

(12) PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 199517409 B2**
(10) Patent No. **704682**

(54) Title
Dry mixture for color-stable liquid compositions

(51)⁶ International Patent Classification(s)
A23L 002/39 A23L 002/70
A23L 001/302 C02F 001/76
A23L 002/58

(21) Application No: 199517409

(22) Application Date: 1995.02.07

(87) WIPO No: WO95/21543

(30) Priority Data

(31) Number	(32) Date	(33) Country
08/193818	1994.02.08	US

(43) Publication Date : 1995.08.29

(43) Publication Journal Date : 1995.10.12

(44) Accepted Journal Date : 1999.04.29

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(56) Related Art
AU 82214/82
US 4282104
EP 554598

OPI DATE 29/08/95 APPLN. ID 17409/95
AOJP DATE 12/10/95 PCT NUMBER PCT/US95/01386



AU9517409

T)

(51) International Patent Classification ⁶ : A23L 2/39, 2/70, 2/58, 1/302, C02F 1/76		A1	(11) International Publication Number: WO 95/21543
			(43) International Publication Date: 17 August 1995 (17.08.95)
(21) International Application Number: PCT/US95/01386		(81) Designated States: AM, AT, AU (Petty patent), BB, BG, BR, BY, CA, CH, CN, CZ, DE, DE (Utility model), DK, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ).	
(22) International Filing Date: 7 February 1995 (07.02.95)			
(30) Priority Data: 08/193,818 8 February 1994 (08.02.94) US			
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(54) Title: DRY MIXTURE FOR COLOR-STABLE LIQUID COMPOSITIONS			
(57) Abstract The present invention relates to a dry mixture which provides a color-stable liquid composition when combined with free chlorine-containing water, said dry mixture comprising: (a) from 0.005 % to 0.035 % by weight chlorine reactive agent; (b) from 0.5 % to 5.0 % by weight electrolyte; (c) coloring agent, wherein the dry mixture comprises sufficient coloring agent to provide for a concentration of coloring agent in the range of from 5 ppm to 200 ppm in a color-stable liquid composition prepared from said dry mixture; and (d) a balance of carbohydrates. The present invention also relates to a method of preparing a color-stable liquid composition, said method comprising: (a) preparing a dry mixture as described above and (b) combining said dry mixture with free chlorine-containing water, thereby producing a color-stable liquid composition; wherein the weight ratio of water combined with dry mixture to dry mixture is in the range of from 10.5:1 to 22:1 (water:dry mixture), wherein the molar ratio of chlorine reactive agent contained in the dry mixture to free chlorine contained in the water is at least 2.2:1 (chlorine reactive agent:free chlorine), and wherein the color-stable liquid composition comprises from 5 ppm to 200 ppm coloring agent.			

DRY MIXTURE FOR COLOR-STABLE LIQUID COMPOSITIONS

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FIELD OF INVENTION

The present invention relates to a dry mixture which produces a color-stable liquid composition when combined with water which contains free chlorine. The present invention further relates to a method for preparing such color-stable liquid composition.

BACKGROUND OF INVENTION

Liquid compositions for human consumption come in many flavors and colors. One flavor that is especially popular with consumers is grape. For aesthetic purposes, such grape flavored beverages often have a dark purple color, which consumers typically associate with grape flavor. This is undoubtedly due to the purple color of concord grapes. Another popular flavor is orange. Orange flavored beverages typically have an orange color. Again, this is undoubtedly due to the natural color of the orange fruit.

Of course, with modern flavors it is possible to prepare beverages which are clear and which have different flavors, such as grape and orange. An example of such beverages are flavored waters. However, when formulating compositions having colors which more typically pertain to the composition flavor, e.g., purple-colored, grape-flavored compositions,

here is often difficulty keeping the color stable. This is especially troublesome when using water containing free chlorine.

It is desirable to use tap water when preparing liquid compositions of the type described herein. This is because of its ready availability and low cost. However, one problem associated with tap water is free chlorine, which is a residue of a typical municipal sanitizing treatment. This free chlorine acts to bleach the color out of some liquid compositions, and particularly out of dark colored liquid compositions such as grape-flavored compositions. It would therefore be desirable to develop a dry mixture which can be used to prepare a liquid composition, preferably for human consumption, which is color-stable when prepared using tap water containing free chlorine. The present invention provides for such a dry mixture. It would also be desirable to develop a method for preparing a color-stable liquid composition prepared from tap water which contains free chlorine. The present invention also provides for such a method.

BACKGROUND ART

There are numerous processes known in the art for stabilizing color in foods and preventing discoloration of foods.

25 U.S. Patent 3,814,820, issued June 4, 1974, to Busta et al., discloses a process for treating a product selected from the group consisting of vegetables and fruits. The disclosed method comprises the steps of: (a) washing a product to be

treated in an aqueous cleaning solution at a temperature of from 32°-70°F; (b) promptly rinsing the washed product of step (a) with potable water; (c) contacting the rinsed product of step (b) with an aqueous sanitizing solution to thereby
5 inactivate unwanted micro-organisms, said sanitizing solution comprising a chlorine-containing sanitizer selected from the group consisting of ascorbic acid and sulfur dioxide-producing discoloration inhibitors; and (d) removing excess solution of step (d) from said product.

10 U.S. Patent 4,208,434, issued June 17, 1980, to Iacobucci et al., discloses an improved process for formulating a color stable food containing bio-available vitamin C and an anthocyanic pigment of the type wherein said anthocyanic pigment and said bio-available vitamin C are combined with a
15 food base prior to consumption, the improvement comprising providing said bio-available vitamin C in the form of ascorbic acid, or a soluble, non-toxic salt thereof, blockingly substituted at least one enolic OH function.

U.S. Patent 4,590,079, issued May 20, 1986, to Nishimori
20 et al., discloses that discoloration of meat products can be prevented by incorporating ascorbic acids, cystine and/or cysteine, and aspartic acid, and optionally a starch hydrolyzate with a dextrose equivalent of 5 to 30, into meat products.

25 U.S. Patent 4,937,085, issued June 26, 1990, to Cherry et al., discloses a method of preventing the discoloration of potatoes. The disclosed method comprises cutting the potatoes for consumption and exposing the cut potatoes to a solution

consisting essentially of citric acid in a weight percentage concentration of from about 0.5% to about 1.00% of the solution and cysteine in a weight percentage of about 0.01% to about 0.04% of the solution, and the remainder water, said
5 exposing including contacting said potatoes with said solution for a time sufficient such that the contacting of the potatoes with said solution prevents discoloration of said potatoes when said potatoes are exposed to an atmosphere which would cause discoloration in the absence of said contacting.

10 Methods are also taught for treating water which contains chlorine with various agents.

U.S. Patent 4,282,104, issued August 4, 1981, to Pacini et al., disclose a method of treating a water supply to sanitize the water supply, reduce carcinogen concentration in
15 the water supply, and prevent the formation of carcinogens in the water supply. The method comprises the steps of: (a) adding chlorine to the water supply to a concentration in excess of the amount needed to sanitize the water supply; and (b) adding a concentration of ascorbic acid thereto sufficient
20 to inactivate an amount of chlorine equal to the excess of the chlorine over the amount needed to sanitize the water supply; wherein said concentration of ascorbic acid is sufficient to destroy existing carcinogens and prevent the formation of carcinogens while leaving a residual free concentration in the
25 water supply sufficient to sanitize the water supply.

U.S. Patent 5,192,571, issued March 9, 1993, to Levy, discloses a process for removing chlorine from coffee and tea beverages. The chlorine is removed from the water used to

prepare such beverages by treating said water with a material consisting of an alkali metal or alkaline earth metal thiosulfate selected from the group consisting of sodium thiosulfate, magnesium thiosulfate and calcium thiosulfate.

- 5 The thiosulfate is used in a quantity that reacts with 60% to 100% of the chlorine in the water on a 0.25-1.00 to one molecular basis with the stoichiometric amount of chlorine present in said water.

- As can be seen, nothing in this art teaches a dry mixture
10 useful for making a color-stable liquid composition, when such composition is prepared with water containing free chlorine.

It is therefore an object of the present invention to provide a dry mixture which provides a color-stable liquid composition when combined with free chlorine-containing water.

- 15 It is another object of the present invention to provide a method of preparing such color-stable liquid compositions by mixing such dry mixture and water containing free chlorine.

- These objects are accomplished by the invention described herein. Unless otherwise specified, the percentages provided
20 herein are weight percentages.

SUMMARY OF THE INVENTION

The present invention relates to a dry mixture which provides a color-stable liquid composition when combined with free chlorine-containing water, said dry mixture comprising:

- 25 (a) from 0.005% to 0.035% by weight chlorine reactive agent;
(b) from 0.5% to 5.0% by weight electrolyte;

(c) coloring agent, wherein the dry mixture comprises sufficient coloring agent to provide for a concentration of coloring agent in the range of from 5 ppm to 200 ppm in a color-stable liquid composition prepared from said dry mixture; and

(d) a balance of carbohydrate.

The present invention also relates to a method for preparing a color-stable liquid composition, said method comprising:

- 10 (a) preparing a dry mixture comprising:
- (1) from 0.005% to 0.035% by weight chlorine reactive agent;
 - (2) from 0.5% to 5.0% by weight electrolyte;
 - (3) coloring agent, wherein the dry mixture
- 15 comprises sufficient coloring agent to provide for a concentration of coloring agent in the range of from 5 ppm to 200 ppm in the color-stable liquid composition; and
- (4) a balance of carbohydrate.; and
- 20 (b) combining said dry mixture with free chlorine-containing water, thereby producing a color-stable liquid composition;

wherein the weight ratio of water combined with dry mixture is in the range of from 10.5:1 to 22:1 (water:dry

25 mixture), wherein the molar ratio of chlorine reactive agent contained in the dry mixture to free chlorine contained in the water is at least 2.2:1 (chlorine reactive agent:free

chlorine), and wherein the color-stable liquid composition comprises from 5 ppm to 200 ppm coloring agent.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a dry mixture which, when
5 combined with water containing free chlorine, provides a color-stable liquid composition. By the term "color-stable" it is meant that after a liquid composition is prepared with the dry mixture of the present invention and free chlorine-containing water, the coloring agents contained in said liquid
10 composition are not oxidized (i.e., bleached out) by the presence of chlorine to a noticeable degree.

The dry mixture of the present invention comprises from 0.005% to 0.035%, preferably from 0.020% to 0.035%, more preferably from 0.025% to 0.035% by weight chlorine reactive
15 agent.

In the context of the present invention, the term "chlorine reactive agent" means any reagent which reacts with free chlorine, as defined herein, to prevent the free chlorine from oxidizing or bleaching out the color of any liquid
20 composition prepared by the dry mixture of the present invention.

The dry mixture can utilize any chlorine reactive agent known to those skilled in the art. Examples of chlorine reactive agents useful in the dry mixture of the present
25 invention include, but are not limited to, erythorbic acid and its salts, ascorbic acid and its salts, and mixtures thereof, with ascorbic acid being preferred. When such salts are utilized as the chlorine reactive agent, they are not

considered as an electrolyte for purposes of formulating the dry mixture of the present invention.

When the preferred ascorbic acid is used, the dry mixture comprises from 0.005% to 0.4%, preferably from 0.01% to 0.05%,
5 more preferably from 0.02% to 0.04% by weight ascorbic acid.

The dry mixture of the present invention also comprises a coloring agent. As with the chlorine reactive agents, any type of coloring agent known to those skilled in the art may be used in the present invention. Examples of useful coloring
10 agents include, but are not limited to, Food, Drug & Cosmetic ("FD&C") Yellow # 6, FD&C Red # 40, FD&C Blue # 1, FD&C Yellow # 5, and FD&C Green # 3, and mixtures thereof. It has been found that the color-stability benefit provided by the dry mixture of the present invention is most pronounced when the
15 coloring agents FD&C Red # 40, FD&C Blue # 1, and mixtures thereof are used. For this reason, these coloring agents are preferred for use in the dry mixture of the present invention.

The dry mixture of the present invention comprises sufficient coloring agent to provide a coloring agent
20 concentration in the range of from 5 ppm to 200 ppm, preferably from 10 ppm to 50 ppm, more preferably from 15 ppm to 25 ppm, in a color-stable liquid composition prepared by combining the dry mixture with water. To achieve such coloring agent concentrations in a final color-stable liquid
25 product, the dry mixture of the present invention typically comprises from 0.007% to 0.3%, preferably from 0.02% to 0.1%, more preferably from 0.02% to 0.05% by weight coloring agent. Of course, the exact amount of coloring agent used will depend

upon a number of factors, including the desired color intensity, desired final product color, ratio of dry mixture to water used to prepare a liquid composition, and the type of coloring agents used.

5 For example, according to the *CRC Handbook of Food Additives*, 2d. Ed., Vol. II, published by The Chemical Rubber Co., Cleveland, Ohio, an orange carbonated beverage comprises either 75 ppm of all FD&C Yellow # 6 or 50 ppm of a mixture of 96 parts FD&C Yellow # 6 and 4 parts FD&C Red # 40; a cherry
10 carbonated beverage comprises 100 ppm of a mixture of 99.5 parts FD&C Red # 40 and 0.5 parts FD&C Blue # 1; a grape carbonated beverage comprises 75 ppm of a mixture of 80 parts FD&C Red # 40 and 20 parts FD&C Blue # 1; a strawberry carbonated beverage comprises 60 ppm of all FD&C Red # 40; a
15 lime carbonated beverage comprises 20 ppm of a mixture of 95 parts FD&C Yellow # 5 and 5 parts FD&C Blue # 1; and a lemon carbonated beverage comprises 20 ppm of all FD&C Yellow # 5.

When the preferred combination of FD&C Red # 40 and FD&C Blue # 1 is used to prepare the dry mixture of the present
20 invention, the dry mixture comprises sufficient coloring agent to provide for a concentration of coloring agent in the range of from 5 ppm to 200 ppm, preferably from 10 to 50 ppm, more preferably from 15 ppm to 25 ppm in a color-stable liquid composition prepared by combining the dry mixture with water
25 product. To achieve such coloring agent concentrations in a final color-stable liquid product, the dry mixture of the present invention typically comprises from 0.005% to 0.1%, preferably from 0.01% to 0.05%, more preferably from 0.01% to

0.03% by weight FD&C Red # 40, and from 0.002% to 0.05%, preferably from 0.002% to 0.025%, more preferably from 0.0025% to 0.01% by weight FD&C Blue # 1. In the preferred combination of FD&C Red # 40 and FD&C Blue #1, the ratio of
5 FD&C Red # 40 to FD&C Blue #1 is in the range of from 3.5:1 to 4.5:1, preferably from 3.75:1 to 4.25:1, more preferably from 3.9:1 to 4.1:1 (FD&C Red # 40:FD&C Blue #1).

Of course, the coloring agents of the present invention are susceptible to bleaching by free chlorine. If coloring
10 agents are used which are not bleached by free-chlorine, then the chlorine reactive agents of the present invention are not necessary.

The dry mixture of the present invention also comprises from 0.5% to 5.0%, preferably from 1.0% to 4.0%, more
15 preferably from 2.0% to 3.0% by weight of an electrolyte. Any electrolyte known to those skilled in the art may be used in the present invention. Examples of electrolytes useful herein include, but are not limited to, sodium chloride, potassium chloride, monopotassium phosphate, dipotassium phosphate,
20 sodium citrate, potassium citrate, and mixtures thereof, with a mixture of sodium chloride, sodium citrate, and monopotassium phosphate being preferred.

When this preferred electrolyte mixture is used, the dry mixture comprises from 0.3% to 1.5%, preferably from 0.6% to
25 1.2%, more preferably from 0.8% to 1.0% by weight sodium chloride; from 0.3% to 1.5%, preferably from 0.6% to 1.2%, more preferably from 0.8% to 1.0% by weight sodium citrate; and from 0.2% to 1.0%, preferably from 0.4% to 0.8%, more

preferably from 0.5% to 0.7% by weight monopotassium phosphate.

The balance of the dry mixture of the present invention comprises a carbohydrate. The dry mixture preferably
5 comprises from 70% to 96%, more preferably from 80% to 94%, still more preferably from 90% to 93% by weight carbohydrate.

Any carbohydrate known to those skilled in the art may be used in dry mixture of the present invention. Of course, the carbohydrates have to be in dry form when used in the dry
10 mixture of the present invention. Examples of carbohydrates useful in the dry mixture include, but are not limited to, sucrose, dextrose, maltodextrin, fructose, corn syrup solids, and mixtures thereof, with a mixture of sucrose and dextrose being preferred.

15 When the preferred mixture of sucrose and dextrose is used, the dry mixture of the present invention comprises from 35% to 95%, preferably from 55% to 75%, more preferably from 60% to 70% by weight sucrose; and from 1% to 50%, preferably from 10% to 40%, more preferably from 20% to 30% by weight
20 dextrose.

The weight ratio of chlorine reactive agent to coloring agent in the dry mixture is preferably in the range of from 60:1 to 2:1, more preferably from 20:1 to 2:1, still more preferably from 4:1 to 3:1 (chlorine reactive agent:coloring
25 agent).

The dry mixture may also comprise optional ingredients. Examples of optional ingredients useful in the dry mixture

included, but are not limited to, natural and artificial flavors.

When natural and artificial flavors are included as ingredients, the dry mixture comprises from 0.05% to 0.8%,
5 preferably from 0.1% to 0.5%, more preferably from 0.15% to 0.2% by weight natural and artificial flavors.

After being combined, the components of the dry mixture are mixed until the dry mixture is substantially uniform. Any method of mixing known to those skilled in the art may be used
10 when preparing the dry mixture of the present invention. Examples of mixing methods known to those skilled in the art include, but are not limited to, mixing the ingredients in one of the following apparatuses: a ribbon mixer, a vee-blender, an air impingement mixer, a paddle mixer, a vertical screw
15 mixer, and a fluidized bed, with a ribbon mixer being preferred.

When the ribbon mixer is used to prepare the dry mixture of the present invention, the dry mixture ingredients are charged into the mixer and mixed at a speed in the range of
20 from 50 to 200 rpm, preferably from 100 to 200 rpm, more preferably from 125 to 175 rpm, for a period of time in the range of from 5 to 20 min., preferably from 7 to 18 min., more preferably from 10 min. to 15 min.

The present invention also relates to a method of
25 preparing a color-stable liquid composition. The method comprises initially preparing a dry mixture in the manner already described herein. The dry mixture is prepared by combining and mixing the ingredients already described herein

in the proportions described herein, including any desirable optional ingredients. As far as is known, the ingredients may be combined in any manner known to those skilled in the art. Of course, it is preferred to mix the dry ingredients to
5 obtain a substantially uniform distribution of the individual ingredients in the dry mixture. This provides for a liquid composition of more uniform quality.

Once the dry mixture is prepared, it is combined with water which contains free-chlorine, thereby producing a color-
10 stable liquid composition. By "free chlorine" it is meant that the water contains either hypochlorous acid (HOCl) or the hypochlorite ion (OCl^-), either of which is capable of reacting with other organic constituents present in the liquid environment. The free chlorine is typically present in the
15 water due to municipal water treatment processing wherein chlorine is added as a sanitizing agent. Following the sanitizing process there is usually residual free chlorine contained in the treated water. This residual free chlorine, if untreated, acts to oxidize the coloring agents present in
20 the liquid composition, thereby bleaching out the color in the liquid composition.

The concentration of chlorine in the water will depend upon a number of factors, such as the level of sanitizing agent used in the particular water treatment process in
25 question, the proximity of the water to the treatment plant, and the length of time since the water was treated. The length of time affects the chlorine concentration because the concentration tends to diminish over time. Typical chlorine

concentrations encountered in municipally treated water range from 0.1 ppm to 10 ppm, more typically from 0.3 ppm to 3 ppm, still more typically from 0.5 ppm to 1 ppm.

The water and dry mixture are combined in weight ratio of
5 water to dry mixture in the range of from 10.5:1 to 22:1, preferably from 12:1 to 18:1, more preferably from 13:1 to 15:1 (water:dry mixture).

The dry mixture and water can be combined in any manner known to those skilled in the art. In the usual manner in
10 which the method of the present invention is practiced, the consumer combines the dry mixture with tap water to prepare the color-stable liquid composition. This tap water typically contains free chlorine. The color-stable liquid composition is then typically mixed, for example with a spoon, until the
15 dry mixture is completely dissolved.

For any liquid composition prepared from the dry mixture and free chlorine-containing water to be color-stable, the dry mixture must provide a sufficient weight ratio of chlorine reactive agent to free chlorine to inhibit the color-bleaching
20 activity of the chlorine. Of course there are a number of variables which have to be considered when calculating this weight ratio. Specifically, the concentration of the chlorine reactive agent of the dry mixture, the weight ratio of dry mixture to water, and the concentration of free chlorine in
25 the water. It has been found that the molar ratio of chlorine reactive agent contained in the dry mixture to free chlorine contained in the water must be at least 2.2:1 (chlorine reactive agent:free chlorine). Preferably, this molar ratio

of chlorine reactive agent to free chlorine falls within the range of from 10:1 to 2:1, more preferably from 5:1 to 2:1, still more preferably from 3:1 to 2:1.

The color-stable liquid composition prepared by the process of the present invention also comprises from 5 ppm to 200 ppm, preferably from 10 ppm to 50 ppm, still more preferably from 15 ppm to 25 ppm coloring agent. As already described herein, the exact concentration of coloring agent will depend upon factors such as the desired color intensity, desired final product color, ratio of dry mixture to water used to prepare a liquid composition, and the type of coloring agents used.

When the preferred combination of FD&C Red # 40 and FD&C Blue # 1 is used to prepare the dry mixture of the present invention, the color-stable liquid composition prepared by the process of the present invention comprises from 5 ppm to 200 ppm, preferably from 10 ppm to 50 ppm, more preferably from 15 ppm to 25 ppm coloring agent. In the preferred combination of FD&C Red # 40 and FD&C Blue #1, the ratio of FD&C Red # 40 to FD&C Blue #1 is in the range of from 3.5:1 to 4.5:1, preferably from 3.75:1 to 4.25:1, more preferably from 3.9:1 to 4.1:1 (FD&C Red # 40:FD&C Blue #1).

As already stated herein, after a liquid composition is prepared with the dry mixture of the present invention and free chlorine-containing water, the coloring agents contained in said liquid composition are not oxidized (i.e., bleached out) to a noticeable degree by the presence of free chlorine. While there will be some oxidation reaction between the

coloring agents and the free-chlorine, the amount will minimal due to the presence of the chlorine reactive agent. Furthermore, any reactions between the free chlorine and coloring agents will occur substantially immediately after
5 mixing. This further contributes to the color stability of the liquid composition.

The present invention is further illustrated, but not limited by, the following examples.

EXAMPLES

10

Example 1

A dry mixture of the following formula is prepared:

	<u>Ingredient</u>	<u>Weight Percent</u>
	Sucrose	67.197
15	Dextrose	26.516
	Citric Acid	3.500
	Salt Blend	2.549
	Ascorbic Acid	0.029
	FD&C Red # 40	0.021
20	FD&C Blue # 1	0.006
	<u>Flavoring Agents</u>	<u>0.182</u>
	TOTAL	100.000

The above dry mixture is prepared by combining 1224.71
25 kg. sucrose, 496.69 kg. dextrose, 65.32 kg. citric acid, 47.63 kg. salt blend, 0.54 kg. ascorbic acid, 0.39 kg. FD&C Red # 40, 0.13 kg. FD&C Blue #1, and 3.40 kg. flavoring agents in a ribbon mixer.

After being combined, the dry ingredients are mixed on
30 high speed for a period of 10 minutes. The final product is a dry mixture having substantially uniformly mixed ingredients.

Example 2

A color-stable liquid beverage is prepared by mixing 66.25 grams of the dry mixture of example 1 with 896.25 grams of water in a 1.0 L, non-metallic container. The water and
5 dry mixture are mixed using a spoon until all the dry mixture is dissolved. The water contains 3.0 ppm free chlorine.

CLAIMS

1. A dry mixture which provides a color-stable liquid composition when combined with free chlorine-containing water,
5 said dry mixture characterized by:
- (a) from 0.005% to 0.035% by weight chlorine reactive agent;
 - (b) from 0.5% to 5.0% by weight electrolyte;
 - (c) coloring agent, wherein the dry mixture comprises
10 sufficient coloring agent to provide for a concentration of coloring agent in the range of from 5 ppm to 200 ppm in a color-stable liquid composition prepared from said dry mixture; and
 - (d) a balance of carbohydrate.
- 15
2. A dry mixture according to claim 1 characterized by from 0.025% to 0.035% by weight chlorine reactive agent, from 2.0% to 3.0% electrolyte, and from 90% to 93% by weight carbohydrate, and sufficient coloring agent to provide for a
20 concentration of coloring agent in the range of from 15 ppm to 25 ppm in a color-stable liquid composition prepared from said dry mixture.
3. A dry mixture according to claim 1 or 2 wherein the
25 carbohydrate is selected from the group consisting of sucrose, dextrose, maltodextrin, fructose, corn syrup solids, and mixtures thereof, wherein the electrolyte is selected from the group consisting of sodium chloride, potassium chloride,

monopotassium phosphate, dipotassium phosphate, sodium citrate, potassium citrate, and mixtures thereof, wherein the chlorine reactive agent is selected from the group consisting of erythorbic acid and its salts, and ascorbic acid and its salts, and mixtures thereof, and wherein the coloring agent is selected from the group consisting of FD&C Red # 40, FD&C Blue # 1, and mixtures thereof.

5 4. A dry mixture according to any one of claims 1-3 characterized by from 60% to 70% by weight sucrose, from 20% to 30% weight dextrose, from 0.8% to 1.0% by weight sodium chloride, from 0.5 to 0.7% by weight monopotassium phosphate, from 0.8% to 1.0% by weight sodium citrate, and from 0.2 to 0.04% by weight ascorbic acid, wherein the coloring agent is a mixture of FD&C Red # 40 and FD&C Blue # 1, wherein the dry mixture comprises sufficient coloring agent to provide for a
10 concentration of coloring agent in the range of from 15 ppm to 25 ppm in a color-stable liquid composition prepared from said dry mixture, wherein the ratio of FD&C Red # 40 to FD&C Blue # 1 is in the range of from 3.5:1 to 4.5:1 (FD&C Red # 40:FD&C Blue # 1), and wherein the weight ratio of ascorbic acid to coloring agent is in the range of from 4:1 to 3:1 (chlorine reactive agent : colouring agent).

15 5. A dry mixture according to claim 4 wherein the ratio of FD&C Red # 40 to FD&C Blue # 1 is in the range of from 3.75:1 to 4.25:1 (FD&C Red # 4 : FD&C Blue # 1).

6. A method of preparing a color-stable liquid composition, said method characterized by:

(a) preparing a dry mixture comprising:

(1) from 0.005% to 0.035% by weight chlorine reactive agent;

20 (2) from 0.5% to 5.0% by weight electrolyte;

(3) coloring agent, wherein the dry mixture comprises sufficient coloring agent to provide for a concentration of coloring agent in the range of from 5 ppm to 200 ppm in the color-stable liquid composition; and

(4) a balance of carbohydrate; and

25 (b) combining said dry mixture with free chlorine-containing water, thereby producing a color-stable liquid composition;

wherein the weight ratio of water combined with dry mixture is in the range of from 10.5:1 to 22:1 (water:dry mixture), wherein the molar ratio of chlorine reactive agent contained in the dry mixture to free chlorine contained in the water is at least 2.2:1 (chlorine reactive agent:free chlorine),

30 and wherein the color-stable liquid composition comprises from 5 ppm to 200 ppm coloring agent.

7. A method according to claim 6 wherein the dry mixture comprises from 0.025% to 0.035% by weight chlorine reactive agent, from 2.0% to 3.0% electrolyte, and from 90% to 93% by weight carbohydrate, and sufficient coloring agent to provide for a concentration of coloring agent in the range of from 15 ppm to 25 ppm in the color-stable liquid composition, wherein the molar ratio of
35 chlorine reactive agent contained in the dry mixture to free chlorine contained in the water is in the range of from 3:1 to 2:1 (chlorine reactive agent:free chlorine), and wherein the color-stable liquid composition comprises from 15 ppm to 25 ppm coloring agent.

8. A method according to claim 6 or 7 wherein the carbohydrate is selected from the group consisting of sucrose, dextrose, maltodextrin, fructose, corn syrup solids, and mixtures thereof,
40 wherein the electrolyte is selected from the group consisting of sodium chloride, potassium chloride,



monopotassium phosphate, dipotassium phosphate, sodium citrate, potassium citrate, and mixtures thereof, wherein the chlorine reactive agent is selected from the group consisting of erythorbic acid and its salts, and ascorbic acid and its salts, and mixtures thereof, and wherein the coloring agent is selected from the group consisting of FD&C Red # 40, FD&C Blue # 1, and mixtures thereof.

- 5 9. A method according to any one of claims 6-8 wherein the dry mixture comprises from 60% to 70% by weight sucrose, from 20% to 30% weight dextrose, from 0.8% to 1.0% by weight sodium chloride, from 0.5% to 0.7% by weight monopotassium phosphate, from 0.8% to 1.0% by weight sodium citrate, from 0.02% to 0.04% by weight ascorbic acid, and sufficient coloring agent to provide for a concentration of coloring agent in the range of from 15 ppm to 25 ppm in the color-
10 stable liquid composition, wherein the coloring agent is a mixture of FD&C Red # 40 and FD&C Blue # 1, wherein the ratio of FD&C Red # 40 to FD&C Blue # 1 is in the range of from 3.5:1 to 4.5:1 (FD&C Red # 40:FD&C Blue # 1), and wherein the weight ratio of water combined with dry mixture is in the range of from 13:1 to 15:1 (water: dry mixture), wherein the molar ratio of chlorine reactive agent contained in the dry mixture to free chlorine contained in the water is in the range of from 3:1 to
15 2:1 (chlorine reactive agent:free chlorine), wherein the color-stable liquid composition comprises from 15 ppm to 25 ppm coloring agent, wherein the weight ratio of ascorbic acid to coloring agent in the dry mixture is in the range of from 4:1 to 3:1 (chlorine reactive agent:coloring agent).

10. A method according to claim 9 wherein the ratio of FD&C Red # 40 to FD&C Blue # 1 in the dry mixture is in the range of from 3.75:1 to 4.25:1 (FD&C Red # 40:FD&C Blue # 1), and wherein
20 the water comprises from 0.3 ppm to 3 ppm free chlorine.

11. A dry mixture which provides a color-stable liquid composition when combined with free chlorine-containing water, substantially as hereinbefore described with reference to any one of the Examples.

12. A method of preparing a color-stable liquid composition, substantially as hereinbefore
25 described with reference to any one of the Examples.

Dated 3 March, 1999
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