Title: GUM HAVING MULTIPLE COLORS

Abstract: Gums that are capable of changing color during use are provided. The color change results from one or more coloring agents in the gum which can cause a release of different colors as the gum is chewed. The coloring agent can include a variety of different combinations of materials, such as encapsulated coloring materials, dyes, lakes, dispersions, pH sensitive coloring materials and combinations thereof. In this regard, the gum of the present invention can produce gum bibles that are differently colored, such as uniformly colored and/or multi-colored, during use.
SPECIFICATION

TITLE

“GUM HAVING MULTIPLE COLORS”

BACKGROUND OF THE INVENTION

The present invention generally relates to gums. More specifically, the present invention relates to colored gums, particularly colored bubble gums.

Of course, gum and products thereof have been known for a great number of years. Over the years, a variety of different gums, such as chewing gums and bubble gums, and products thereof have been developed to improve and enhance the quality of these products. Known gum products include, for example, sugar free, low calorie and the like. Likewise, a variety of different shapes, sizes and colors of gums are known and used. For example, it is known to provide individual pieces of gum in the form of chunks, sticks, tapes, shredded pieces, tabs, pellets or the like. Each form can include a variety of different shapes and sizes.

With respect to gum color, gums typically include an identifying color. The identifying color can include a variety of different colors. In some gums, the identifying color effectively corresponds to the flavoring of the gum. For example, an orange flavored gum may have an identifying color that is orange; a banana flavored gum may have an identifying color of yellow; a grape flavored gum may have an identifying color of purple; and the like.

Typically, the identifying color of the gum is not soluble in water. In this regard, the gum effectively retains the color associated with its identifying color while the gum is chewed. Thus, the gum can produce a colored bubble associated with the identifying color when the gum is blown.

Blowing colored gum bubbles provides an element of excitement and enjoyment to the consumer, particularly for children. However, the initial excitement of blowing a colored bubble may readily diminish after continually blowing the same colored bubble.

A need, therefore exists, to provide gums that increase the level of enjoyment and excitement that one gains from chewing and blowing same.
SUMMARY OF THE INVENTION

The present invention provides gums, such as bubble gums and chewing gums, capable of changing colors when chewed. The color change is induced by a coloring agent(s) of the gum that can cause a release of one or more colors as the gum is chewed. The released colors can be uniformly colored, multi-colored or combinations thereof. In this regard, the gum of the present invention can produce gum bubbles of a variety of different colors when blown.

To this end, in an embodiment of the present invention, a gum capable of changing colors is provided. The gum includes a gum base portion, a flavor and a coloring agent that causes a release of color as the gum is chewed.

In another embodiment, a bubble gum capable of producing differently colored bubbles is provided. The bubble gum includes a gum base portion, a flavor and a coloring agent that causes a release of color as the gum is chewed.

In an embodiment, the colored bubbles are uniformly colored, multi-colored or combinations thereof.

In yet another embodiment, a gum capable of changing colors is provided. The gum includes a gum base portion, a flavor and a coloring agent that includes an encapsulated coloring material wherein the coloring agent causes a release of one or more colors as the gum is chewed.

In still yet another embodiment, a method of producing a gum capable of providing differently colored bubbles is provided. The method includes the step of mixing a plurality of gum ingredients including a gum base portion, a flavor and a coloring agent wherein the coloring agent causes a release of one or more colors as the gum is chewed.

It is, therefore, an advantage of the present invention to provide a gum capable of changing colors as the gum is chewed.

Another advantage of the present invention is to provide a bubble gum capable of producing differently colored gum bubbles, such as uniformly colored bubbles and/or multi-colored bubbles, when the gum is blown.

A further advantage of the present invention is to provide a gum that includes a coloring agent which can cause a release of one or more colors as the gum is chewed in which the coloring agent can include encapsulated coloring materials, pH
sensitive coloring materials, dyes, lakes, dispersions or the like and combinations thereof.

Yet a still further advantage of the present invention is to provide a gum that creates increased levels of enjoyment and excitement during use.

Additional features and advantages of the present invention are described in, and will be apparent in the detailed description of the presently preferred embodiments.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

The present invention provides a gum(s), such as bubble gum and chewing gum, capable of changing colors as the gum is chewed. In this regard, the gum, particularly bubble gum, can produce differently colored bubbles when the gum is blown. The variety of colors results in increased and improved levels of enjoyment and excitement during its use.

In an embodiment, the gum of the present invention includes a coloring agent that can cause a release of color as the gum is chewed. This enables the gum to change colors during use. In particular, the gum is capable of producing differently colored gum bubbles associated with the changing colors of the gum when the gum is blown. The gum can include any suitable number and make-up of coloring agents to provide desirable and improved levels of enjoyment and excitement during use.

The present invention is not limited to the color. Any suitable color that can be effectively added to the gum may be utilized. For example, the colors of a rainbow, namely, red, orange, yellow, green, blue, indigo, violet and any imaginable colors which can result from the combination thereof. In addition, any suitable type of color can be utilized, such as dyes, lakes, dispersions and combinations thereof.

The colors can be released one at a time in the gum thereby resulting in a series of uniform colors. In addition, a mixture of colors can be simultaneously released thereby resulting in a multi-colored gum and gum bubbles thereof.

The coloring agent generally includes a coloring component which includes a specific color as previously discussed. The coloring component can be water soluble. This enables the gum to retain a color associated with the coloring component for a set period of time after which the color disappears. The release and
disappearance of colors can result in a continual and controllable change of colors associated with the gum during use, preferably during its entire use.

The water soluble color component can include a dye. Any suitably colored dye that can be effectively used with a gum can be utilized. The dyes can include synthetic dyes, natural dyes, artificial dyes and mixtures and combinations thereof. The dyes can be provided in a liquid form, a solid form or combinations and mixtures thereof.

The solid and liquid dyes can include a variety of any suitable materials. For example, the solid dyes can include a dye material that has been compressed and compacted under pressure to form a solid structure, such as a bead, a rod, a crystalline or other like pressure compacted solid form. The pressure compacted dyes can include about 5% to about 100% of dye by weight, preferably about 50% to about 95% of dye by weight and most preferably about 75% to about 90% of dye by weight.

It should be appreciated that the coloring component or material of the present invention is not limited to dyes. For example, the coloring component or material can include lakes, dispersions or pH sensitive coloring materials. The present invention can also include any suitable number and combination of coloring materials, such as dyes, lakes, dispersions and pH sensitive coloring materials.

In an embodiment, the coloring component or material of the coloring agent is encapsulated within an encapsulating material. This effectively controls the release of the coloring component by requiring that the encapsulating material first be dissolved, broken through chewing or the like prior to the release of the coloring component.

The encapsulating material can include a variety of different and suitable materials, such as a glaze, a gel, a fat, a material that traps color, a molecular encapsulate, a gum encapsulate, a gum-based component encapsulate or combinations thereof. For example, the encapsulating material can include a glazing agent or any material that forms a film layer to encapsulate the coloring component.

The glazing material is preferably utilized to encapsulate the solid dyes. The glazing material can include a food grade varnish, such as shellac, zein and mixtures thereof.
The encapsulating material can also include a gel material. The gel material is preferably utilized to encapsulate the coloring material in liquid form. This material can include any suitable food grade gel material, such as gelatin.

In an embodiment, the coloring agent can also include a coloring component that is essentially trapped within the solid matrix of a material. These can include materials that essentially act like sponges to absorb or trap color within the interstitial spaces of the crystalline structure associated with these materials. In this regard, these types of materials effectively act to control the release of the coloring component as the gum is chewed.

These materials can include any suitable food grade materials which can effectively trap color to control the color change of the gum. For example, these materials can include gum arabic, maltodextrin, starch, other like materials and combinations or mixtures thereof.

Materials that effectively trap the coloring component can also include sugar-based materials that form a tubular or other open end materials, amorphous materials or combinations thereof. The coloring component is delivered into a micro-sized cavity or cavities of the color trapping materials. Delivery can occur by any suitable processing technique, such as extrusion. In this regard, the coloring component remains within the cavity of these materials due to “packing” forces, surface forces or the like of the micro-sized cavity. Thus, the release of color can be controlled.

The present invention can also include any suitable molecular encapsulate, fat encapsulate, gum encapsulate, gum-based component encapsulate or combinations thereof. For example, the molecular encapsulate can include betacyclodextrin or the like. The fat encapsulate can include any suitable food grade fat.

The gum encapsulate can include any suitable gum. It is suggested that the coloring material can be encapsulated in the gum encapsulate such that the release of color associated with the coloring material is controlled. The gum-based component encapsulate can include any suitable food grade plastic, such as polyvinyl acetate or the like.

In an embodiment, the present invention provides a coloring agent which can continually and controllably release colors to impact a color change in the gum by adjusting the pH level. In this regard, the coloring agent includes a pH sensitive coloring component. The pH level of the gum can be adjusted by adding any suitable
amount of an acid, base or like pH sensitive coloring material or combinations thereof. The pH adjusting component can be encapsulated by any one of the previously described encapsulating materials. By encapsulating the pH sensitive coloring material, the change in pH level can be effectively controlled thereby controlling the change in color which results from the pH change.

It should be appreciated that the coloring agent of the present invention can include any suitable number, variety and make-up of materials, such as encapsulated coloring materials, pH sensitive coloring material, dyes, lakes, dispersions or combinations thereof as previously discussed.

The gum base portion and flavor components of the gum of the present invention can include any suitable amount and number of a variety of different materials that are typically found in gums, such as bubble gum. For example, the gum base portion can include a hydrophobic gum base, a hydrophilic gum base portion, the like or combinations thereof. The hydrophilic portion is typically utilized to dissipate a portion of the flavor, particularly water insoluble flavors, over a period of time during chewing. The gum base portion is retained in the mouth throughout the chew.

In an embodiment, the hydrophilic portion can also be utilized to dissipate or release the colors, particularly water insoluble colors, during chewing. The hydrophilic portion has an affinity for water. In this regard, the hydrophilic gum base may provide a suitable medium within which the coloring agent can be effectively released during chewing.

The hydrophobic gum base portion can also be utilized to control the release of the colors, particularly water soluble colors, during chewing. The hydrophobic portion has an affinity for non-aqueous components. In this regard, the hydrophobic gum base may provide a suitable medium within which color can be effectively and controllably released during chewing.

The gum base generally comprises elastomers, resins, fats and oils, softeners, and inorganic fillers. The gum base may or may not include wax. The insoluble gum base can constitute approximately 5% to about 95%, by weight, of the gum, more commonly, the gum base comprises 10% to about 50% of the gum, and in some preferred embodiments, 20% to about 35%, by weight, of the gum.
In an embodiment, the gum base of the present invention contains about 20 weight % to about 60 weight % synthetic elastomer, 0 weight % to about 30 weight % natural elastomer, about 5 weight % to about 55 weight % elastomer plasticizer, about 4 weight % to about 35 weight % filler, about 5 weight % to about 35 weight % softener, and optional minor amounts (about 1% or less) of miscellaneous ingredients such as colorants, antioxidants, etc.

Synthetic elastomers may include, but are not limited to, polyisobutylene with GPC weight average molecular weight of about 10,000 to about 95,000, isobutylene-isoprene copolymer (butyl elastomer), styrene-butadiene copolymers having styrene-butadiene ratios of about 1:3 to about 3:1, polyvinyl acetate having GPC weight average molecular weight of about 2,000 to about 90,000, polyisoprene, polyethylene, vinyl acetate-vinyl laurate copolymer having vinyl laurate content of about 5% to about 50% by weight of the copolymer, and combinations thereof.

Preferred ranges are, for polyisobutylene, 50,000 to 80,000 GPC weight average molecular weight, for styrene-butadiene, 1:1 to 1:3 bound styrene-butadiene, for polyvinyl acetate, 10,000 to 65,000 GPC weight average molecular weight with the higher molecular weight polyvinyl acetates typically used in bubble gum base, and for vinyl acetate-vinyl laurate, vinyl laurate content of 10% - 45%.

Natural elastomers may include natural rubber such as smoked or liquid latex and guayule as well as natural gums such as jelutong, lechi caspi, perillo, sorva, massaranduba balata, massaranduba chocolate, nispero, rosindinha, chicle, gutta hang kang, and combinations thereof. The preferred synthetic elastomer and natural elastomer concentrations vary depending on whether the gum in which the base is used is adhesive or conventional, bubble gum or regular gum, as discussed below.

Preferred natural elastomers include jelutong, chicle, sorva and massaranduba balata.

Elastomer plasticizers may include, but are not limited to, natural rosin esters such as glycerol esters of partially hydrogenated rosin, glycerol esters polymerized rosin, glycerol esters of partially dimerized rosin, glycerol esters of rosin, pentaerythritol esters of partially hydrogenated rosin, methyl and partially hydrogenated methyl esters of rosin, pentaerythritol esters of rosin; synthetics such as terpene resins derived from alpha-pinene, beta-pinene, and/or d-limonene; and any suitable combinations of the foregoing. The preferred elastomer plasticizers will also
vary depending on the specific application, and on the type of elastomer which is used.

Fillers/texturizers may include magnesium and calcium carbonate, ground limestone, silicate types such as magnesium and aluminum silicate, clay, alumina, talc, titanium oxide, mono-, di- and tri-calcium phosphate, cellulose polymers, such as wood, and combinations thereof.

Softeners/emulsifiers may include tallow, hydrogenated tallow, hydrogenated and partially hydrogenated vegetable oils, cocoa butter, glycerol monostearate, glycerol triacetate, lecithin, mono-, di- and triglycerides, acetylated monoglycerides, fatty acids (e.g. stearic, palmitic, oleic and linoleic acids), and combinations thereof.

Colorants and whiteners may include FD&C-type dyes and lakes, fruit and vegetable extracts, titanium dioxide, and combinations thereof.

The base may or may not include wax. An example of a wax-free gum base is disclosed in U.S. Patent No. 5,286,500, the disclosure of which is incorporated herein by reference.

In addition to a water insoluble gum base portion, a typical gum composition includes a water soluble bulk portion and one or more flavoring agents. The water soluble portion can include bulk sweeteners, high intensity sweeteners, flavoring agents, softeners, emulsifiers, colors, acidulants, fillers, antioxidants, and other components that provide desired attributes.

Softeners are added to the gum in order to optimize the chewability and mouth feel of the gum. The softeners, which are also known as plasticizers and plasticizing agents, generally constitute between approximately 0.5% to about 15% by weight of the gum. The softeners may include glycerin, lecithin, and combinations thereof. Aqueous sweetener solutions such as those containing sorbitol, hydrogenated starch hydrolysates, corn syrup and combinations thereof, may also be used as softeners and binding agents in gum.

Bulk sweeteners include both sugar and sugarless components. Bulk sweeteners typically constitute 5% to about 95% by weight of the gum, more typically, 20% to 80% by weight, and more commonly, 30% to 60% by weight of the gum.

Sugar sweeteners generally include saccharide-containing components commonly known in the gum art, including, but not limited to, sucrose, dextrose,
maltose, dextrin, dried invert sugar, fructose, levulose, galactose, corn syrup solids, and the like, alone or in combination.

Sugarless sweeteners include, but are not limited to, sugar alcohols such as sorbitol, mannitol, xylitol, hydrogenated starch hydrolysates, maltitol, and the like, alone or in combination.

High intensity artificial sweeteners can also be used, alone or in combination with the above. Preferred sweeteners include, but are not limited to sucralose, aspartame, salts of acesulfame, alitame, saccharin and its salts, cyclamic acid and its salts, glycyrrhizin, dihydrochalcones, thaumatin, monellin, and the like, alone or in combination. In order to provide longer lasting sweetness and flavor perception, it may be desirable to encapsulate or otherwise control the release of at least a portion of the artificial sweetener. Such techniques as wet granulation, wax granulation, spray drying, spray chilling, fluid bed coating, coacervation, and fiber extrusion may be used to achieve the desired release characteristics. Colors and sweeteners can also be encapsulated together.

Usage level of the artificial sweetener will vary greatly and will depend on such factors as potency of the sweetener, rate of release, desired sweetness of the product, level and type of flavor used and cost considerations. Thus, the active level of artificial sweetener may vary from 0.02% to about 8%. When carriers used for encapsulation are included, the usage level of the encapsulated sweetener will be proportionately higher.

Combinations of sugar and/or sugarless sweeteners may be used in gum. Additionally, the softener may also provide additional sweetness such as with aqueous sugar or alditol solutions.

If a low calorie gum is desired, a low caloric bulking agent can be used. Examples of low caloric bulking agents include: polydextrose; Raftilose; Raftilin; Fructooligosaccharides (NutraFlora); Palatinose oligosaccharide; Guar Gum Hydrolysate (Sun Fiber); or indigestible dextrin (Fibersol). However, other low calorie bulking agents can be used.

A variety of flavoring agents can be used. The flavor can be used in amounts of approximately 0.1 weight % to about 15 weight % of the gum, and preferably, 0.2% to 5%. Flavoring agents may include essential oils, synthetic flavors or mixtures thereof including, but not limited to, oils derived from plants and fruits such
as citrus oils, fruit essences, peppermint oil, spearmint oil, other mint oils, clove oil, oil of wintergreen, anise and the like. Artificial flavoring agents and components may also be used. Natural and artificial flavoring agents may be combined in any sensorially acceptable fashion.

Additional oral health ingredients may be added including but not limited to, antiplaque/anti-gingivitis agents (such as chlorhexidine, CPC, triclosan), pH control agents (including Urea and buffers), other inorganic components for tartar or caries control (phosphates, fluoride) and biological agents (antibodies, enzymes). The only requirement is that the agents be safe and effective and that they do not react undesirably with each other such as may happen with phosphate salts.

It should be understood that various changes and modifications to the presently preferred embodiments described herein will be apparent to those skilled in the art. Such changes and modifications can be made without departing from the spirit and scope of the present invention and without diminishing its intended advantages. It is therefore intended that all such changes and modifications be covered by the appended claims.
WE CLAIM:

1. A gum capable of changing colors comprising:
   a gum base portion;
   a flavor; and
   a coloring agent that causes a release of color as the gum is chewed.

2. The gum of claim 1 wherein a uniform color is released.

3. The gum of claim 1 wherein a mixture of colors are released.

4. The gum of claim 1 wherein the coloring agent includes a coloring component and an encapsulating material that encapsulates the coloring component.

5. The gum of claim 4 wherein the coloring component is a dye, lake, dispersion, pH sensitive coloring material or combinations thereof.

6. The gum of claim 4 wherein the encapsulating material includes a glazing material, a gel material, a fat material, a material that traps the coloring component, a molecular encapsulate, a gum encapsulate, a gum-based component encapsulate or combinations thereof.

7. The gum of claim 6 wherein the glazing material includes a food grade varnish.

8. The gum of claim 6 wherein the gel material includes a gelatin.

9. The gum of claim 6 wherein the material that traps the coloring component is gum arabic, maltodextrin, starch or combinations thereof.

10. The gum of claim 6 wherein the material that traps the coloring component is a sugar-based material forming an amorphous material, a tubular-shaped material or combinations thereof for trapping the coloring component.
11. The gum of claim 6 wherein the molecular encapsulate is betacyclodextrin.

12. The gum of claim 6 wherein the gum-based component encapsulate is a food grade plastic including polyvinyl acetate.

13. The gum of claim 1 wherein the coloring agent changes color by adjusting a pH level of the gum.

14. A bubble gum capable of producing differently colored bubbles comprising:
   a gum base portion;
   a flavor; and
   a coloring agent that causes a release of color as the gum is chewed.

15. The bubble gum of claim 14 wherein the bubbles are uniformly colored, multi-colored or combinations thereof.

16. The bubble gum of claim 14 wherein the coloring agent includes a dye, a lake, a dispersion, a pH sensitive coloring material, an encapsulated coloring material or combinations thereof.

17. The bubble gum of claim 16 wherein the encapsulated coloring material includes an encapsulating material that encapsulates a dye, a lake, a dispersion, a pH sensitive coloring material or combinations thereof.
18. The bubble gum of claim 17 wherein the encapsulating material includes a glaze, a gel, a fat, a material that entraps color, a molecular encapsulate, a gum encapsulate, a gum-based component encapsulate or combinations thereof.

19. A gum capable of changing colors comprising:
   a gum base portion;
   a flavor; and
   a coloring agent that includes an encapsulated coloring material wherein the coloring agent causes a release of one or more colors as the gum is chewed.

20. The gum of claim 19 wherein the encapsulated coloring material includes a coloring material and an encapsulating material that encapsulates the coloring material.

21. The gum of claim 20 wherein the encapsulating material comprises a glaze, a gel, a fat, a material that traps color, a molecular encapsulate, a gum encapsulate, a gum-based component encapsulate or combinations thereof.

22. The gum of claim 20 wherein the coloring material is a dye, a lake, a dispersion, a pH sensitive coloring material or combinations thereof.

23. The gum of claim 20 wherein the encapsulated coloring material includes the coloring material in a liquid form and a gel membrane that encapsulates the coloring material.

24. The gum of claim 20 wherein the encapsulated coloring material includes the coloring material in a solid form and a glaze film layer that encapsulates the solid dye.

25. The gum of claim 24 wherein the solid form includes a pressure compacted solid, a sugar-based material coated with the coloring material or combinations thereof.
26. The gum of claim 19 wherein the gum base portion includes a hydrophobic gum base portion, a hydrophilic gum base portion or combinations thereof.

27. The gum of claim 26 wherein the coloring agent is added to the hydrophobic gum base portion, the hydrophilic gum base portion or combinations thereof.

28. The gum of claim 19 wherein the encapsulated coloring material controls the release of color during chewing.

29. A method of producing a gum capable of providing differently colored bubbles comprising the step of mixing a plurality of gum ingredients including a gum base portion, a flavor and a coloring agent wherein the coloring agent causes a release of one or more colors as the gum is chewed.

30. The method of claim 29 wherein the coloring agent includes an encapsulated coloring material, a pH sensitive coloring material, dyes, lakes, dispersions or combinations thereof.

31. The method of claim 29 wherein the coloring agent includes an encapsulating material that encapsulates a dye, a lake, a dispersion, a pH sensitive coloring material or combinations thereof.

32. The method of claim 31 wherein the encapsulating material includes a glaze, a gel, a fat, a material that traps color, a molecular encapsulate, a gum encapsulate, a gum-based component encapsulate or combinations thereof.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A 23 G 3/80
US CL : 426/3, 5, 104, 250

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 426/3, 5, 104, 250

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>US 5,030,459 A (BARCELON et al) 09 July 1991 (09.07.91), see entire document.</td>
<td>1-6, 13-22, 26-32</td>
</tr>
<tr>
<td>Y</td>
<td>US 5,135,760 A (DEGADY et al) 04 August 1992 (04.08.92), see entire document</td>
<td>1-6, 13-22, 26-32</td>
</tr>
<tr>
<td>Y</td>
<td>US 5,069,918 A (GRAF et al) 03 December 1991 (03.12.91), see entire document</td>
<td>1-6, 13-22, 26-32</td>
</tr>
<tr>
<td>Y, P</td>
<td>US 6,231,901 B1 (SHARKASI et al) 15 May 2001 (15.05.01), see entire document</td>
<td>1-6, 13-22, 26-32</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search: 16 JULY 2002

Date of mailing of the international search report: 03 SEP 2002

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703) 805-9280

Authorized officer
ARTHUR CORBIN
Telephone No. (703) 808-0661

Form PCT/ISA/210 (second sheet) (July 1998)