vitamin and mineral fortified beverage or beverage concentrate. These beverages may be juice or cola beverages that may be carbonated. More specially this patent teaches the use of vitamin C in

sugar to enhance the body's uptake of nutritionally supplemental amounts of iron compounds and calcium compounds. This patent does not suggest the use of whey protein nor the critical need for the final product pH to be in the range of 2.8 to 3.3 so as to achieve a clear product that possesses excellent mouth feel.

EP Patent 486,425 discloses a liquid oral nutritional formulation comprising, based on the total formulation calories, from 40-90% of the calories as carbohydrates, from 2 to 30% of the calories as protein, from 0 to 35% of the calories as fat and from 0 to 17% of the calories as fiber, whereby the protein source is at least 60% by weight whey protein concentrate and the pH of the formulation is from 3.5 to 3.9. The product CitriSource®-clear liquid nutritional supplement from Sandoz Nutrition is believed to be the commercial embodiment of this patent. This patent does not suggest the critical need for the use of a whey protein isolate and a pH of 2.8 to 3.3 to achieve the unexpected and highly desirable results of the present invention.

Unlike the prior art which produces "milk tasting products" the present invention provides a clear oral nutritional supplement which has a juice like consistency and flavor.

All of the shortcomings of the prior art are overcome by the present invention along with providing a nutritional supplement beverage which is appetizing in appearance by being substantially clear, and is of a thin texture and body which gives a pleasing, refreshing mouth feel while at the same time containing a significantly high caloric density. As used herein the term "thin texture" and "mouth feel" relate to viscosity of the product. The product of this invention must have a viscosity of less than 15 centipoise as determined by a Brookfield viscometer at 72° (22° C.) using a #1 spindle at 60 RPM.

In view of the present disclosure or through practice of the present invention, other advantages or the solutions to other problems may become apparent.

SUMMARY OF THE INVENTION

The present invention includes a nutritional supplement beverage and a method of making same. The present invention also includes a nutritional supplement beverage prepared by the method of the present invention.

The nutritional supplement beverage of the present invention, in broadest terms, comprises (1) water; (2) from about 1% to about 10% by weight whey protein isolate; and (3) at least one source of carbohydrate, with a preferred majority of the carbohydrate source being a complex carbohydrate. Complex carbohydrates are viewed as nutritionally superior to simple sugars such as sucrose. The beverage also includes vitamins, trace minerals and ultra-trace minerals, and is essentially free of added macro-nutrients. The pH of the nutritional supplement beverage is in the range of from about 2.8 to about 3.3, and the caloric density of the nutritional supplement beverage is at least 1.00 kcal/milliliter.

As used herein, the term "comprising" or "comprises" means various components can be conjointly employed in the beverages and concentrates of the present invention. Accordingly, the terms "comprising essentially of" and "consisting of" are embodied in the term comprising.

The whey protein can be supplied by commercially available sources. Preferably the whey protein is a whey protein isolate. Whey protein isolate is greater than 90% protein by weight and contains very low levels of fat and lactose. Commercially available sources of whey protein isolate that are useful in the present invention are BiPRO® from Le