

1. Carnation® Hot Cocoa Mix
2. Ghirardelli® all-purpose ground chocolate and cocoa
3. Crystal Light® sugar-free lemonade mix
4. Raspberry Jell-o®, sugar-free

Where necessary, lumps were ground up with mortar and pestle before addition. Powders could be suspended easily until ingested, although they eventually rose to the surface. The Carnation® and Ghirardelli® mixes had more of a granular, sugary mouth-feel which was not undesirable, according to test subjects. The lemonade and Jell-o® mixes contained finely powdered NutraSweet® in place of sugar and remained in suspension much longer. It was reported that all of the above samples effectively mask the PFOB and are acceptable to the patient.

One subject reported that he could distinguish a slight PFOB slickness of the back of his tongue with the chocolate-flavored samples. Addition of a "bitter" note, such as caffeine in a coffee flavored sample was tested; a coffee-mocha combination proved to be acceptable. The Jell-o® and lemonade mix appeared to completely mask the slickness sensation.

Finally, optimization of the following aspects further improves the palatability of fluorocarbon contrast media: (1) flavor selections and use concentrations including recommendations for incorporating off-the-shelf items during clinical evaluation; (2) variations in powder size for improved suspension and mouth-feel; (3) added ingredients, such as filler ingredients, for improved mouth-feel, and/or for eliminating aftertaste; and (4) varying the temperature of the product when ingested.

EXAMPLE 8

In order to use the carbon dioxide generating compositions of the present invention in imaging the GI tract, the composition is orally administered to the patient. After carbon dioxide gas has been generated in the portion of the GI tract to be imaged, an image is formed using conventional X-ray, CAT scan, MRI, ultrasound, or other imaging technique in a manner that is well known.

EXAMPLE 9

Preparation of a composition according to the present invention is preferably accomplished by mixing together the individual components. For example, PFOB and hot cocoa mix were placed together in a container and mixed via shaking. Preferably, the particle size of the agent added to the fluorocarbon liquid is small enough to allow the agent to remain in suspension for about 2-3 minutes, which is typically long enough to allow administration of the admixture to a patient.

Compositions according to the present invention may be provided or sold in mixed or separate form. For example, the fluorocarbon and agent(s) may be provided in two separate, sealed containers; prior to administration to a patient, the contents of the container holding the agent may be poured into that holding the fluorocarbon. The mixture may then be agitated and administered to the patient.

Agents Tested

The various agents tested herein were selected largely because they were readily-available and in ready-to-use form. The list of agents tested is not to be considered as limiting the scope of the invention. There is no evidence indicating that the agents tested or contemplated by the present invention interfere with methods of imaging used, including MRI, CT and conventional radiography. As a further example of the variety of substances that may be

effectively used with fluorocarbon liquids, the ingredients of the various agents used herein are listed below. They are not to be construed as limiting the scope of the invention; for example, sweeteners other than sugar or aspartame are certainly acceptable.

Crystal Light®

citric acid, potassium citrate, flavoring, aspartame, calcium phosphate or tricalcium phosphate, maltodextrin, lemon juice solids (for lemon-flavored variety), vitamin C, artificial color, BHA.

Unsweetened Kool-Aid®

citric acid, calcium phosphate, flavoring, vitamin C, artificial color.

Sugar-free Kool-Aid®

citric acid, maltodextrin, aspartame, calcium phosphate, artificial color, artificial flavor, vitamin C, salt.

Suisse Mocha-flavored Instant Coffee

non-dairy creamer (partially hydrogenated soybean oil, maltodextrin, sodium caseinate, dipotassium phosphate, mono- and diglycerides, lecithin), instant coffee, cocoa, maltodextrin, trisodium citrate, carrageenan, artificial flavor, aspartame.

Hershey's® or Ghirardelli® Cocoa 100% cocoa.

Sugar-free Carnation® Hot Cocoa

nonfat milk, cocoa, sweet dairy whey, salt, cellulose gum, aspartame, artificial vanilla flavor, disodium phosphate.

Artificial Creamer (e.g., ARA®)

corn syrup solids, partially hydrogenated vegetable oil (one or more of the following: soybean, canola, palm, palm seed, safflower, corn, sunflower, cottonseed), dipotassium phosphate, sodium caseinate, mono- and diglycerides, artificial color and flavor (some varieties also contain sodium silicoaluminate and/or lecithin).

Lipton® Sugar-free Iced Tea

maltodextrin, malic acid, instant tea, aspartame; some varieties also contain lemon flavoring.

Tang®

sugar, fructose, citric acid, calcium phosphate, potassium citrate, vitamin C, orange juice solids, calcium citrate, artificial color, flavoring, cellulose gum, xanthan gum, niacinamide, vitamin A palmitate, vitamin B₆, riboflavin (vit. B₂), folic acid; sugar-free varieties contain aspartame in place of the sugar and fructose.

Jell-o®

gelatin, adipic acid, maltodextrin, disodium phosphate, aspartame, fumaric acid, color, salt, flavor.

Equal® (NutraSweet®)

aspartame; Equal® tablets also contain lactose, leucine, maltodextrin, cellulose, and cellulose derivatives; Equal® in powdered form also contains dextrose and maltodextrin.

The foregoing detailed description of the invention and the preferred embodiments, especially with respect to product compositions and processes, is to be considered illustrative of specific embodiments only. It is to be understood, however, that additional embodiments may be perceived by those skilled in the art. The embodiments described herein, together with those additional embodiments, are considered to be well within the scope of the present invention.

I claim:

1. A composition for delivering an active material to a patient, comprising:

a fluorocarbon liquid; and

an effective amount of a solid, fluorocarbon-insoluble particulate material, selected from the group consisting of a gas-generating agent, a palatability-enhancing agent, a pharmacological agent, and a bioactive agent, in direct admixture with said liquid.