

The protein in water and oil slurries are blended together with agitation and the resultant blended slurry is maintained at a temperature from about 55° C. to about 65° C. After waiting for at least one minute, the carbohydrate/mineral slurry is added to the blended slurry from the preceding step with agitation and the resultant blended slurry is maintained at a temperature from about 55° C. to about 65° C. The vessel which contained the carbohydrate/mineral slurry should be rinsed with about 20 kilograms of water and the rinse water should be added to the blended slurry. The marine oil/MCT structured lipid is then added to the blended slurry with agitation. Desirably, the marine oil/MCT structured lipid is slowly metered into the product as the blend passes through a conduit at a constant rate.

After waiting for a period of not less than one minute nor greater than two hours, the blend slurry is subjected to deaeration, ultra-high-temperature treatment, and homogenization, as follows:

- A. use a positive pump to supply the blended slurry for this procedure;
- B. heat the blended slurry to a temperature from about 65° C. to about 71° C.;
- C. deaerate the blend to 28–38.1 cm hg
- D. emulsify the blended slurry at 63–77 atmospheres;
- E. pass the mix through a plate/coil heater and heat the mix to from about 120° C. to about 122° C. with a hold time of about 10 seconds;
- F. ultra high temperature heat the blended slurry to a temperature of about 144° C. to about 147° C. with a hold time of about 5 seconds;
- G. reduce the temperature of the blended slurry to from about 122° C. to about 122° C. by passing it through a flash cooler;
- H. reduce the temperature of the blended slurry to from about 71° C. to about 82° C. by passing it through a plate/coil heat exchanger;
- I. homogenized the blended slurry at 274–288/28–42 atmospheres;
- J. pass the blended slurry through a hold tube for at least 16 seconds at temperature from about 74° C. to about 88° C.;
- K. cool the blended slurry to a temperature from about 1° C. to about 7° C. by passing it through a heat exchanger; and
- L. store the blended slurry at a temperature from about 1° C. to about 7° C. with agitation.

Preferably, after the above steps have been completed, appropriate analytical testing for quality control is conducted. Based on the analytical results of the quality control tests, an appropriate amount of water is added to the batch with agitation for dilution.

A vitamin solution and a flavor solution are prepared separately and added to the processed blended slurry.

The vitamin solution is prepared by heating about 80 kilograms of water to a temperature from about 43° C. to about 66° C. with agitation, and thereafter adding the following ingredients, in the order listed, under agitation: Ascorbic Acid, 45% Potassium Hydroxide, Taurine, Water Soluble Vitamin Premix, Choline Chloride, and L-Carnitine. The vitamin slurry is then added to the blended slurry under agitation.

The flavor solution is prepared by adding the natural and artificial vanilla flavor and artificial chocolate marshmallow flavor to about 25 kilograms of water with agitation. The flavor slurry is then added to the blended slurry under agitation.

The product pH may be adjusted to achieve optimal product stability. The completed product is then placed in suitable containers and subjected to terminal sterilization.

The nutritional products of the present invention are provided to the patient in any manner commonly in use in the art. It is desirable that the nutritional products be provided either in eight ounce cans, 500 ml plastic bottles, or one liter ready-to-hang bottles, etc.

The nutritional products of the present invention are particularly useful for improving the nutritional status of a patient having a malabsorption condition by enterally feeding to the patient a nutritionally effective amount of the liquid nutritional products of the present invention (an amount to prevent malnutrition of the individual patient, depending upon the individual patient's status). As used herein, the term "patient" refers to warm-blooded animals or mammals, including, but not limited to, mice, rats and humans. The identification of patients who are in need of nutritional support with the products of the present invention is well within the ability and knowledge of a skilled practitioner. A practitioner skilled in the art can readily identify, by the use of clinical tests, physical examination and medical/family history, those patients in need of nutritional supplementation with the products of the present invention.

The embodiments of the present invention may, of course, be carried out in other ways than those set forth herein without departing from the spirit and scope of the invention. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive and that all changes and equivalents also come within the description of the present invention.

We claim:

1. An elemental liquid nutritional product comprising:

- a) a protein system which comprises;
  - i) from about 40 w/w % to about 90 w/w % of soy protein hydrolysate,
  - ii) from about 10 w/w % to about 60 w/w % of partially hydrolyzed caseinate in which: a) the fraction of the caseinate having a molecular weight greater than 10,000 daltons but less than 25,000 daltons, is at least 26 w/w % of the total caseinate present and is no greater than about 55 w/w % of the total caseinate present and b) the fraction of the caseinate having a molecular weight of less than 14,000 daltons, is less than about 20 w/w % of the total caseinate present, and,
  - iii) optionally, from about 0 w/w % to about 10 w/w % of arginine;
- b) at least one lipid, and;
- c) at least one carbohydrate.

2. The elemental liquid nutritional product according to claim 1 in which:

- a) the protein system provides from about 10% to about 25% of the total calories of the product;
- b) the lipid provides from about 20% to about 35% of the total calories of the product, and;
- c) the carbohydrate provides from about 50% to about 70% of the total calories of the product.

3. The elemental liquid nutritional product according to claim 1 in which the lipid comprises a structured lipid formed from marine oil and medium chain triglyceride oil.

4. The elemental liquid nutritional product according to claim 1 in which:

- a) the fraction of the partially hydrolyzed caseinate having a molecular weight greater than 10,000 daltons but less than 25,000 daltons, is at least 26 w/w % of the total