ABSTRACT
Scented packaging may provide an aromatic gas to a consumer upon consumption, such as may be used to augment a flavor, and/or add a flavor to a consumable item. Consumable items configured for consumption in the presence of an aromatic gas may be reduced in caloric sweetener content, reduced in salt content, reduced in the content of another ingredient or a combination of ingredients may be reduced in content. Scented packaging may also provide a scent that acts to remove or block an undesirable scent provided from a consumable item or portion of packaging.
Fig. 1

12. Manufacture of packaging including one or more aromatic compounds

14. Shipping and handling operations—collection of aromatic gas within one or more compartments

16. Consumer purchase of product

18. Initial sampling of product and release of some aromatic gas

20. Continued sampling of product and release of some of the remaining aromatic gas
Manufacture of packaging including one or more aromatic compounds

Shipping and handling operations

Consumer purchase of product

Initiation of scent release

Initial sampling of beverage and loss of some aromatic gas

Restoration of at least a portion of lost aromatic gas

Continued sampling of beverage and release of some of the remaining aromatic gas

Fig. 4
Unpack beverage and/or remove any external seals that may be present

Initiate the release of scent

Consumption of beverage

Fig. 13
CONSUMABLE ITEMS PROVIDED WITH SCENTED PACKAGING AND USING SCENT TO REDUCE INGREDIENTS IN CONSUMABLE ITEMS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application Ser. No. 61/644,306 filed May 8, 2012, the disclosure of which is herein wholly incorporated by reference.

FIELD

[0002] The present application relates to scented packaging as well as to consumable items designed for consumption along with scented packaging.

BACKGROUND

[0003] The perception of flavor may be related to a number of factors that modify the taste and/or smell of a consumable item. For example, food or beverage texture, mouthfeel, the concentration of various flavoring compounds, and the proportion of flavoring compounds delivered to the mouth, nose or both may affect the perception of flavor. For a consumed item, the scent of a flavor may be a particularly strong factor affecting the overall experience provided to a consumer.

[0004] The scent of a flavor may be associated with stimulation of olfactory nerve receptors in the nasal cavity by gas phase aromatic compounds. A gas may also be perceived by stimulation of the trigeminal nerve, which, like the olfactory nerve, propagates to the nasal epithelium. The trigeminal nerve may be associated with various sensations including, e.g., the observation of pressure, pain, touch, and temperature. Gas molecules may reach the nasal epithelium through a number of routes. A flavoring compound may, e.g., be provided to a consumer as a dissolved or mixed compound; that is, a flavoring compound may be added directly to a solid or liquid consumable item and provided to a consumer in the same phase as other ingredients. Upon mixing in the mouth a flavoring compound, which may be somewhat volatile, may become freed from the matrix of other material in which it is mixed, and may enter the nasal passage as a gas. An aromatic gas may also be delivered to the nasal cavity directly; that is, pre-formed gas may enter the mouth or the nose during stages associated with consumption. For some consumable items, the delivery of scent as one or more pre-formed gases may be a more efficient manner of scent delivery than addition of volatile flavoring compounds to a food or beverage. For example, providing scent as a pre-formed gas, such as, from a beverage headspace, may facilitate a more intense sensory experience because the concentration of vapor may be suitably high.

[0005] Scented packaging, such as with aromatic compounds added to container walls, has been proposed as a means to encourage direct sampling of a gas. However, the packaging logistics concerning delivery of scent as a pre-formed gas are not the same as providing a food or beverage. For example, while a headspace region may collect gas molecules, such as, for example, during shipping and storage stages in the lifetime of a beverage, molecules from a headspace may be lost upon opening a container or upon sampling a beverage. Even if the venting of a beverage container is controlled, providing a repeated dose of a liquid and gas together, without marked variations in the proportion of gas and liquid sampled, may be difficult. In that light, there is a need for improved packaging systems that enable the efficient provision of gas and other phases of a consumable item in a controlled manner.

SUMMARY

[0006] A beverage and packaging may include a container configured for holding the beverage; the beverage comprising an ingredient that has a characteristic taste; wherein the container is in fluid communication with a dispense opening configured to provide the beverage to a consumer; and a component of packaging including aromatic material; wherein the component of packaging is configured to release a portion of said aromatic material as an aromatic gas to a compartment; wherein the compartment is in gaseous communication with a vent opening; wherein the vent opening is configured to provide the aromatic gas to a consumer; wherein the aromatic gas has a complementary scent to the characteristic taste.

[0007] A beverage and scented packaging may include a container having: a wall to hold the beverage; a headspace compartment bounded by a portion of the wall and wherein a boundary of the headspace compartment is the standing level of the beverage; a dispensing hole in fluid communication with the headspace and configured to provide the beverage to a consumer; a compartment of a package; wherein the compartment is isolated from the headspace compartment; and a vent hole configured to provide a gas contained within the compartment to a consumer.

[0008] Packaging for a beverage may include: a container configured for holding the beverage; a dispensing hole in fluid communication with the beverage; wherein a headspace is defined within the container between the dispensing hole and the beverage; wherein a boundary of the headspace includes the standing level of the beverage; at least one bottom wall defining a boundary of a compartment of the packaging; a vent hole configured to provide gaseous communication between the compartment and an external environment; and wherein the wall acts as a barrier to flow of gas between the headspace and the compartment.

[0009] A consumable item designed for consumption along with scented packaging may include an ingredient with a characteristic taste. The scented packaging may provide a complementary scent to the characteristic taste enhancing the perception of that taste. In some embodiments, the consumable item may be a reduced-calorie consumable item, a reduced-salt consumable item, or may be reduced in a combination of salt content, calories, and/or other ingredients. In some embodiments, a consumable item may include packaging wherein the packaging provides a scent that inhibits the perception of an undesirable taste and/or scent.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a flowchart depicting some steps that may be present during the product lifetime of a packaged consumable item.

[0011] FIG. 2 is a front elevational view of a beverage bottled in scented packaging.

[0012] FIG. 3 is a front elevational view of the beverage bottled in scented packaging of FIG. 2 following an initial consumption of some of the beverage.
FIG. 4 is a flowchart depicting some steps that may be present during the product lifetime of a packaged consumable item where a consumer may initiate the release of scent from the packaging.

FIG. 5A is an exploded front elevational view of a cap and a top portion of a beverage container. FIG. 5B is a cross-sectional view of a wall of the top portion of the beverage container shown in FIG. 5A. FIG. 6A is a schematic view of an embodiment of a scent insert. FIG. 6B is a schematic view of another embodiment of a scent insert. FIG. 7A is a cross-sectional view of a cap and a top portion of a beverage container prior to compression of a scented insert. FIG. 7B is a cross-sectional view of the cap and top portion of a beverage container of FIG. 7A wherein the cap has been twisted and scent released from a scented insert. FIG. 8A is an exploded view of a threaded cap and top portion of a beverage container. FIG. 8B is an exploded view of the threaded cap and the top portion of a beverage shown in FIG. 8A following rotation of the cap.

FIG. 9 is a cross-sectional view of a cap and a top portion of a beverage container in which a coating including scented material is coated to a wall of the cap. FIG. 10A is a cross-sectional view of a cap that includes an enclosed compartment and a top portion of a beverage container. FIG. 10B is a top view of the cap shown in FIG. 10A. FIG. 11A is a side elevational view of a cap. FIG. 11B is a perspective view of the cap shown in FIG. 11A with a pocket removed from the cap. FIG. 11C is an exploded perspective view of the cap of FIGS. 11A and 11B and a top portion of a container. FIG. 12A is a side elevational view of cap with a compartment that includes a wall that separates the compartment from a headspace. FIG. 12B is a perspective view of the cap shown in FIG. 12A.

FIG. 13 is a flowchart depicting a method of consuming a consumable item.

**DETAILED DESCRIPTION**

The term “complementary scent” as used herein means a scent that has a property of being complementary to a certain taste perception. A complementary scent may be presented to a consumer along with another ingredient that provides the particular taste perception for which the scent is complementary. Presentation of the complementary scent and ingredient may increase the consumer’s awareness of a particular taste perception.

The term “consumable item” means anything that may be orally ingested by a consumer, including without limitation a food, beverage, pharmaceutical composition, nutraceutical composition, vitamin, lozenge, dietary supplement, confection, chewing gum, candy and a combination of any of the foregoing.

The term “flavor” as used herein means a combined effect of scent and taste which may be provided by a consumable item or an ingredient of a consumable item. A flavor may be provided as a liquid, solid, gas, or combination thereof.

The term “flavoring compound” as used herein means a compound that possesses a characteristic flavor.

“Having” means including but not limited to.

The term “headspace” as used herein means a compartment that includes a gas-liquid interface as a boundary of the compartment.

The term “high-potency sweetener” means any ingredient that initiates a perception of sweetness at a concentration less than that which would be required for a natural-caloric sweetener. High-potency sweeteners may include by way of example saccharin-K, aspartame, saccharin, stevia, sucralose, and combinations thereof.

The term “natural-caloric sweetener” means any of various naturally occurring sugars that provide greater than about 3.5 kilocalories of energy per gram. Natural-caloric sweeteners may include by way of nonlimiting example fructose, glucose, sucrose, and combinations thereof.

The term “non-nutritive sweetener” means any of various materials that initiate a perception of sweetness but are substantially free of caloric content. Non-nutritive sweeteners provide less than about 0.5 kilocalories per gram. Non-nutritive sweeteners may include by way of nonlimiting example erythritol, aspartame, saccharin, sucralose, and combinations thereof.

The term “nutritive sweetener” means any of various materials that initiates a perception of sweetness and provides less caloric content than a natural-calorie sweetener but greater caloric content than a non-nutritive sweetener. Nutritive sweeteners may include by way of nonlimiting example tagatose, sorbitol, mannitol, maltitol, isomalt, lactitol, and combinations thereof.

The term “packaging” as used herein means a bottle or other container configured to hold a food or beverage and includes the walls of the container as well as other items that may be provided or attached to the container, including, by way of non-limiting example, a bottle cap, gasket seal, label, or the like.

This disclosure is generally directed to foods, beverages, and other consumable items that may be provided along with aromatic compounds and packaging materials that may be used with such consumable items. Consumable items as described herein may be designed for consumption in the presence of a scent, such as may be provided from scented packaging. Scented packaging may provide an aromatic gas to a consumer upon consumption, such as may be used to augment a flavor and/or add a flavor to a consumable item. In
some embodiments, enhancement or addition of flavor using a gas may facilitate the production of a consumable item with lowered amounts of one or more ingredients. For example, consumable items configured for consumption in the presence of an aromatic gas may be reduced in caloric sweetener content, reduced in salt content, reduced in the content of another ingredient (such as, for example, an artificial additive) or reduced in content of a combination of ingredients. Packaging described herein may be configured to provide gas phase molecules in a desired manner, such as, for example, without substantial change in the concentration of gas or change in scent quality during repetitive sampling of a food or beverage over a period of time.

[0050] In some embodiments, gas may be collected in a compartment of a container and dispensed. For example, gas may fill a region of space above a standing beverage, i.e., a headspace region of a container bounded by a liquid-gas interface. A headspace region may be permeated with gas using scented packaging, such as, for example, may be described herein in relation to FIGS. 2 and 3. However, in some embodiments, such as, for example, described herein in relation to FIGS. 10A and 10B, gas may alternatively or additionally fill a compartment of a container that does not include a liquid-gas interface and is not a headspace. A compartment that does not share an interface with a beverage may remain about the same size as a beverage is consumed and may facilitate the dispensing of gas in a controlled manner, such as in a manner that may tend to minimize changes in perceived scent upon repetitive consumption. In addition, a compartment that does not share an interface with a beverage may facilitate the use of some aromatic gases which would otherwise contact and/or mix with liquid phase reagents. Avoiding substantial contact of gas and a beverage may be desirable for a number of reasons, including, for example, because such may diminish the risk of undesirable interactions with liquid phase reagents. Undesired interactions with liquid phase reagents may include, for example, hydrolysis and the creation of undesired products, loss of gas due to mixing and/or chemical breakdown, or both.

[0051] In some embodiments, a gas may be provided to a compartment during manufacture or may leach from packaging during distribution stages of a product’s lifetime. However, in some embodiments, such as, for example, may be described in relation to FIGS. 5, 7A-7B, and 10A-10B, gas may alternatively or additionally escape from packaging at some other stage of a product’s lifetime, such as during consumption. Some embodiments wherein initiation of gas release is associated with un包装 or consumption may facilitate the release of gas molecules over a time period that may substantially overlap the time period for consumption of a beverage. The release of gas may, for example, be configured to counter loss of scent during consumption, such that a repeatable dose of aromatic gas may be provided to a consumer upon repetitive tastings over time. In addition, initiation of gas release during un包装 or consumption may diminish loss of aromatic material to the environment due to escape of gas during distribution and may lessen loss of aromatic material due to undesired interactions with a beverage. Some embodiments of packaging may combine combinations of strategies described herein, such as, for example, venting aromatic gas to a consumer from a volume that does not change substantially during consumption and release of gas from packaging to counteract loss of gas that may occur during the time period of consumption. Of the various consumable items described herein, such as, for example, reduced-calorie beverages provided along with a scent that augments or adds a perception of sweetness, some of those consumables may involve packaging in any of the various packaging embodiments or involve packaging using combinations of features described herein, such as, for example, with regard to different embodiments.

[0052] Gas may, in some embodiments, be collected during any of various stages of shipping, handling, storage, consumption or combinations of stages thereof. For example, if the walls of a beverage container are molded from a material that includes one or more volatile compounds (as further discussed below) or if the walls of a container are coated with one or more volatile compounds, the compounds may leach from the container walls during distribution stages of a product lifetime and enter the gas phase. Leached gas molecules may be concentrated in a compartment of the container. When a consumer purchases a beverage, he or she may open the beverage container and taste the beverage. Gas that has collected within the container compartment may be sampled along with consumption of the liquid beverage.

[0053] Upon sampling of a consumable item, gas and liquid may be provided from the same or different dispensing components or openings of packaging. In some embodiments, two or more different gases may be provided to the mouth and/or nose from different routes and may reach the nasal epithelium at about the same time or with some temporal lag. For example, a gas may be associated with a portion of packaging that faces the consumer and a gas may also be provided from an opening that is in gaseous communication with a compartment enclosed within a container.

[0054] A dispensing component may comprise an opening suitably sized, such as, for example, to prevent or encourage rapid venting of gas. In some embodiments, a dispensing component may include a valve. A valve may be manually or automatically operated by a consumer, such as, for example, through application of suction or actuated in some other way. For example, a valve function may be accomplished as described in U.S. Pat. No. 6,745,949 titled “Drinking Straw with Valve Function” or a valve may be configured in a manner as described in U.S. Pat. No. 5,505,345 titled “Gas Saving Dispensing Cap for a Bottle,” both of which are incorporated herein by reference.

[0055] FIG. 1 illustrates a flowchart depicting some steps that may be present during the product lifetime of some packaged consumable items (such as some beverages and associated beverage containers) including scented packaging. In step 12 scented packaging, such as may include aromatic material associated with container walls, cap seal, caps, or other packaging components, may be produced. For example, a plastic may be heated to a molten state, a solution of aromatic material may be added to the plastic, and then the resultant mixture formed or molded into a desired shape. Aromatic material incorporated in plastic may, for example, be added to the plastic at a concentration wherein, upon cooling the plastic, a component of the aromatic material may exceed its solubility limit. Thus, a super-saturated mixture of aromatic material in plastic may be formed, and aromatic gas may tend to leach from the plastic material. An aromatic material may also be applied to a portion of packaging using other methods such as, for example, spray coating, dipping of materials, plasma deposition, impregnation (such as in the presence of a supercritical fluid), or other methods. Some methods may be useful wherein a
certain aromatic compound is thermally labile and wherein addition of the compound to plastic during stages associated with high temperatures, such as molding, is not desired. For some labile aromatic compounds, acceptable temperatures may not be compatible with process conditions for some plastics that may be used for bottle caps, bottle gaskets, or labels. For such a reason, among other considerations, for example, considerations related to the desired area of loading an aromatic material, cost, or other factors, it may, in some embodiments, be desirable to incorporate an aromatic material into a bottle cap, gasket, or label but not the walls of a container.

[0056] During shipping and handling steps 14, aromatic material may leach from the associated packaging components (enter the gas phase) and aromatic gas may collect within a headspace compartment or other compartment of packaging. In step 16, a consumer may purchase the item, and optionally may remove a flip-top portion of a cap or remove an external seal, such as might be included to assist in minimizing loss of aromatic molecules to the environment. In step 18, a consumer may perform an initial tasing of the consumable item and sample at least a portion of collected gas. In a step 20, a consumer may continue sampling the product, and at least some of the remaining gas molecules, for example, those which remain after a previous tasing, may be provided to the consumer.

[0057] Upon sampling of a consumable item, some of the gases that may have collected in a headspace region may be dispersed and lost. In addition, if the consumable item is a flowing medium (such as a liquid), the volume of a headspace may increase; that is, as the item is consumed, the volume of space above the level of the standing medium may enlarge. Thus, sampling additional product and dispensing of gas from the headspace compartment may provide, for any given volume of gas that may be dispersed, a decreased amount of gas molecules (both because the number of gas molecules may have decreased and because remaining molecules may be dispersed over a greater volume).

[0058] For some embodiments of packaging systems, the collection of gas in a headspace may be used to provide a scent to a beverage product and may facilitate the use of beverages with decreased amounts of some ingredients. Such embodiments may be useful where a gas molecule may be collected in a headspace region and at a sufficient concentration where sampling from that region provides a scent that saturates olfactory receptors and where some decrease in the amount of the gas, such as in repetitive sampling over time, still provides an acceptable scent. Moreover, in some embodiments, collection of gas may occur during consumption; that is, new gas molecules may escape from a portion of packaging to at least in part restore molecules lost during consumption.

[0059] As described in relation to FIG. 1, aromatic molecules may be included in packaging and may leach from packaging, enter the gas phase, and permeate a compartment of packaging. However, in some embodiments, an aromatic gas may be added directly to the headspace, such as during operations in which a bottle is sealed or during beverage filling. The direct addition of gas may be used instead of incorporation of aromatic molecules in scented packaging or may be used in combination with scented packaging materials. In addition, a consumable item may include solid or liquid phase components that may be volatile, as some flavoring components may be. Therefore, a given compartment in packaging may, in some embodiments, become permeated with gas because of direct addition of gas, because packaging includes an aromatic material that leaches from the associated packaging and enters the gas phase, because a beverage includes volatile compounds, or combinations thereof.

[0060] FIG. 2 illustrates packaging 22 including aromatic material which may leach from packaging material and enter the gas phase. The resulting gas molecules 36 may permeate headspace region 38 of a container. Packaging 22 may include a container wall 24, a standing level of liquid 26, a neck region 28, and a dispensing element 30 which may have an opening portion 32 and a body portion 34. Dispensing element 30 may include a valve that allows liquid and some gas to escape, such as, for example, when a user applies suction to opening portion 32, when a user manually actuates the valve, or when actuated in some other way. Thus, opening portion 32 may act to control the exit of material from the container.

[0061] Packaging 22 is also illustrated in FIG. 3. However, in FIG. 3 a consumer may have purchased the beverage and adjusted opening portion 32 of dispensing element 30 to access liquid and consumed a portion of the beverage. As shown in FIG. 3, headspace region 38 is a greater volume than in FIG. 2 because the standing level of liquid 26 has been lowered during consumption. Also, the number of gas molecules 36 remaining within headspace region 38 is illustrated to be considerably decreased, that is, in FIG. 3 only one-half of the gas molecules 36 are shown to remain. In addition, because the volume of headspace region 38 may be about twice as large as the volume shown in FIG. 2, the concentration of any remaining molecules 36 may be about one-fourth that of FIG. 2.

[0062] As a level of standing beverage decreases (during consumption and repetitive tastings over time) additional surface area of a container wall may be exposed to the headspace. As wall area is exposed, at least some additional aromatic material may leach to the headspace. If a given area of a wall beneath a level of standing beverage (at some point of consumption) contains a small amount of associated aromatic material, then exposing that area of wall (during consumption and repetitive tasting) may not provide a substantial amount of gas molecules to the growing headspace. However, if the exposed surface area is large, as may be the case with some highly porous plastics or coatings or if a bottle is suitably shaped, then a greater amount of aromatic material (than with low porosity plastic and other bottle shapes) may be exposed during consumption. Additionally, if liquid beverage is not in direct contact with some number of pores of the wall, a greater amount of gas may be associated with the dry surface of the pore than may be possible for a pore in contact with liquid.

[0063] In some embodiments, the pore structure of a container wall (such as a circular wall) may be configured such that a number of pores of the wall are inaccessible to the contained beverage. The wall of a container may, in some embodiments, be coated, such as with a polymer, and the polymer coating may possess a pore distribution wherein at least some of the pores are inaccessible to beverage. Configuring beverage inaccessible pores may involve controlling the pore size distribution and/or controlling the hydrophobic character of the wall (or wall coating) and/or pores of the wall (or wall coating). As the level of beverage drops (during consumption and repetitive tastings over time), new areas of the porous wall (or porous wall coating) may de-wet and the
boundary between liquid inaccessible pores and the headspace may change, i.e., the wall or coating boundary may change from a liquid boundary to a dry boundary. The rate of release of aromatic material from the pores to the growing headspace may, in some embodiments, increase as the porous wall (or porous coating) de-wets.

[0064] In some embodiments, the pore structure of a container wall may be about the same at any given position along the container wall. In other embodiments, the pore structure of a container wall may depend upon the vertical position of the container wall. The surface structure of a container wall or a portion of a container wall may, in some embodiments, be modified by coating the wall (or wall portion) with a film, by laser etching the wall (or wall portion), by using another technique for modifying the surface structure of the wall, or combinations thereof. Thus, in some embodiments, a container wall (or a portion of the wall) may be modified to include pores or surface features with features of different dimension and/or different wetting properties. In some embodiments, a channel or compartment may be configured in a container wall during molding stages in the container’s manufacture. In some embodiments, the pore structure (or a wall compartment) may be configured such that an upper boundary of at least some of the pores (or a wall compartment) may extend above the level of standing beverage, i.e., the boundary of the headspace at the start of consumption or at some other time during beverage consumption. Therefore, a given pore structure (or wall compartment) may define a volume that is not exposed to beverage, and not exposed to beverage because the surface characteristics of the wall repel beverage, because the pore may be too small (and surface tension of the liquid too great), because the volume extends vertically to a position that is above the level of standing liquid (at some point of consumption), or combinations of factors thereof. In some embodiments, a coating may be applied to a porous wall, and the coating may be configured to seal at least some openings of at least some of the pores, and/or the coating may be configured to modify the de-wetting properties of the porous wall. The coating may be applied to an entire wall of a container, to a portion of a wall of a container, such as around the neck region of a container, or may be applied in another manner, such as to selectively cover only some pores to adjust surface de-wetting to some desired level.

[0065] While packaging 22 may be an acceptable mode of providing a scent to some beverages, for other beverages it may be advantageous to provide other packaging products. For example, in some embodiments, gas may be collected in a headspace region, another region, or both regions of a container upon removal of an internally facing sealing layer or upon agitation, disruption, or puncturing of material comprising aromatic compounds. Initiating the collection of new gas during consumption may assist in counteracting the dilution of gas upon consumption (described above) and may improve the repeatability of a scent provided during repetitive tastings over time. In addition, if scent is released at about the time of consumption, the gas may be provided to a consumer prior to extensive mixing of the gas with the beverage. Such may be particularly useful for some gases that may be incompatible with liquids or with liquids that are beverages. For example, even if a gas is only partially soluble in liquid, if that gas is collected during distribution phases of a beverage life cycle, a significant number of gas molecules may interact with the liquid phase because they may have a long period of time in which they may be in contact.

[0066] Beverages, which are typically aqueous, may promote degradation of some molecules, such as, for example, through hydrolysis reactions. Of course, if a gas is only in contact with liquid during a period of time in which a beverage may be consumed, such as about a 30-minute period, for example, as opposed to a period of time associated with product distribution, which could be as long as many months for some products, loss of scent due to any of various reactions with the beverage may be diminished. For example, some scents that may be stable in a solvent, such as a solvent including alcohols, ethers, esters, glycols or combinations thereof, may be used to provide a scent as described herein; however, if those scents were exposed to a beverage interface, they may degrade or otherwise become unavailable for use as a scent because they may be trapped within the beverage (liquid) matrix.

[0067] In some embodiments, packaging may provide a scent that, until a period of consumption, is maintained absorbed on a solid surface or maintained in a thin film of liquid, such as may be in contact with an absorbent or sponge-like material. That liquid may be a part of a scent insert, and may, in some embodiments, comprise an oily matrix or include other liquid that promotes the stability of an aromatic material. The aromatic material may be a flavoring molecule that is volatile and that may be routinely used in the food and beverage industry (as a flavoring component or additive); i.e., the flavoring molecule may routinely be directly added to the consumable item. Again, as noted above, one advantage of including those molecules in packaging as discussed above and not as a direct additive in a beverage, may be that those molecules are only partially volatile and if mixed in the beverage would be primarily tasted and not smelled. Alternatively, scent may be provided from a molecule that may not be typically used in the food and beverage industry. For example, the perception of scent may be provided from a molecule that may be routinely used as a fragrance, may be tasteless, and may be inappropriate for direct addition to the consumable item for any number of reasons (such as those reasons discussed above).

[0068] FIG. 4 illustrates a flowchart depicting some steps 40 that may be present during the product lifetime of a packaged consumable item (such as some beverages and associated containers) including scented packaging configured such that a consumer may initiate release of gas molecules at about the time of purchase or consumption. In a step 42, scented packaging may be produced. The scented packaging, may, for example, include aromatic material associated with container walls, gasket seals, caps, scent inserts or other packaging components. In a step 44, a product may be charged at any of various stages of the product life associated with product distribution, e.g., shipping and handling. As described above (in relation to FIG. 1), packaging may integrate aromatic material in container walls (or other packaging components). In addition, as described in relation to step 14 of FIG. 1, aromatic material may leak from container walls (enter the gas phase) and permeate an accessible compartment, such as the headspace, during shipping and handling. Packaging that may follow steps 40 may or may not integrate aromatic material that may be released as gas during shipping and handling. However, at least one packaging component for packages that may follow steps 40 includes aromatic material where the release (or rate of release) of gas to a compartment of packaging is dependent upon an initiating event related to product consumption.
In a step 46, a consumer may purchase a product. In addition, a consumer may optionally remove a flip-top cap or external seal, for example, such as might be included to assist in minimizing loss of aromatic material to the environment. In a step 48, a consumer may initiate the release of scent. For example, a consumer may rotate or press upon a cup or neck portion of packaging such as to disrupt, puncture, or squeeze another portion of packaging, such as a scent insert. For example, a scent insert 66, such as described in relation to FIGS. 5A-5B, may include absorbent material that is enclosed within a housing, and the housing may prevent the release of gas to a compartment of packaging during the step 44. However, the housing may be punctured during a step 48 and scent may be released.

In a further example, a consumer may rotate or press upon a cup or neck portion of packaging to initiate physical abrasion of a film, such as, e.g., a thin film incorporating an aromatic material. A film incorporating aromatic material may include aromatic oil which may, in some embodiments, be mixed in a matrix of an inert material, such as, e.g., gelatin. Physical abrasion may, in some embodiments, disrupt the association of the matrix and the aromatic oil and may enhance the rate of conversion of the aromatic oil to a gas. In some embodiments, physical abrasion of a surface incorporating microencapsulated material may initiate scent release. Initiation of scent release may cause gas or additional gas to other gas already present to permeate within a compartment of packaging.

In a step 50, a consumer may perform an initial tasting of the product and sample at least a portion of gas collected in a compartment of packaging. During tasting, some portion of gas may be lost to the consumer and/or the environment. In a step 52, packaging components previously encouraged to release scent (such as in step 48) may add gas molecules to a compartment and may at least in part counteract loss of gas molecules during the initial tasting. In a step 54, a consumer may continue sampling the product.

The release of scent as initiated in step 48 may occur over various time scales, such as very rapidly, e.g., a time scale on the order of seconds or a fraction of a second, or release may be slower, such as over a period of time of about a duration in which a consumer may typically consume a certain product, e.g., several minutes or up to an hour or more. Thus, step 48 may initiate release of scent in a substantially continuous manner over the course of any number of repetitive tastings of a consumable item. Also, in some embodiments, initiation of scent release may be repeated, such as may be determined necessary by a consumer to counteract any decline in scent the consumer may perceive or to account for a consumer’s individual preference.

In some embodiments, the rate of scent release may be dependent upon the selection of a solvent in which a scent may be dissolved or infused. For example, a solvent may be associated with a porous substrate (as further discussed below), and the rate of solvent release may be dependent upon the volatility of the solvent and whether or not the solvent is exposed to the external environment, such as, e.g., upon removal of a sealing layer. The rate of scent release may also be adjusted by controlling the solvent content, porosity, and/or chemical makeup of a support material. Aromatic material may be associated with the surface of packaging material, such as may be achieved, for example, by dipping or spray coating aromatic material or by using some impregnation methods. Alternatively, aromatic material may be associated with the material bulk. For example, aromatic materials may be added to material bulk by including the material in a melt or may be achieved by embedding the material using some impregnation methods. In addition, the selection of certain application techniques, selection of certain application materials, e.g., metal, high density or low density plastic, or other factors, such as inclusion of binders, may facilitate either strong association or weak association of an aromatic material. The strength of association of an aromatic material may influence the rate at which aromatic compounds escape a portion of packaging material. In some embodiments, the rate of release of material from a wall may depend upon whether or not walls are exposed to air and/or whether a wall is wetted with beverage. In some embodiments, the rate of release of aromatic material from a surface, such as, container walls, may increase or decrease as a beverage is consumed.
ring may release gas confined within that segment but may or may not release gas confined in another segment.

[0076] In the embodiment of FIG. 6B, a scent insert 78 may have a covering 82 and another material such as absorbent material 80. Absorbent material 80 may be high in surface area such as to assist in absorption of aromatic compound and may, for example, be a porous material. An absorbent material may be saturated with an aromatic compound. Alternatively, as shown in FIG. 6C, a scent insert 79 may include absorbent material 80 and may be used without a covering. In some embodiments, absorbent material 80 may be wet and the purpose of a covering may be to prevent the absorbent material from drying out during storage. In some embodiments, absorbent material 80 may include an aromatic compound provided as a highly volatile liquid. The aromatic compound may or may not be mixed with other ingredients, such as, for example, a solvent or additive such as propylene glycol, to form a liquid matrix. Included among solvents that may be used with absorbent materials are solvents that include alcohols, ethers, esters, glycols, and combinations thereof. In some embodiments, a particular solvent or solvent combination may be selected to adjust the rate of evaporation of an aromatic scent. The liquid matrix may help stabilize the aromatic compound and may, in some embodiments, help to keep the aromatic compound from evaporating.

[0077] In some embodiments, a consumer may remove a cap 58 and manually remove a covering 82 of a scent insert. To assist in removal of the covering 82 of a scent insert a pull tab may be attached to the covering 82. The removing of the covering 82 may expose absorbent material 80 which may then proceed to release absorbed gas. In addition, the release of gas may be dependent upon physical agitation of the material. For example, if the absorbent material 80 is a sponge-like material that may be saturated with aromatic scent, squeezing the material 80 may enhance the rate at which gas is released.

[0078] Packaging, such as illustrated, for example, in FIGS. 7A and 7B, may be configured such that rotation 85 or alternatively press fitting of the cap 58 may compress a scent insert 66 (or alternatively scent insert 78 or 79) between rim 62 and top edge 74 or another element of a top portion of a container. More generally, a scent insert (66, 78, or 79) may be positioned between a first element of a cap and a second element of a container, and relative motion of the cap and container may initiate compression and/or disruption of a scent insert (66, 78, or 79). Each or both of the first element and/or second element may provide a horizontal surface such as rim 62 of a cap 58 and ridge 76 of top portion 56 of a container or may be oriented at some other orientation, such as vertically or some other suitable angle.

[0079] A top edge 74 (or other element of a container or cap) may be of suitable thickness or configured with a suitable shape, for example, including a ledge 76, rim, slots, serrated surface or other feature, such as to support or facilitate compression and/or puncturing of a scent insert (66, 78, or 79). FIG. 7A shows a cross-section of the top portion (56) of a container and cap 58, such as may be found when those elements are engaged. As illustrated in FIG. 7B, rotation 85 of cap 58 with respect to top portion 56 of the container may initiate compression and/or puncturing of scent insert 66. Puncture or compression of the scent insert 66 may facilitate the release of gas molecules 86 from scent insert 66. Alternatively, compression of another scent insert (78 or 79) may facilitate the release of gas. Some packaging may comprise a cap with more than one rim, and the two or more rims may be configured such that a first segment of a scent insert (or first group of scent inserts) may be punctured or disrupted upon a first rotation of a cap and a second segment of a scent insert (or second group of scent inserts) may be punctured or disrupted upon further rotation.

[0080] A scent insert (66, 78, or 79) may be sandwiched between a cap rim 62 and the top edge 74 of a container. For example, a consumer may rotate a cap 58, and the orientation of threads may urge the cap 58 towards a container compressing a scent insert and enhancing the rate at which scent is released. In some embodiments, further rotation may urge the cap in the opposing direction. Threads on the cap 58 and top portion 56 may be configured, for example, with relief portions or suitably angled to encourage or guide the cap 58 in a given orientation.

[0081] In some embodiments, a scent insert or another portion of packaging that may become compressed upon initial rotation of a cap may exhibit elasticity and may also urge a cap in a desired manner. For example, FIGS. 8A and 8B illustrate a cap 90 and a top portion 92 of a container (shown in an exploded configuration) which may be engaged with each other when a consumer consumes a beverage. The cap 90 may include internal threads 94 which may engage external threads 96 of the top portion 92 of a container. FIG. 8A shows a configuration wherein rotation 98 of the cap 90 urges the cap 90 towards the top portion 92 of a container. In FIG. 8B the cap 90 has been rotated to a position where internal threads 94 meet up with a relief portion 100 of the external threads 96. A scent insert or other portion of packaging (not shown) may be compressed during the rotation 98, may be deformed, and may apply a force that urges the cap 90 in a direction opposite the force on the cap initiated upon rotation (through engagement of threads 94 and 96). When rotation of the cap is sufficient to orient the cap 90 in the configuration shown in FIG. 8B, that is, with the internal threads 94 oriented with the relief portion 100, the force of the threads may not be present. Without a counter force of the threads to offset the force asserted by the deformed scent insert (or other portion of packaging), the cap 90 may be pushed away from the top portion 92 of the container. Of course, the cap 90 and top portion 92 may be configured to encourage proper engagement of the threads (94 and 96) during any given portion of rotation. Thus, in some embodiments, packaging may be configured so that a consumer may be able to repeatedly rotate the cap, such as, for example, may be desired to enhance the release of gas, so as to compensate for a decrease in scent, which may be performed as desired by a consumer. The cap 90 may further include an opening 102 (or a valve) to provide fluid communication with a beverage. The cap 90 may have a flip-top (not shown) as may or may not be included in some packaging embodiments. Thus, a cap may, in some embodiments, be configured such that beverage may be dispensed without removing the cap 90.
embodiments, include microencapsulated particles. A rotation 112 of the cap 106 may initiate a surface of the wall 104 to physically abrade against a surface of a container wall 114. In some embodiments, a surface of the container wall 114 may be textured and include, e.g., one or more ridges 116 or other protrusions that may abrade against the material 110 and facilitate rupture of particles and scent release from material 110. Gas that may be released may vent to an interior portion of packaging.

In some embodiments, a cap and a top portion of a container may be configured such that rotation of the cap initiates stress upon walls of the cap. In some embodiments, stress initiated by rotation of the cap may be transferred to a wall that faces an internal compartment of a cap. The wall facing the internal compartment may be coated with a material that includes an aromatic compound. Stress initiated in the wall may disrupt a coating material and enhance the release of aromatic gas. For example, FIG. 10A shows a cap 118 mounted on a top portion 122 of a container. The cap 118 may include aromatic material 130 in an internal compartment 120 and an opening 128 which provides liquid communication with the container. Cap threads 124 and container threads 126 may facilitate mounting of the cap 118 on the top portion 122 of the container. Rotation of the cap 118 may initiate contact between an edge 136 of the top portion 122 of the container and a wall 134 of cap 118. The wall 134 of the cap and the edge 136 of the container may be suitably positioned, constructed and/or shaped, such as, e.g., by configuring the container to include a ledge or one or more protrusions 131, to promote contact between the container and the wall 134 and a desired force suitable for stressing the wall 134 may be applied. For example, contact between the container and the wall 134 may promote deformation of the wall 134. Stress initiated in the wall 134 may serve to promote release of aromatic gas from the material 130.

FIG. 10B shows a top-side view of the cap 118. As shown in FIG. 10B, a dispensing portion 138 of the cap 118 may include opening 128 and a vent opening 132, which may provide gaseous communication between the internal compartment 120 and a consumer. In some embodiments, the cap 118 may include a ring or seal 125 sandwiched between a circular side wall 127 of the cap 118 and a container wall 129 of the top portion 122 of the container. The seal 125 may help prevent any liquid from escaping between the cap 118 and the top portion 122 of the container. In some embodiments, the cap 118 may include a lip 135 that may engage the top portion 122 of the container. The lip 135 may, in some embodiments, be configured to snap over a ridge (not shown) of top portion 122, such as upon rotation of the cap 118. The orientation of the ridges may serve to guide a consumer to rotate the cap to a desired level, e.g., a desired level of rotation to stress wall 134 and perturb material 130, and may, in some embodiments, also mitigate any concern associated with inadvertent release of beverage from the cap 118.

Any number of approaches may be used to prevent inadvertent initiation of scent release from material 130 and/or cap 118. For example, in one approach a consumer may remove a safety ring that may be removed upon pulling a tab. The safety ring may fit around a neck region of the container, such as where the cap and container meet, and only after removing the tab may the cap be rotated in a way that initiates scent release. The safety ring may be perforated to facilitate tearing. One advantage of including the aromatic material 130 on the wall 134 (which may face the interior of packag-
cap may snap the flange into a groove (not shown). Press fitting the cap 140 upon top portion 144 of a container may act to sandwich scent insert 146 between rim 148 and surface 154 thereby puncturing and/or compressing the scent insert 146. In some embodiments, the surface 154 may include ribs or protrusions that may facilitate compression or disruption of the scent insert 146. Therefore, initiation of scent release may, e.g., be accomplished by press fitting the cap onto the container.

In some embodiments, press fitting cap 140 upon top portion 144 may, in addition to puncturing or disrupting a scent insert 146, direct conduit 156 through hole 160 and/or further extend conduit 156 through hole 160. In some embodiments, the hole 160 may have a protective seal and that seal may be punctured by conduit 156 when press fitting the cap 140. Such a seal may be used with embodiments where gas may be dispersed from both a headspace and from the compartment 142. In some embodiments, conduit portion 156 may be absent or may not fully extend through the cap 140 and may, e.g., function to direct or guide a user to insert a straw through opening 162 and through hole 160, either or both of which may include a seal that may be punctured by a straw.

A cap 140 may be provided to a consumer in a configuration where it rests upon the container top portion but has not yet been press fit together in a manner that initiates scent release. Any number of approaches may be used to prevent inadvertent application of force (and inadvertent initiation of scent release) to either the cap or container. For example, in one approach a consumer may remove a safety ring that may be removed upon pulling a tab. For example, the safety ring may fit around the neck region, e.g., where the cap and container meet, and only after removing the tab may the cap be snapped onto the container in a way that initiates scent release. The safety ring may be perforated to facilitate tearing.

In some embodiments, such as illustrated in FIGS. 10A-10B and FIGS. 11A-11C, a cap may include a wall that may separate a compartment that is in gaseous communication with a vent hole from a headspace. The compartment may further include a portion of packaging that may be scented, such as a scent insert which as discussed below, may be configured to hold a significant amount of scented material. Additionally or alternatively, the walls of the compartment may be plastic and may comprise an aromatic material. In some embodiments, the walls of the container may also comprise aromatic material. A scented portion of packaging, such as a scent insert, may, in some embodiments, include a porous absorbent material that may hold a significant amount of aromatic material in a small volume. For example, in some embodiments, aromatic material may be associated with the surface of an absorbent material and/or porous material, which may include adsorbed gas or contain gas infused within a liquid matrix. The porous material may further be configured such that scent may be released in a controlled manner. The vent hole may, in some embodiments, be sealed and the seal may be removed during unpacking of a beverage product. For example, the cap may include a flip-top which, upon opening, may break a seal. A dispensing hole may, in some embodiments, allow a consumer to access the beverage and may also be sized such that headspace is vented.

FIGS. 12A-12B show an alternative embodiment of a cap 164 for a container. Cap 164 includes a wall 166 which may serve to separate a compartment 168 from a headspace compartment 172. A scent insert 170 is shown to be within the compartment 168. Compartment 168 may vent a gas generated by scent insert 170 to a consumer through a vent opening 174. A dispensing hole 176 may provide access to liquid and may, in some embodiments, serve as a vent hole for headspace gas. However, another vent hole (or holes) in communication with the headspace may, in some embodiments, also be present. In some embodiments, the vent holes in communication with the headspace may be configured to promote venting of headspace gas and minimize the consumer’s perception of scent derived from gases that may occupy the headspace. Such may be used, for example, where a contained beverage has a scent that is not desired or where the inherent scent of the beverage is less pleasant than the scent provided from gases that may be dispersed from vent opening 174. A flip-top cap 178 may be included in some embodiments. In some embodiments, opening the flip-top cap 178 may act to break a seal of scent insert 170 and/or may serve to compress the scent insert 170. For example, to actuate flip-top 178, a consumer may press down on the flip-top cap 178; e.g., packaging may direct the consumer to press down on the flip-top cap 178 in order to release the flip top 178. Pressing down on the flip-top cap 178 may compress scent insert 170 held within the compartment 168 thereby generating a scented gas to be released through vent opening 174.

The shaping and positioning of a vent hole (in gaseous communication with a first compartment) and a dispensing hole (in fluid communication with a contained beverage) may encourage sampling of gas from the first compartment upon beverage tasting. For example, the vent hole may be positioned about 1 inch from the dispensing hole; therefore, the positioning of the vent hole and dispensing hole may encourage a consumer to experience liquid through the mouth and gas through the nose. Alternatively (or additionally), a vent hole may be positioned such that gas is sampled through the mouth, e.g., along with tasting.

In some embodiments, the positioning and shaping of a dispensing hole and a vent hole may serve to minimize risk that liquid, such as may drip from a dispensing hole after sampling, may inadvertently drip towards the vent hole. For example, a dispensing cap may include a vent hole and a shield that helps prevent liquid within a container from inadvertently leaking and potentially blocking the vent hole. The top of the cap may, in some embodiments, be curved, and the curve may provide both an aesthetic function and also promote flow of any liquid that may inadvertently exit packaging. Thus, the relative orientation of the vent and dispensing holes and the shape of a top curved surface of a cap may prevent residual liquid from dripping towards unintended locations.

A method 180 of consuming a beverage contained in scented packaging is shown in FIG. 13. In a step 182, a consumer may purchase a beverage, unpack the beverage, and/or remove any external seals that may be present. Unpacking a beverage may involve, e.g., releasing a flip-top cap, removing a beverage sleeve, removing a seal, pulling a tab to remove a safety ring, other activities, or combinations thereof. Activities associated with step 182 may serve any of various functions including, e.g., the removal of elements that minimize loss of gas during distribution stages of a beverage and/or the removal of elements present during distribution which may serve to minimize risk of inadvertent initiation of scent release. For some embodiments, a consumer may unpack a beverage and consume the beverage. In other embodiments, as shown in a step 184, a consumer may initiate
the release of scented material. For example, initiation of scent may involve the compression and/or the disruption of a pocket or adsorbent material, removal of a seal or combinations thereof. In a step 186, a consumer may consume a beverage.

[0096] In some embodiments, a beverage may be bottled in scented packaging, wherein the packaging may provide an aromatic gas that possesses a complementary scent to a desired beverage taste. A beverage may, for example, possess a sweet, salty, bitter, sour or umami taste. In some embodiments, a scent that a consumer has become accustomed to experience along with a taste may be a complementary scent. Packaging presentation such as contextual elements provided by product labeling may further encourage an association between a given scent and a desired taste. For example, if a strawberry scent is used as a complementary scent to a sweet taste, a beverage label may depict a strawberry and another element may provide a picture associated with sweetness, such as a sugar cube or a word or phrase such as “sweet” or “sugar” or “strawberry sweet.” In some embodiments, contextual elements for enhancing the association of a taste and scent may be provided in the color of packaging and/or the coloring of a consumable item. For example, if strawberry is selected as a complementary scent beverage packaging may include a red color. In some embodiments, beverages as described herein may be directed towards children. A child may, for example, rotate a cap of a beverage and the rotation may release a scent. In some embodiments, the rotation of the cap may orient a thematic picture. For example, a top part of a picture may upon rotation become oriented with a bottom part of a picture. Such depiction may serve the dual purpose of providing enjoyment and providing an instructional role in urging a consumer to initiate scent release in the desired manner. Including a gas that possesses a complementary scent may, in some embodiments, facilitate the use of beverages that include lower amounts of other ingredients, e.g., liquid ingredients. Minimizing such ingredients may provide a cost benefit and/or provide a health benefit to the consumer.

[0097] In some embodiments, scented packaging may be used to minimize the presence of a scent or taste of a consumable item that in the absence of the scented packaging may be perceived and may, for example, be undesirable. Scented packaging may provide a scent that masks any number of tastes or other scents, such as, for example, may be associated with deterioration of a consumable item, the presence of sulfur off-notes, dairy off-notes, or combinations thereof. For some consumable items, some deterioration of ingredients may occur without hazardous spoilage of foods. For example, some compositions that may be high in protein and/or include fatty acids may be prone to breakdown and may release low molecular weight (and volatile) products such as, e.g., ketones, organosulfur, aldehydes, esters and/or ethers. The presence of such undesirable compounds may be detected by a consumer during tasting or smelling of a consumable item. Volatile compounds may leach from the consumable item, fill a headspace compartment, and be provided to a consumer as a gas. The scent may be particularly strong when a consumer initially unpackages a beverage.

[0098] In some embodiments, a gas may be provided from packaging to mask or block a scent that may be related to sulfur off-notes, dairy off-notes, the deterioration of a consumable item, or combinations thereof, wherein the gas may comprise, e.g., vanillin, ethyl vanillin, isovaleryl acetate, hexyl acetate, benzyl acetate, any of various citrates (such as tri-ethyl citrate), any of various malonates (such as diethyl malonate), any of various alcohols (such as menthol), any of various terpenes (such as limonene or camphene) or combinations thereof. In some embodiments, a masking agent to block an undesired scent may be a small amount of fragrance, a scent associated with a fruity flavor, a scent associated with a floral fragrance, woody scent, combinations thereof, or some other desirable scent.

[0099] In some embodiments, an undesired taste or scent may be present for a consumable item comprising a protein, such as a dairy protein. Exemplary dairy proteins include calcium caseinate, sodium caseinate, whey protein, whey protein concentrate, whey protein isolate, whey protein hydrolyzate, demineralized whey protein, milk protein, casein hydrolyzate, or a combination comprising at least two or more of the foregoing proteins. An exemplary milk protein is the spray-dried combination of whey protein isolate and trehalose available from Cargill under the name BT-100. Exemplary vegetable proteins include soy protein, soy protein isolate, soy protein concentrate, pea protein, rice protein, soy flour, rice protein, wheat protein, corn protein, nut protein, or a combination comprising at least two or more of the foregoing proteins. Exemplary other proteins include egg albumin, yeast concentrate, or a combination comprising at least two or more of the foregoing proteins.

[0100] In some embodiments, a protein-containing beverage may be packaged in scented packaging wherein the scented packaging may provide a grapefruit, orange, dark berry or fruit punch scent. In some embodiments, a protein-containing beverage may further comprise a fruit juice component.

[0101] In some embodiments, a protein-containing beverage may comprise a composition that is substantially free of benzaldehyde flavor (almond flavor at low levels and cherry flavor at high levels), and packaging may provide an orange scent, a grapefruit scent, or a combination of those scents.

[0102] In some embodiments, a scent may be provided to mask or block an undesired scent and that scent may be provided from a compartment that may be isolated from a headspace compartment of packaging. In some embodiments, beverage may be dispensed through an opening that is relatively large and that may be configured to provide relatively rapid venting of headspace gas. Additionally or alternatively, a separate vent hole may, in some embodiments, serve to aerate or vent a headspace.

[0103] Some beverages, even newly packaged beverages which may comprise ingredients that may or may not have deteriorated, may taste or smell better when a container provides significant venting or aeration. For example, some beverages may provide, upon consumption, an initial taste and/or aroma that may be stronger than later samplings, and the strength of the initial taste and/or aroma may be deemed by some consumers, including, e.g., even consumers that enjoy a less strong taste and/or aroma of such beverages, to be too strong. Beverage flavors that may provide volatile species to a headspace and that in some concentrations and some beverage matrices may provide undesirable scents include, e.g., garlic, onion, valerian root, tomato, celery, shellfish, clam, and pepper flavors.

[0104] Concern associated with the concentration of headspace gas and/or the initial scent of a beverage upon unpackaging may be particularly strong for some beverages, including, e.g., some beverages comprising the aforementioned flavors or flavor combinations, that may comprise significant
salt content. For example, some non-polar flavoring compounds may tend to collect in a headspace compartment, because, e.g., the vapor pressure of those compounds may be high. The tendency of volatile flavoring compounds to collect in a headspace may be enhanced when used in a beverage with high salt content. More generally, such tendency may be a concern for beverages where the overall solute activity is high, such as, e.g., may be found for some beverages that are medleys of different components or include a number of different flavors and/or juices.

One way to lessen the effect of undesirable scents or strong scents upon initial tastings of a beverage may be to consume the beverage in an opened vented container. For example, if a beverage has developed or possesses an undesirable scent, pouring the beverage into a glass may effectively vent the headspace. Of course, such an approach may not be compatible with some strategies that make use of scented packaging. Moreover, some approaches where a user pours a contained beverage into another container may not be desirable for products that are consumed while traveling. Increasing the size of a dispensing opening and/or increasing the size of a separate vent hole may encourage rapid venting of a headspace gas and mitigate concerns associated with an undesirable aroma. However, if desirable gas, such as from scented packaging, has also vented into the same headspace, increasing such opening(s) may not be desired.

One way to avoid such concerns may be to separately vent aroma from one compartment of packaging and gas from a headspace. For example, in some embodiments, packaging described in relation to FIGS. 11A-11C or FIGS. 12A-12B may be useful for separately venting compartments of packaging. In some embodiments, an opening may be sized to encourage venting of excess gas from a headspace, and another opening, such as may be in gaseous communication with a compartment including scented packaging, may be sized to control the venting of a compartment that is isolated from the headspace. In some embodiments, packaging configured as such may contain a beverage that may possess an undesired scent.

In some embodiments of a beverage and packaging, a beverage may comprise a combination of at least one component of fruit and at least one component of vegetable. The term “vegetable component” as used herein means a component that may be produced from vegetable matter, including for example carrot, cucumber, beets, pumpkins, tomatoes, celery, turnip, or any combination thereof. It should be clarified that tomatoes as used herein may be grouped as a vegetable based on taste as commonly done in the food sciences. Other botanical fruits that possess the culinary properties of a vegetable (and which for the purposes herein may be treated as vegetables) include, e.g., squash, pumpkin, cucumber, beans, corn, peas, eggplant and sweet peppers. A fruit component may comprise a fruit flavor, such as may be associated with a fruit juice. Fruit flavors or juices may include, e.g., apple, grape, orange, grapefruit, lemon, banana, strawberry, mango, pear, pineapple, raspberry, blackberry, or any combination thereof. It may be desirable to combine one or more fruit components and one or more vegetable components in a beverage for any number of reasons. For example, some individuals may find it convenient to receive the health benefits of a fruit and a vegetable at the same time. However, some individuals may prefer the aroma or flavor of a fruit component that is included in the beverage over a vegetable component that is included in the beverage or vice versa or prefer another aroma or flavor that may not be present in the beverage altogether. For example, in some embodiments of beverages that provide both a fruit and a vegetable component (from beverage components), packaging may provide a fruit, vegetable, floral, honey, almond, vanilla, or mint scent or combinations of scents thereof. In some embodiments of beverages that provide both a fruit and a vegetable flavor (from beverage components), packaging may provide a scent of a flavor that enhances the perception of sweetness and the beverage may be a reduced-calorie beverage.

In some embodiments, a beverage may be a reduced-calorie beverage and a gas may comprise a compound that increases a consumer’s perception of sweetness, the perception of some other taste, or combinations thereof. In some embodiments, a gas may comprise a component that increases a consumer’s perception of a salty taste. Addition of a gas that augments the perception of saltiness may facilitate the production of liquid beverages that possess decreased content of dissolved salt. For example, a soy sauce-like scent may, in some embodiments, enhance a consumer’s perception of a salty taste. In some embodiments, a gas may comprise a component that increases a consumer’s perception of a desired taste, such as, e.g., a fruit taste, vegetable taste, nut taste, vanilla taste, chocolate taste, mint taste, another taste, or combinations thereof.

In some embodiments, a desired taste may be sweetness and a scent complementary to a sweet taste may, e.g., be a vanilla, caramel, chocolate, coffee, or fruit-like scent or any combinations thereof. Exemplary fruit-like scents include by way of non-limiting example, apple, grape, orange, grapefruit, lemon, banana, strawberry, mango, pear, pineapple, raspberry, blueberry, blackberry, peach, passion fruit, lychee, cherry, mangosteen, and pomegranate scents or blends thereof. Any number of aromatic compounds including, e.g., vanillin (4-Hydroxy-3-methoxybenzaldehyde), ethyl vanillin, citral (3,7-dimethyl-2,6-octadienial), furanol or strawberry furanone (4-Hydroxy-2,5-dimethyl-3-furanone), prop-2-enyl 2-(3-methylbutoxy)acetate, 3-hydroxy-4,5-dimethyl-5H-furan-2-one, 2-methylhexanol-3-one, benzyl 3-phenylprop-2-enate, ethyl butynate or combinations thereof may upon release as a gas provide a complementary scent to a sweet taste.

In some embodiments, a desired taste may be saltiness and a scent complementary to a salty taste may, e.g., be a soy-sauce, anchovy, sardine, pretzel, cheese, popcorn, bul- lion, bacon, nut, olive, or caper like scent or any combinations thereof. Exemplary nut scents include almond, hazelnut, macadamia, peanut, pecan, pistachio, chestnut and walnut scents.

A reduced-calorie beverage may provide a caloric content that is substantially lowered as compared to a typical full-calorie beverage. For example, in some embodiments, a reduced-calorie beverage may contain about 5 calories to about 20 calories, or about 10 calories to about 50 calories, for a serving of about 8 to 12 fluid ounces. In some embodiments, a reduced-calorie beverage may contain less than about 10 calories, or less than about 20 calories, or less than about 50 calories, for a serving of about 8 to 12 fluid ounces.

In some embodiments, a reduced-calorie beverage may comprise both a fruit juice flavor and a vegetable juice flavor (from beverage components), and packaging may provide a scent of a flavor that enhances the perception of sweetness, and the reduced-calorie beverage may contain about 25 calories to about 100 calories, or about 50 calories to about 80
calories, for a serving size of about 8 to 12 fluid ounces. In some embodiments, the packaging may comprise an opening configured to vent gas from a headspace and an opening configured to vent a gas from a compartment that is isolated from the headspace.

[0113] In some embodiments, the sweetness of a beverage may be enhanced using a scent. The sweetness intensity provided by beverage ingredients may be increased by the presence of a scent. For example, in some embodiments, the relative intensity of sweetness may be increased in the presence of scent by at least about 10%, at least about 25%, or higher when compared to the perceived sweetness in the absence of scent.

[0114] Sweeteners used in some embodiments may include high-potency sweeteners, natural-calcio sweeteners, nutritive sweeteners, non-nutritive sweeteners, and combinations thereof. Natural-calcio sweeteners may, for example, be provided in the form of corn syrup that has been treated to convert a fraction of glucose into fructose. For example, natural-calcio sweeteners may be provided as corn syrup with a mixture of about 55% fructose and about 42% glucose, which is commonly referred to as HFCS 55. Other natural-calcio sweeteners, including corn syrup with different distributions of fructose and glucose, may also be used. Natural-calcio sweeteners may also be provided from sources other than corn syrup, such as natural sugar from sugar cane, or other sources.

[0115] Natural-calcio sweeteners may in some embodiments be included at concentrations that by themselves are insufficient to achieve an acceptable level of sweetness, e.g., a level of sweetness typical of a full-caloric beverage. Sweetness may be augmented by the inclusion of a scent, such as a complementary scent, or may be augmented by use of another sweetener type or combinations thereof.

[0116] High-potency sweeteners used in some embodiments, be included at concentrations that by themselves are insufficient to achieve an acceptable level of sweetness. A combination of high-potency sweeteners, one or more natural-calcio sweetener, and a complementary scent may, however, be sufficient to provide adequate sweetness in a beverage. In some embodiments, the overall sweetness level provided by the sweeteners may be greater than would be expected by simply adding the combination of high potency sweeteners and the one or more natural sweeteners. In those embodiments, the combination of sweeteners may provide non-linearity in the overall sweetness level that is perceived.

[0117] Without being limited to a particular sweetener, representative categories and examples include:

[0118] (a) water-soluble sweetening agents such as dihydrochalcones, monellin, steviosides, glycyrrhizin, dihydroflavanol, dihydroflavonol, and sugar alcohols such as sorbitol, mannitol, maltitol, and L-aminoicarboxylic acid aminooalkenoic acid ester amidines, such as those disclosed in U.S. Pat. No. 4,619,834 of Zanone et al., which is incorporated herein by reference, and mixtures thereof;

[0119] (b) water-soluble artificial sweeteners such as soluble saccharin salts, i.e., sodium or calcium saccharin salts, cyclamate salts, the sodium, ammonium or calcium salt of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide, the potassium salt of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide (Acesulfame-K), the free acid form of saccharin, and mixtures thereof;

[0120] (c) dipeptide based sweeteners, such as L-aspartic acid derived sweeteners, such as L-aspartyl-L-phenylalanine methyl ester (Aspartame) and materials described in U.S. Pat. No. 3,492,131 of Schlatter, which is incorporated herein by reference, L-alpha-aspartyl-N-(2,4,4-tetramethyl-3-thietanyl)-D-alaninamide hydrate (Alitame), N-[N-(3,3-dimethyl-ylbutyl)]-L-aspartyl]-L-phenylalanine 1-methyl ester (Neotame), methyl esters of L-aspartyl-L-phenylglycine and L-aspartyl-L-2,5-dihydrophenylglycine, L-aspartyl-2,5-dihydro-L-phenylalanine; L-aspartyl-L-(1-cyclohexenyl)alanine, and mixtures thereof;

[0121] (d) water-soluble sweeteners derived from naturally occurring water-soluble sweeteners, such as chlorinated derivatives of ordinary sugar (sucrose), e.g., chlorodeoxy-sugar derivatives such as derivatives of chlorodeoxyxycose or chlorodeoxyxylcosose, known, for example, under the product designation of Sacrosene; examples of chlorodeoxyxycose and chlorodeoxyxylcosose derivatives include but are not limited to: 1-chloro-1-deoxyxycose; 4-chloro-4-deoxy-alpha-D-galactopyranosyl-alpha-D-fructofuranoside, or 4-chloro-4-deoxy-alpha-D-galactopyranosyl-1-chloro-1-deoxy-beta-D-fructofuranoside, or 4,1'-dichloro-4,1'-dideoxyxylcosose; 1',6'-dichloro 1',6'-dideoxyxycose; 4-chloro-4-deoxy-alpha-D-galactopyranosyl-1,6-dichloro-1,6-dideoxy-beta-D-1-fructofuranoside, or 4,1',6'-trichloro-4,1',6'-trideoxyxylcosose; 4,6-dichloro-4,6-dideoxy-alpha-D-galactopyranosyl-6-chloro-6-deoxy-beta-D-fructofuranoside, or 4,6,6'-trichloro-4,6,6'-trideoxyxylcosose; 6,1',6'-trichloro-6,1',6'-trideoxyxylcosose; 4,6-dichloro-4,6-dideoxy-alpha-D-galactopyranosyl-1,6-dichloro-1,6-dideoxy-beta-D-fructofuranoside, or 4,6,1',6'-tetrachloro-4,6,1',6'-tetideoxyxylcosose, and mixtures thereof;

[0122] (e) protein-based sweeteners such as thaumacoccus danielii (Thaumatin I and II); and

[0123] (f) the naturally occurring sweetener monatin (2-hydroxy-2-(indol-3-ylmethyl)-4-aminoglutaric acid) and its derivatives.

[0124] In some embodiments, a beverage may include, e.g., one or more sweeteners, and one or more flavor potentiators. Sweetener potentiators, which are a type of flavor potentiator, may also be used to enhance the taste of sweetness. Some of the sweetener potentiators may, in some embodiments, be provided as a component of the beverage, as a pre-formed gas, as a volatile liquid such as may be associated with an absorbent material of packaging, e.g., infused within absorbent material, or combinations thereof.

[0125] In some embodiments, exemplary sweetener potentiators may include monoammonium glycyrhrizinate, licorice glycyrhrizinates, citrus aurantium, alapyridain, alapyridaine (N-(1-carboxyethyl)-6-(hydroxymethyl)pyridinium-3-ol) inner salt, miriculain, curculin, strogain, mabinlin, gymnemic acid, cyanarin, glypyridain, compounds, sugar beet extract, neotane, thaumatin, neohesperidin dihydrochalcone, hydroxybenzoic acids, tagatose, trehalose, maltol, ethyl maltol, vanilla extract, vanilla oleoresin, vanillin, sugar beet extract (alcoholic extract), sugarcane leaf essence (alcoholic extract), compounds that respond to G-protein coupled receptors (T2Rs and T1Rs), and a combination comprising any of the foregoing potentiators. In some embodiments, the combination of sweeteners and one or more taste potentiators may provide non-linearity in the overall sweetness level that is perceived.
As discussed below, for embodiments that involve the providing of a combination of different scents, the scents may be routed to the nasal cavity in a substantially concurrent or consecutive manner, e.g., with or without a time delay between the providing of different scents. Distinct scents may, e.g., be provided from the same or different portions of packaging material or from different compartments in gaseous communication with different portions of packaging. For some embodiments, scents may be provided consecutively (i.e., if presented at the same time would initiate a decreased or undesirable consumer response in comparison to the scents provided with at least some temporal separation. For example, two scents may be provided consecutively that if provided together would inhibit or alter the perception of one or both of the scents. For example, two different scents may be provided that cause a beverage to taste like one flavor (e.g., strawberry) when the first scent is released and cause the beverage to taste like another flavor (e.g., cherry) when the second scent is released. In some embodiments, each of a plurality of scents may be selected by a user, for example, by placing a cap in a selected position with respect to a container, which causes release of the selected scent.

As noted above, in some embodiments, a beverage may be bottled in scented packaging, wherein the packaging may provide an aromatic gas that possesses a complementary scent to a desired beverage taste. A beverage may, for example, possess a sweet, salty, bitter, sour or umami taste. In some embodiments, a scent that a consumer has become accustomed to experience along with a taste may be a complementary scent. A desired taste may be sweetness, and a gas may provide a scent that augments or adds the perception of sweetness. In addition, in some embodiments, a desired taste may be sourness, and a scent complementary to a sour taste may, e.g., be a subtle vinegar or lemon-like scent. Furthermore, in some embodiments, a desired taste may be a salty taste and a scent complementary to a salty taste may, e.g., be a soy-sauce like scent. Some embodiments of packaging may provide a combination of two or more different scents, including, e.g., scents that are complementary to both a sweet and salty taste.

In addition to any scents that escape from liquid ingredients in a beverage (during consumption), scents provided from a headspace region may be the sole source of scent delivery or may provide gases in concert with other gases, such as, e.g., may be provided from a portion of packaging that may not vent to a headspace, including, e.g., a package label, film or strip that faces the outside of packaging material or an absorbent material, packet or film that may vent to an internal compartment that may be isolated from a headspace. Gas provided from an external face or surface of packaging material may be substantially sampled by a consumer through the nose and mouth whereas gas provided in a headspace region may be sampled through the mouth. For instance, as a consumer brings a beverage towards his or her mouth, he or she may take a breath and draw gas into the nose and/or the mouth. A consumer may be driven to take a breath before drinking because an individual may not take a breath while drinking, and the consumer may be accustomed to do so; moreover, a consumer may be more likely to take a deep breath if the consumer is aware that an aromatic scent may be present on packaging. In addition, packaging material (such as on a label) may include instructions to take such a breath prior to tasting the beverage. Following such an initial breath, i.e., the breath before tasting liquid, a consumer may sample liquid and gas from a compartment of a beverage. Thus, in some embodiments, during steps associated with tasting a beverage, a consumer may, if scents are delivered from both a compartment of packaging and externally facing packaging material, experience the scent of external packaging followed by the scent of gas provided from a packaging compartment. The temporal relationship between a gas provided from an external part of packaging and from one or more internal compartments of packaging may also be adjusted depending upon whether or not gas is vented through an opening or through a conduit portion of a container.

In some embodiments, the temporal dynamics of smelling one or more scents may be used in combination with liquid sampling of a beverage to enhance the flavor experience provided to a consumer. For example, in some embodiments, a first scent, such as may be released from externally facing packaging material, may condition a consumer for a second scent, such as may be provided from a headspace region or other compartment of a container.

In some embodiments, a scent derived from packaging may comprise a scent or other scent that is a trigeminal stimulant. For example, a scent may comprise a cooling agent, a warming agent, or a tingling agent. Trigeminal stimulants may include, e.g., Vanilllyl alkyl ethers, Vanillyl n-buty1 ether, spilanilol, Ephedraceae extract, Northern Prickly Ash extract, capsicin, capsicum oleoresin, red pepper oleoresin, black pepper oleoresin, piperine, ginger oleoresin, gingerol, shogol, cinnamon oleoresin, cassia oleoresin, cinnamic aldehyde, eugenol, cyclic acetal of vanillin, menthol glycerin ether, unsaturated amides and combinations thereof. In some embodiments, a trigeminal stimulant may condition a consumer for another scent, including, e.g., a honey, almond, fruity, vegetable-like, soy, vanilla, or combination of scents thereof.

In some embodiments, an externally facing film or coating may provide a first scent to a consumer, e.g., upon taking a breath prior to tasting a beverage, and a headspace or other compartment or region may provide a second scent to a consumer upon or after tasting the beverage. The first and second scent may be the same or different. In some embodiments, the two scents may be a pair of scents that may be perceived by a consumer in a different manner than if those scents were provided simultaneously.

In some embodiments, a consumable composition may include additives such as caffeine, coloring agents ("colorants", "colorings"), emulsifiers, food-grade acids, minerals, micronutrients, plant extracts, preservatives, salts including buffering salts, stabilizers, thickening agents, medicaments, and a combination comprising any of the foregoing. Those of ordinary skill in the art will understand that certain additives may meet the definition or function according to more than one of the above-listed additive categories.

Exemplary salts may include alkali or alkaline earth metal chlorides, glutamates, and the like. For example, monosodium glutamate, potassium chloride, sodium chloride, and a combination comprising any of the foregoing salts may be used. The salts may be added to the beverage as a flavor potentiator as described above. Food-grade acids for use in certain embodiments of the consumable composition may include, for example, acetic acid, adipic acid, ascorbic acid, butyric acid, citric acid, formic acid, tartaric acid, glycolic acid, lactic acid, malic acid, phosphoric acid, oxalic acid, succinic acid, tartaric acid, and a combination comprising any of the foregoing food-grade acids. The food-grade acid may
be added as acidulant to control the pH of the consumable composition and also to provide some preservative properties; or to stabilize the consumable composition. The pH of a beverage, syrup or mix, or concentrate may also be modified by the addition of food-grade compounds such as ammonium hydroxide, sodium carbonate, potassium carbonate, sodium bicarbonate, and the like, and a combination comprising any of the foregoing. Additionally, the pH may be adjusted by the addition of carbon dioxide. The pH may also affect the relative partition of solutes between liquid and solid portions of a beverage; such is particularly true if the pH is changed over a region where a solute becomes at least fractionally ionized. In some embodiments, the ionization of a component may be modified by selection of a pH that alters the fraction of a component which is ionized. In addition, a sweetener or bulk solute may in some cases be selected because within a desired pH range for a beverage, the component may exist in an ionized form.

[0134] A person having ordinary skill in the art will understand that embodiments of beverages may contain one or more flavors. Exemplary flavor oils may include spearmint oil, cinnamon oil, oil of wintergreen (methyl salicylate), peppermint oil, Japanese mint oil, clove oil, bay oil, anise oil, eucalyptus oil, thyme oil, cedar leaf oil, oil of nutmeg, allspice, oil of sage, mace, oil of bitter almonds, and cassia oil; useful flavoring agents may include artificial, natural and synthetic fruit flavors such as vanilla, and citrus oils including lemon, orange, lime, grapefruit, yuzu, sudachi; and fruit essences including apple, pear, peach, grape, blueberry, strawberry, raspberry, cherry, plum, prune, raisin, cola, guanana, neroli, pineapple, apricot, banana, melon, apricot, lime, cherry, raspberry, blackberry, tropical fruit, mango, mangosteen, pomegranate, papaya and so forth. Additional exemplary flavors imparted by a flavoring agent may include a milk flavor, a butter flavor, a cheese flavor, a cream flavor, and a yogurt flavor; a vanilla flavor; tea or coffee flavors, such as a green tea flavor, an oolong tea flavor, a tea flavor, a cocoa flavor, a chocolate flavor, and a coffee flavor; mint flavors, such as a peppermint flavor, a spearmint flavor, and a Japanese mint flavor; spicy flavors, such as an asafetida flavor, an ajowan flavor, an anise flavor, an angelica flavor, a fennel flavor, an allspice flavor, a cinnamon flavor, a camomile flavor, a mustard flavor, a cardamom flavor, a caraway flavor, a cumin flavor, a clove flavor, a pepper flavor, a coriander flavor, a saffron flavor, a savory flavor, a Zanthoxyly Fructus flavor, a perilla flavor, a juniper berry flavor, a ginger flavor, a star anise flavor, a horseradish flavor, a thyme flavor, a tarragon flavor, a dill flavor, a capscium flavor, a nutmeg flavor, a basil flavor, a marjoram flavor, a rosemary flavor, a bayleaf flavor, and a wasabi (Japanese horseradish) flavor; a nut flavor such as an almond flavor, a hazelnut flavor, a macadamia nut flavor, a peanut flavor, a pecan flavor, a pistachio flavor, and a walnut flavor; alcoholic flavors, such as a wine flavor, a whisky flavor, a brandy flavor, a rum flavor, a gin flavor, and a liqueur flavor; floral flavors; and vegetable flavors, such as an onion flavor, a garlic flavor, a cabbage flavor, a carrot flavor, a celery flavor, mushroom flavor, and a tomato flavor.

[0135] In some embodiments, other flavoring agents may include aldehydes and esters such as cinnamyl acetate, cinnamaldehyde, citral diethylacetal, dihydrocarvyl acetate, eugenyl formate, p-methylamylol, and so forth. Examples of aldehydes flavorings may include acetaldehyde (apple), benzaldehyde (cherry, almond), anisic aldehyde (licorice, anise), cinnamic aldehyde (cinnamon), citral, i.e., alpha-citral (lemon, lime), neroli, i.e., beta-citral (lemon, lime), decanal (orange, lemon), ethyl vanillin (vanilla, cream), heliotrope, i.e., piperonal (vanilla, cream), vanillin (vanilla, cream), alpha-amyl cinnamaldehyde (spicy fruity flavors), butyraldehyde (butter, cheese), valeraldehyde (butter, cheese), citronellal (modifies, many types), decanal (citrus fruits), aldehyde C-8 (citrus fruits), aldehyde C-9 (citrus fruits), aldehyde C-12 (citrus fruits); 2-ethyl butyraldehyde (berry fruits), hexenal, i.e., trans-2 (berry fruits), tolyl aldehyde (cherry, almond), veratraldehyde (vanilla), 2,6-dimethyl-5-heptenal, i.e., melonal (melon), 2,6-dimethyloctanal (green fruit), and 2-dodecenal (citrus, mandarin), and the like.

[0136] The flavoring agents may be used in liquid or solid/dried form and may be used individually or in a mixture. When employed in dried form, suitable drying means such as spray drying an oil may be used. Alternatively, the flavoring agent may be absorbed onto water-soluble materials, such as cellulose, starch, sugar, maltodextrin, gum arabic and so forth or may be encapsulated. In still other embodiments, the flavoring agent may be adsorbed onto silicones, zeolites, and the like. The techniques for preparing such dried forms are well-known.

[0137] In some embodiments, the flavoring agents may be used in many distinct physical forms. Without being limited thereto, such physical forms may include free forms, such as spray dried, powdered, bead forms, encapsulated forms, emulsions such as caramel or gum arabic emulsions, and a combination comprising at least one of the foregoing physical forms. The particular amount of the flavoring agent effective for imparting flavor characteristics to the composition may depend upon several factors including the flavor, the flavor impression, and the like.

[0138] In some embodiments, the tanness of a beverage may be varied by selecting and combining acids to provide a desired tanness perception. Some factors to consider in determining a desired tanness include, for example, the acid’s dissociation constant, solubility, pH, etc. These variables may be measured by measuring the titratable acidity of a beverage, syrup or mix, or concentrate.

[0139] In some embodiments, a coloring agent may be used in amounts effective to produce a desired color for the composition. Exemplary coloring agents may include pigments, natural food colors and dyes suitable for food, drug and cosmetic applications. A full recitation of all colorants approved by the United States Food and Drug Administration, together with corresponding chemical structures, may be found in the Kirk-Othmer Encyclopedia of Chemical Technology, 3rd Edition, in volume 5 at pages 857-884.

[0140] As classified by the United States Food, Drug, and Cosmetic Act (21 C.F.R. 73), colors may include those exempt from certification colors (sometimes referred to as natural even though they can be synthetically manufactured) and certified colors (sometimes referred to as artificial), and a combination comprising any of the foregoing. In some embodiments, exemplary colors exempt from certification or natural colors may include, for example, annatto extract, bixin, norbixin, astaxanthin, dehydrated beets (beet powder), beetroot red/betanin (E162), ultramarine blue, canthaxanthin (E161g), cryptoxanthin (E161c), rubixanthin (E161d), violaxanthin (E161c), rhodoxanthin (E161f), caramel (E150(a-d)), beta-apo-8-carotenal (E160e), beta-carotene (E160a), alpha carotene, gamma carotene, ethyl ester of beta-apo-8-carotenal (E160f), flavoxanthin (E161a), lutein (E161b), cochenile extract (E120); carmine (E132), car-
moisine/azorbin (E122), sodium copper chlorophyllin (E141), chlorophyll (E140), toasted partially defatted cooked cottonseed flour, ferrous gluconate, ferrous lactate, grape color extract, grape skin extract (enocianina), anthocyanins (E163), haematococcus algae meal, synthetic iron oxide, iron oxides and hydroxides (E172), fruit juice, vegetable juice, dried algae meal, teagets (Aztec marigold) meal and extract, carrot oil, corn endosperm oil, paprika, paprika oleoresin, phaffia yeast, riboflavin (E101), saffron, titanium dioxide, turmeric (E100), turmeric oleoresin, amaranth (E123), capsanthin/capsorbin (E160c), lycopene (E160d), and a combination comprising any of the foregoing.

[0141] In some embodiments, exemplary certified colors may include FD&C blue #1, FD&C blue #2, FD&C green #3, FD&C red #3, FD&C red #40, FD&C yellow #5 and FD&C yellow #6, tartrazine (E102), quinoline yellow (E104), sunset yellow (E110), ponceau (E124), erythrosine (E127), patent blue V (E131), titanium dioxide (E171), aluminium (E173), silver (E174), gold (E175), pigment rubine/lithol rubine BK (E180), calcium carbonate (E170), carbon black (E153), black PN/brilliant black BN (E151), green S/acid brilliant green BS (E142), and a combination comprising any of the foregoing. In some embodiments, certified colors may include FD&C aluminum lakes, which consist of the aluminum salts of FD&C dyes extended on an insoluble substrate of alumina hydrate. Additionally, in some embodiments, certified colors may be included as calcium salts.

[0142] In some embodiments, a consumable composition may include additional preservatives to provide freshness and to prevent the unwanted growth of bacteria, molds, fungi, or yeast. The addition of a preservative, including antioxidants, may also be used to maintain the composition’s flavor, color, or texture. Exemplary preservatives may include benzoic acid alkali metal salts (e.g., sodium benzoate), sorbic acid alkali metal salts (e.g., potassium sorbate), ascorbic acid (Vitamin C), citric acid, calcium propionate, sodium erythorbate, sodium nitrite, calcium sorbate, butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), ethylenediaminetetraacetic acid (EDTA), tocopherols (Vitamin E), straight chain polyphosphates, and a combination comprising any of the foregoing preservatives.

[0143] While many examples in this description refer to consumable items and packaging thereof, it is understood that those consumable items and packaging are described in an exemplary manner only and that other compositions and methods may be used. For example, any feature described for one embodiment may be used in any other embodiment. Additionally, other ingredients may be used, depending on the particular needs. Although the foregoing specific details describe certain embodiments, persons of ordinary skill in the art will recognize that various changes may be made in the details of these embodiments without departing from the spirit and scope of this invention as defined in the appended claims and other claims to be drawn to this invention, considering the doctrine of equivalents. Therefore, it should be understood that this invention is not limited to the specific details shown and described herein.

What is claimed is:

1. A beverage and packaging comprising:
   a container configured for holding said beverage;
   said beverage comprising an ingredient that has a characteristic taste;
   wherein said container is in fluid communication with a dispense opening configured to provide said beverage to a consumer; and
   a component of packaging comprising aromatic material;
   wherein said component of packaging is configured to release a portion of said aromatic material as an aromatic gas to a compartment;
   wherein said compartment is in gaseous communication with a vent opening;
   wherein said vent opening is configured to provide said aromatic gas to a consumer;
   wherein said aromatic gas has a complementary scent to said characteristic taste.

2. The beverage and packaging of claim 1 wherein said beverage comprises at least one fruit component and at least one vegetable component.

3. The beverage and packaging of claim 2 wherein said complementary scent is a fruity scent.

4. The beverage and packaging of claim 3 wherein said fruity scent is selected from the group consisting of apple, grape, orange, grapefruit, lemon, banana, strawberry, mango, pear, pineapple, raspberry, blueberry, blackberry, peach, passion fruit, lychee, cherry, mangosteen, pomegranate, and combinations thereof.

5-11. (canceled)

12. The beverage and packaging of claim 1 wherein said beverage is a reduced-calorie beverage;
   wherein said characteristic taste comprises a sweet taste;
   wherein said complementary scent comprises a vanilla, caramel, chocolate, coffee, or fruit-like scent or any combination thereof.

13. The beverage and packaging of claim 12 wherein said fruit-like scent is selected from the group consisting of an apple, grape, orange, grapefruit, lemon, banana, strawberry, mango, pear, pineapple, raspberry, blueberry, blackberry, peach, passion fruit, lychee, cherry, mangosteen, pomegranate scent and any combination thereof.

14-19. (canceled)

20. The beverage and packaging of claim 1 wherein said beverage is a reduced-salt beverage;
   wherein said characteristic taste comprises a salt taste;
   wherein said complementary scent is selected from the group consisting of soy-sauce, anchovy, sardine, pretzel, cheese, popcorn, bullion, bacon, nut, olive, caper-like scent, and any combination thereof.

21. The beverage and packaging of claim 20 wherein said nut scent is selected from the group of almond, hazelnut, macadamia, peanut, pecan, pistachio, chestnut, walnut, and any combination thereof.

22. The beverage and packaging of claim 1 wherein said component of packaging comprises a scent insert.

23. The beverage and packaging of claim 1 wherein at least one wall of said compartment is plastic and wherein said at least one wall includes said aromatic material.

24-26. (canceled)

27. A beverage and packaging comprising:
   a container configured for holding said beverage;
   said beverage comprising an ingredient that has a characteristic taste;
   wherein said container is in fluid communication with a dispense opening configured to provide said beverage to a consumer;
   a headspace region contained within said container between said dispense opening and said beverage;
a component of packaging comprising aromatic material; wherein said component of packaging is configured to release a portion of said aromatic material as an aromatic gas to a compartment; wherein said compartment is in gaseous communication with a vent opening; wherein said vent opening is configured to provide said aromatic gas to a consumer; wherein said aromatic gas has a complementary scent to said characteristic taste; wherein said compartment and said headspace are not in gaseous communication with each other.

28. The beverage and packaging of claim 27 wherein the compartment is part of a cap.

29. The beverage and packaging of claim 28 wherein said cap comprises threads; wherein said threads are configured to permit a consumer to rotate said cap.

30. The beverage and packaging of claim 29 wherein the packaging is configured such that rotation of the cap initiates contact between a top portion of said container and a wall of said compartment of the cap; wherein said wall is configured such that said contact provides a deforming stress to said wall; wherein the aromatic material is configured such that the deforming stress enhances the release of said aromatic material.

31-37. (canceled)

38. A beverage and packaging comprising: a container having said beverage disposed therein; said beverage comprising an ingredient that possesses a characteristic taste; a cap comprising a dispensing hole in fluid communication with said beverage; wherein a headspace compartment is defined within said container between said dispensing hole and said beverage; a scent insert; wherein said scent insert is configured for venting gas to said headspace; wherein said gas possess a complementary scent to said characteristic taste.

39. The beverage and packaging of claim 38 wherein the cap further comprises a rim and threads; wherein said threads are configured for rotatable mounting of said cap upon said container; wherein said rim and said scent insert are configured such that rotation of the cap compresses said scent insert.

40. The beverage and packaging of claim 39 wherein the scent insert is configured such that compression of the scent insert enhances a rate of venting gas to said headspace.

41. The beverage and packaging of claim 39 wherein the rotatable mounting of said cap is configured such that the cap may be rotated for a plurality of revolutions; wherein each revolution among said plurality of revolutions results in compression of said scent insert.

42. The beverage and packaging of claim 39 wherein the scent insert comprises a covering; wherein the scent insert is configured such that selected compression of said scent insert will puncture said covering.

43. The beverage and packaging of claim 42 wherein the scent insert is configured such that said puncturing of the covering initiates release of scent for a predetermined time period.

44-59. (canceled)