

DISPENSING CLOSURE FOR CONTAINER**FIELD OF INVENTION**

5 The present invention generally relates to a dispensing closure and more particularly to a dispensing closure for a container, enabling at least one substance to be dispensed and mixed with other substance within the container.

BACKGROUND OF INVENTION

10 The concept of a container closure which includes a capsule for storing material separate from the container for the purpose of selectively mixing the material with the contents of the container is known in the art. Protein powders, energy mixes, supplements or other nutritional products are examples of materials frequently used in conjunction with common food articles to promote a healthy lifestyle. However, foods, beverage, nutritional supplements, nutraceuticals, drugs,
15 cosmetics, and chemicals which are frequently supplied in liquid, powder, paste or other forms do not retain their stability, strength and effectiveness for long after they have been mixed, either in solution or suspension. This incompatibility after mixing therefore mandates that the product be utilized relatively soon after mixture to prevent deterioration, discoloration, interactions and the like. It is also important that
20 admixtures of various ingredients be done under conditions wherein it can be assured that a measured amount of one ingredient is added to a measured amount of one or more ingredients, to ensure that the desired results are obtained.

25 Another concern involves the merchandising of certain products. Some products are, by their nature, required to be used by the consumer shortly after their manufacture and mixture as they lose certain desirable characteristics within a short period of time. Yet the product can be stored for extended periods of time if one ingredient is maintained separate from the other, and the two ingredients only mixed together to form the desired product shortly before use. In marketing such goods, it
30 obviously is desirable that both ingredients be sold as part of the same container rather than two or more companion ingredients in separate containers be supplied to the consumer. Thus from an aesthetic as well as handling standpoint, it is desirable that just a single container be utilized for maintaining the separation of such ingredients.

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The use of conventional liquid containers such as plastic bottles for carrying water, juices, power drinks or other desirable liquids for human consumption is known. There are, however, several non-active and active substances such as activated oxygen, vitamins, minerals, herbs, nutrients or flavouring that would be desirable to be added to these desirable liquids such as water, juices or other beverages to give the consumer added benefits, particularly those useful for the health of the consumer. Many of the substances, however, that provide additional benefits when mixed into another liquid have short shelf lives and are likely to discolour, interact or degrade quickly when combined with liquids or other substances. Therefore, many desirable liquids are currently sold without the added beneficial ingredient.

One method employed to provide such results is utilizing a container having two capsules in which two ingredients may be stored separately until it is desired to mix them, at which time it is possible to establish communication between the capsules so that the separated ingredients may move from one capsules to the other. It is known in the art to provide dispensers containing a concentrate of soluble materials to a fixed quantity of solute, usually water, for dispensing. Thus, the prior art teaches containers for beverages wherein the interior of the container is divided into a capsule having a basic ingredient and a capsule which can be ruptured so as to mix within the container the basic ingredient and some form of modifier, diluent or flavoring. The reason for this prior art container is to provide the mixing action at the time of consumption since prior mixing would have adverse effects. The basic ingredient is often not suitable for consumption by itself and requires mixing with a diluent / modifier prior to consumption.

U.S. Pat. No. 7, 017, 735 B2 discloses a cap for use with a container which includes a ring member. A capsule extends through an opening that is substantially centered on the recess portion of a closure ring of the container. A plunger is provided on an interior wall of the capsule. The capsule contains a substance, such as water-dispersible liquid. The container having a main chamber and a mouth stores and serves a beverage. The main chamber is filled with a single strength beverage and the capsule is filled with water dispersible liquid. The capsule is placed in the mouth of the container contiguous to the main chamber, with the

capsule being openable to inject the water-dispersible liquid in the single strength beverage in the main chamber in response to manual manipulation of the capsule.

5 WO/2005/081732 discloses an instant drink bottle which includes a body closed by cap, with liquid and a capsule with an ingredient such as flavouring agent, a colour, a preservative, vitamin or drug. The cap and capsule co-operate so that when the cap is manipulated by the user, an opening is formed in the capsule thereby releasing the ingredient into the liquid.

10 WO/2006/115506 discloses a mixing cap and method for use thereof, wherein the mixing cap is preferably pre-loaded during manufacture with a selected dry or liquid ingredient to facilitate consumer use. The mixing cap has an apertured inner tube to the mouth of a bottle and an outer housing co-operatively engaged to the inner tube and slidably restricted thereover via a flange arrangement. Preloaded
15 ingredients contained within the outer housing may be introduced or discharged into the bottle by simply depressing the outer housing over the inner tube, permitting the ingredients to flow through the apertures of the inner tube and into the liquid contents of the bottle. The combined ingredients and liquid within the bottle may subsequently be shaken without fear or risk of leakage or spillage.

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WO/2006/052827 discloses a dispenser comprising a housing that has a removable tamper-proof protective cap and tamper-proof ring and is threaded to a container. The container, which is the main package, holds a supplemental component. The housing holds the first component into a plunger-type chamber in a
25 fully retracted position and is sealed from the supplemental component. The chamber has a delivery end that is closed before use. When pushed all the way in, the chamber's delivery end becomes open and delivers the first compartment into the main package.

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It is known that bottled drinks with bioactive extracts are usually added with preservative to avoid microbial growth. However, adding preservative will give an unhealthy perspective. Hence, the usage of preservative can be avoided by the use of the dispensing closure of the present invention.

It is also known that bioactive extracts are easily degraded in water or liquid. By using a novel dispensing closure of the present invention, the shelf life for the products will be extended.

5 The present invention provides a novel dispensing closure that can be conveniently used whereby premix can be made easily prior to consumption. Accordingly, different ingredient can be kept in different storage members or vials before mixing into a drink. This will also allow on-the-spot premix, which will maintain the freshness of the beverage.

10 Moreover, the use of the novel dispensing closure enhances the logistics of the beverage where transportation of water can be avoided. Accordingly, the ingredients can be kept in the dispensing closure for transportation, whereas water or liquid can be sourced locally.

15 Furthermore, the present invention provide a novel dispensing closure that is easy to use and can be conveniently activated, in a highly sanitary manner, upon manual manipulation by consumer. The present invention uses a minimum number of parts, which renders it simple to manufacture and assemble.

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SUMMARY OF INVENTION

25 The present invention relates to a dispensing closure assembly for a container that permits a substance contained within a sealed capsule to be dispensed and mixed with other substance content contained within the container. Said dispensing closure assembly includes a) an activating member consisting of a closure cap disposed with at least one plunger; b) at least one storage member that contains substance; and c) a dispensing chamber having a cavity to receive activating member, and at least one receiving chamber with an unsealing means to accommodate the storage member.

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Accordingly, the activating member is adapted to be rotated into position where the at least one plunger is alignable with at least one receiving chamber and is pressable to urge the at least one storage member against the unsealing means to discharge the substance contained in the storage member into the container, and

the dispensing chamber is securely engageable with mouth opening of the container.

Accordingly, the activating member is rotatable, but not dislocateable from the dispensing chamber. The activating member includes at least one engraved slot in communication with at least one protruding member disposed at inner side wall of the cavity. The activating member may alternatively includes at least one bounce means extending radially downwards from distal end of inner peripheral side wall of the closure cap.

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Accordingly, at least one plunger is a downward projection member off the central axis of the closure cap. Preferably, the least one plunger is configured at underside of roof of the closure cap or alternatively connected to side portion of inner wall of the closure cap by an extended member. Said least one plunger is alternatively an elongated member with actuating member disposed at bottom end of the elongated member.

Accordingly, the elongated member extends downwardly at predetermined distance from the central axis of the closure cap. The elongated member is configured at underside of roof of the closure cap or alternatively connected to side portion of inner wall of the closure cap by the extended member.

Accordingly, the substance can be a flowable material, or tablet, or capsule. The substance can also be a flavouring, colouring, activated oxygen, health supplements, vitamins, herbs, drug, nutrients or minerals, probiotics, botanicals, or micro-organisms.

Accordingly, at least one storage member is a vial. The vial can be a cylindrical capsule with a sealing layer sealed at its opening end. Preferably, said vial can be of different predetermined volumetric size. Accordingly, the sealing layer is frangible membrane.

Accordingly, the vial is provided with at least one projecting annular rib disposed along outer surface of the cylindrical capsule. Said at least one projecting annular rib is slideably engageable with predetermined groove disposed at inner

surface of the receiving chamber and to hold the vial into position. The vial also provided with a seal ring disposed at its outer surface to prevent liquid content or condensation of the liquid content from the container to enter into cavity of the dispensing chamber. Preferably, the seal ring is an air or water tight seal.

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Accordingly, the at least one storage member can also be a flexible pouch wherein the flexible pouch is a flexible membrane.

Accordingly, the at least one receiving chamber is alternatively provided with
10 fins disposed along its inner wall surface to prevent liquid content or condensation of the liquid content from the container to enter into cavity of the dispensing chamber. The fins also serve as a retaining means to prevent flexible pouch from sliding down to lower portion of the receiving chamber during inactivate condition.

15 Accordingly, the unsealing means is a projection tip. The unsealing means further includes outwardly extended radial projections at its lower portion defining a passageway to permit the substance from the at least one storage member to be discharged into the container.

20 Accordingly, the unsealing means is a hollow conduit with incline cutoff portion defining a sharp edge at its end top portion. The hollow conduit has a predetermined outer cross-sectional length that is marginally smaller than inner cross-sectional length of the vial. The hollow conduit permits the substance from storage member to be discharged into the container upon fracture or punctual of the
25 sealing layer or flexible membrane.

Accordingly, the dispensing chamber is threadably secure and/or snap fit enlargeable with various mouth opening of the container. The dispensing chamber is further provided with a tamper proof ring frangible connected to a bottom portion of
30 the outer skirt of dispensing chamber.

Accordingly, the tamper proof ring is detachably engaged to the mouth opening of the container.

- In accordance with present invention, a method of dispensing a substance from a dispensing closure assembly into a container, comprising a) rotating an activating member to align at least one plunger with at least one storage member; b) applying force against the activating member to urge against the at least one storage member; and c) unsealing the at least one storage member.

BRIEF DESCRIPTION OF DRAWINGS

- The drawings constitute part of this specification and include an exemplary or preferred embodiment of the invention, which may be embodied in various forms. It should be understood, however, that the disclosed preferred embodiments are merely exemplary of the invention. Therefore, the figures (not to scale) disclosed herein are not to be interpreted as limiting, but merely as the basis for the claims and for teaching one skilled in the art of the invention.

- In the appended drawings:

- FIG. 1** is an exploded fragmentary perspective view of a dispensing closure constructed in accordance with one mode of the present invention;
- FIG. 2a** is an exploded fragmentary side view of **FIG. 1**;
- FIG. 2b** is a see-through side view of **FIG. 2a**;
- FIG. 3a** is a top view of the dispensing closure of the preferred embodiment;
- FIG. 3b** is a partial cross-sectional side view illustrating the upper part portion of the dispensing closure engaging with the lower part portion of the cap;
- FIG. 3c** is a cross-sectional side view of the assembled dispensing closure showing a condition where an activating member is rotated and aligned with a vial;
- FIG. 3d** is a see-through side view of the assembled dispensing closure showing a condition where the activating member is pressed into the dispensing chamber and the sealing layer of the vial severed;
- FIG. 4** is an exploded fragmentary perspective view of a multi-capsule dispensing closure constructed with bounce means in accordance with another mode of the present invention;
- FIG. 5a** is an exploded fragmentary side view of **FIG. 4**;
- FIG. 5b** is a see-through side view of **FIG. 5a**;
- FIG. 6** illustrates a top view and auxiliary cross-sectional views of the multi-capsule dispensing closure of another preferred embodiment;
- FIG. 7** is a see-through side view of an assembled multi-capsule dispensing closure;

FIG. 8 is an exploded fragmentary perspective view of a multi-capsule dispensing closure constructed without bounce means in accordance with another mode of the present invention;

FIG. 9a is an exploded fragmentary side view of **FIG. 8**;

5 **FIG. 9b** is a see-through side view of **FIG. 9a**;

FIG. 10 illustrates a top view and auxiliary cross-sectional views of the multi-capsule dispensing closure of the embodiment shown in **FIG. 8**;

FIG. 11 is a see-through side view of an assembled multi-capsule dispensing closure;

10 **FIGS. 12a – 13b** are partial cross-sectional side views of the dispensing closure illustrating a possible mode of the plunger disposed at the activating member;

FIG. 14a is a partial cross sectional side view of the dispensing closure illustrating a dispensing chamber provided with a tamper-proof ring;

15 **FIG. 14b** is a side view of the dispensing closure of **FIG. 14a**, illustrating the dispensing chamber provided with the tamper-proof ring;

FIG. 15 is an enlarged perspective view of the vial with a seal ring;

FIG. 16a is a cross-sectional side view of the dispensing closure illustrating a receiving chamber provided with fins disposed along its inner wall surface;

20 **FIG. 16b** is an enlarged cross-sectional side view of the receiving chamber of **FIG. 16a**;

FIG. 17 is an enlarged cross-sectional perspective view of the receiving chamber showing a position where the vial is being urged against unsealing means.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

25 Detailed description of preferred embodiments of the invention is disclosed herein. It should be understood, however, that the embodiments are merely exemplary of the invention, which may be embodied in various forms. Therefore, the details disclosed herein are not to be interpreted as limiting, but merely as the basis for the claim and for teaching one skilled in the art of the invention. The numerals in
30 the diagrams refer to features of the same description in different embodiments, although the features may vary in configuration.

Referring to **FIGS. 1 – 3d**, a dispensing closure assembly (10) is disclosed in accordance with one mode of the present invention. The dispensing closure

assembly (10) collectively comprises an activating member (12a), a storage member (14), and a dispensing chamber (16).

5 The dispensing closure assembly (10) can be used with a container (not shown) of any type, for example, bottled water, sports drinks or other flowable bottled substances. Said dispensing closure assembly (10) is particularly suited for use with containers having a liquid that is to be mixed with a consumable flowable material, tablet, or capsule including, but not limited to, liquids, powders, pastes, crystals or tablets by a consumer at the time of consumption. It will be appreciated
10 that the dispensing closure assembly (10) is adapted for use with various mouth openings of a container, in which case, for example, a different thread or snap fit configuration can be used.

The activating member (12a) generally includes a closure cap (13a) having
15 at least one plunger (13b) disposed at under portion of roof of the closure cap (13a). Accordingly, the plunger (13b) is a downward projection member that is positioned at a predetermined distance from the central axis of the closure cap (13a). Preferably, said plunger (13b) is configured at underside of the roof of the closure cap (13a) (FIG. 12a). Alternatively, the plunger (13b) may be connected to side
20 portion of inner wall of the closure cap (13a) by an extended member (13d) (FIG. 12b).

The plunger (13b) may be replaced by an elongated member (11a) with
25 actuating member (11b) disposed at bottom end of the elongated member (11a) (FIG. 13a). Said elongated member (11a) is extending downwardly at predetermined distance from central axis of the closure cap (13a). Accordingly, the elongated member (11a) is configured at underside of the roof of the closure cap (13a). Alternatively, the elongated member (11a) may be connected to side portion of inner wall of the closure cap (13a) by the extended member (13d) (FIG. 13b). The
30 actuating member (11b) can be of any geometrical plate form configured at bottom end of the elongated member (11a). It will be appreciated that the plunger (13b) or elongated member (11a) can be of solid or hollow type body.

Outer peripheral side wall of the closure cap (13a) is provided with engraved
35 slots (13c). The engraved slots (13c) are in communication with protruding members

(19) disposed at a predefined position or positions on inner side wall of cavity (17a). Accordingly, said engraved slots (13c) enable the activating member (12a) to be snap-fitted into the protruding members (19) and matingly engaged with the cavity (17a). The engraved slots (13c) permit the activating member (12a) to be rotated
5 into desired position and pressed downwardly. In particular, engagement of engraved slots (13c) and protruding members (19) enable plunger (13b) of the activating member (12a) to be rotated into position to align with receiving chamber (17b) and in contact with the storage member (14).

10 The storage member (14) is accommodatable within the receiving chamber (17b). Said storage member (14) can be of, but is not limited to, a vial or flexible pouch. In accordance with the preferred embodiment, the vial is of a cylindrical capsule with a sealing layer (15) sealed at its opening end, and with outwardly projecting annular ribs (14a) disposed along the outer surface of the vial (FIGS. 15
15 and 17). The projecting annular ribs (14a) are slideably engageable with predetermined groove (17c) disposed at inner surface of the receiving chamber (17b) and to hold the vial into position. The vial is further provided with a seal ring (20) disposed at its outer surface to prevent liquid content or condensation of the liquid content from the container to enter into the cavity (17a) of the dispensing
20 chamber (16). Preferably, the seal ring (20) is an air or water tight seal.

The vial may contain substance for example, a flowable material, or tablet, or capsule such as in liquid, powder, paste, crystal or table form. Said substance may optionally include, but not limited to, flavouring, colouring, activated oxygen, health
25 supplements, vitamins, herbs, drug, nutrients or minerals, probiotics, botanicals, or micro-organisms. Preferably, the vial can be of different predetermined volumetric size for different quantity of substance. It will be appreciated that the vial has an open bottom end which is sealed by a sealing layer (15). The sealing layer (15) is preferably made of, but not limited to, frangible membrane such as a foil laminate
30 seal enclosed at the open bottom end of the vial.

If desired, the vial can be replaced by a flexible pouch (not shown) which comprises a flexible membrane to accommodate the substance. The substance in the flexible pouch will be discharged into the container upon fracture or punctual of
35 flexible membrane.

The dispensing chamber (16) has a cavity (17a) to receive the activating member (12a). It is to be noted that the activating member (12a) is rotatable, but not dislocateable from the dispensing chamber (16). Inner side wall of the cavity (17a) is provided with protruding member (19) at a predefined position to communicate with the engraved slots (13c) of the activating member (12a). Accordingly, said activating member (12a) is adapted to be snap-fitted into the cavity (17a) and in communication with the protruding member (19) as mentioned above. The dispensing chamber (16) is further provided with a receiving chamber (17b) extending from base (24) of the cavity (17a) to accommodate the storage member (14), i.e. either vial or flexible pouch. Said receiving chamber (17b) has preferably an upper guide portion to guide the introduction of the storage member (14) into position into the receiving chamber (17b). The receiving chamber (17b) may alternatively be provided with fins (17d) disposed along its inner wall surface (FIGS. 16a – 16b). Said fins (17d) prevent liquid content or condensation of the liquid content from the container to enter into cavity (17a) of the dispensing chamber (16). It will be appreciated that the fins (17d) may also serve as a retaining means to prevent the storage member (14) from sliding down to the lower portion of the receiving chamber (17b) when it is in a rest position. The receiving chamber (17b) further includes unsealing means (18) disposed at its lower portion.

The unsealing means (18) terminates in sharp upward projection tips (18a), and having plurality of outwardly extended radial projections (18b) at its lower portion defining a passageway to permit the substance from the storage member (14) to be discharged into the container upon fracture or puncture of the sealing layer (15), or upon fracture or punctual of the flexible membrane if the flexible pouch is used as storage member (14). It is to be noted that the unsealing means (18) can be of, but not limited to a hollow conduit (25) with incline cutoff portion (27) defining a sharp edge (29) at its end top portion (FIG. 17).

By a way of example, but not by the way of limitations, it will be noted that the hollow conduit (25) has a predetermined cross-section length that is marginally smaller than the inner cross-sectional length of the vial (in the event that the vial is used as storage member (14)). Said hollow conduit (25) permits the substance from the vial to be discharged upon fracture or punctual of the sealing layer (15). In the

event that the vial is replaced by the flexible pouch, the hollow conduit (25) permits the substance from the flexible pouch to be discharged through the conduit upon fracture or punctual of the flexible membrane.

5 The dispensing chamber (16) further includes an outer skirt (21) having a container-engaging member (21a) extending from internal surface of the outer skirt (21) (FIG. 14a). Said container-engaging member (21a) is optionally provided with internal thread. The internal thread is adapted to be securely engageable with the mouth opening of the container. It will be appreciated that the dispensing chamber
10 (16) may also be adapted to engage with various mouth opening of the container, for example, a protruded snapping rib or snap fit engagement may be used (not Shown). It will be appreciated that a tamper-proof ring (22) may be provided and is frangibly connected to a bottom portion of the outer skirt (21) of the dispensing chamber (16) (FIGS. 14a – 14b). Said tamper proof ring (22) is detachably engaged
15 to the mouth opening of the container.

In use, the dispensing closure assembly (10) is activated by turning and pressing actions. The dispensing closure assembly (10) is first manipulated by a consumer by rotating the activating member (12a) to locate the plunger (13b) in
20 alignment with the receiving chamber (17b). Particularly, the plunger (13b) of the activating member (12a) is rotated into position aligned with the receiving chamber (17b). It will be appreciated that the plunger (13b) is of configuration matingly engageable with upper portion opening of the receiving chamber (17b). Accordingly, the plunger (13b) can be partially inserted into the receiving chamber (17b) of the
25 dispensing chamber (16) when the activating member (12a) is being urged.

Force is applied against the activating member (12a) to urge against the storage member (14), i.e. the vial. Accordingly, the plunger (13b) of the activating member (12a) is pressed into contact with the vial, urging the vial downwardly
30 towards the unsealing means (18) to unseal the sealing layer (15). The unsealing means (18) permits the substance from within the vial to flow into the container through the hollow conduit (25) upon fracture or punctual of the sealing layer (15).

In the event that the vial is replaced by the flexible pouch, force is applied
35 against the activating member (12a) to urge against the flexible pouch. Accordingly,

the activating member (12a) is pressed into contact with the flexible pouch, urging the flexible pouch downwardly towards the unsealing means (18). The unsealing means (18) permits the substance from within the flexible pouch to flow into the container through the hollow conduit (25) upon fracture or punctual of the flexible membrane.

Referring now to **FIGS. 4 – 7**, a multi-capsule dispensing closure assembly (50) configured with bounce means (55) in accordance with another mode of the present invention is shown. The multi-capsule dispensing closure assembly (50) collectively comprises an activating member (12b), a plurality of storage members (14), and a dispensing chamber (16) with a plurality of receiving chambers (17b).

The activating member (12b) includes a closure cap (13a) having at least one plunger (13b) disposed at under-portion of the roof of the closure cap (13a). Similarly, the at least one plunger (13b) is a downward projection member which is positioned at a predetermined distance from the central axis of the closure cap (13a). Said at least one plunger (13b) is preferably configured at underside of the roof of the closure cap (13a) (**FIG. 12a**). Alternatively, the at least one plunger (13b) may be connected to side portion of inner wall of the closure cap (13a) by extended member (13d) similar to that shown in **FIG. 12b**.

The at least one plunger (13b) may be replaced by at least one elongated member (11a) with actuating member (11b) disposed at bottom end of the elongated member (11a) (**FIG. 13a**). Said at least one elongated member (11a) extends downwardly at a predetermined distance from the central axis of the closure cap (13a). Accordingly, the at least one elongated member (11a) is configured at underside of the roof of the closure cap (13a). Alternatively, the at least one elongated member (11a) may be connected to side portion of inner wall of the closure cap (13a) by the extended member (13d) similar to that shown in **FIG. 13b**. The actuating member (11b) can be of any geometrical plate form configured at bottom end of the elongated member (11a). It will be appreciated that the at least one plunger (13b) or the at least one elongated member (11a) can be a solid or hollow type body.

Outer peripheral side wall of the closure cap (13a) is provided with engraved slots (13c). The engraved slots (13c) are in communication with protruding members (19) disposed at predefined position on inner side wall of cavity (17a). Accordingly, said engraved slots (13c) enable the activating member (12b) to be snap-fitted into the protruding members (19) and matingly engaged with the cavity (17a). The engraved slots (13c) permit the activating member (12b) to be rotated either clockwise or counter-clockwise into desired position and pressed downwardly. In particular, engagement of engraved slots (13c) and protruding members (19) enable plunger (13b) of the activating member (12b) to be rotated into position to align with receiving chamber (17b) and into contact with the storage members (14).

It is to be noted that the closure cap (13a) is provided with plurality of bounce means (55) preferably disposed at its inner peripheral side wall. Particularly, the bounce means (55) extend radially downwardly from distal end of inner peripheral side wall of the closure cap (13a). The bounce means (55) permit the activating member (12b) to bounce back into initial position when the activating member (12b) is released after being pressed. Accordingly, when the at least one plunger (13b) of the activating member (12b) rotates into position aligned with one or more of the receiving chamber(s) (17b), the activating member (12b) forces downwardly and urges one or more of the storage member(s) (14) toward unsealing means (18). The bounce means (55) acts as a spring to rebound the activating member (12b) into initial position and ready for the consumer to turn the activating member (12b) into another position aligned with the other receiving chamber (17b).

Similar to the first mode of the present invention, the storage member (14) is accommodated fully or partially within receiving chamber (17b). Said storage member (14) can be of, but not limited to a vial or flexible pouch. In accordance with the preferred embodiment, the vial is accommodated within each receiving chamber (17b). In this case, the different substances may be contained in different vials for selective dispensing into the container. The vials and contents therein are as per description alluded to earlier in this description. If desired, the vial can be replaced by flexible pouch (not shown) which comprises flexible membrane to accommodate the substance. The substance in the flexible pouch will be discharged into the container upon fracture of flexible membrane.

The dispensing chamber (16) of the multi-capsule dispensing closure assembly (50) also has a cavity (17a) to receive the activating member (12b). Accordingly, the activating member (12b) is adapted to be securely fitted into the cavity (17a). It is to be noted that the activating member (12b) is rotatable, but not
5 dislocateable from the dispensing chamber (16). The dispensing chamber (16) is further provided with plurality of receiving chambers (17b) extending from base (24) of the cavity (17a) to accommodate different substance contained in the storage member (14), i.e. either vial or flexible pouch. Said plurality of receiving chambers (17b) is provided with an upper guide portion to guide the introduction of the storage
10 member (14) into position into the receiving chamber (17b). The plurality of receiving chambers (17b) may be alternatively provided with fins (17d) disposed along its inner wall surface (FIG. 16a - 16b). Said fins (17d) enable to prevent liquid content or condensation of the liquid content from the container to enter into cavity (17a) of the dispensing chamber (16). It will be appreciated that the fins (17d) may also
15 serve as a retaining means to prevent the storage member (14) from sliding down to lower portion of the receiving chamber (17b) when it is in a rest position. Each receiving chamber (17b) further includes unsealing means (18) at its lower portion.

The dispensing chamber (16) of the multi-capsule dispensing closure
20 assembly (50) also includes an outer skirt (21) having a container-engaging member (21a) extending from internal surface of the outer skirt (21) (FIG. 14a). Said container-engaging member is optionally provided with internal thread. The internal thread is adapted to be securely engageable with the mouth opening of the container. It will be appreciated that the dispensing chamber (16) may also be
25 adapted to engage with various mouth opening of the container, for example, a protruded snapping rib or snap fit engagement may be used. Similarly, tamper proof ring (22) may be provided and is frangible connected to a bottom portion of the outer skirt (21) of dispensing chamber (16) (FIGS. 14a - 14b). Accordingly, said tamper
proof ring (22) is detachably engaged to the mouth opening of the container.

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FIGS. 8 - 11 show another variation of a multi-capsule dispensing closure assembly (60). This variation of multi-capsule dispensing closure assembly (60) is similar to that multi-capsule dispensing closure assembly (50) as mentioned above but without the bounce means (55). This variation of multi-capsule dispensing
35 closure assembly (60) allows the consumer to rotate the activating member (12c)

either clockwise or counter-clockwise to locate the at least one plunger (13b) in alignment with one or more of the selected vial(s) or flexible pouch(s). The activating member (12c) is then pressed downwardly to urge one or more of the vial(s) or flexible pouch(s) toward unsealing means (18). This multi-capsule dispensing closure assembly (60) is made only for one turning and pressing actions.

It will be appreciated that the multi-capsule dispensing closure assembly (50, 60) can also be used with containers of any type such as bottle water, sport drinks or other flowable bottled substances. Said dispensing closure assembly (50, 60) is particularly suited for use with containers having a liquid that is to be mixed with a consumable flowable material, tablet, or capsule including, but not limited to, liquids, powders, pastes, crystals or tablets by a consumer at time of consumption. It will also be appreciated that the dispensing closure assembly (50, 60) is adapted for use with various mouth openings of the container, in which case, for example, a different thread or snap fit configuration can be used.

In general, the multi-capsule dispensing closure assembly (50, 60) is activated by turning and pressing actions. The multi-capsule dispensing closure assembly is first manipulated by the consumer by rotating the activating member (12b, 12c) to locate the at least one plunger (13b) in alignment with one or more of selected vial(s) or flexible pouch(s). Particularly, the at least one plunger (13b) of the activating member (12b, 12c) is rotated into position aligned with one or more of selected receiving chamber(s) (17b). It will be appreciated that the plunger (13b) is of configuration matingly engageable with upper portion opening of the receiving chamber (17b). Accordingly, the plunger (13b) can be partially inserted into the receiving chamber (17b) of the dispensing chamber (16) when the activating member (12b, 12c) is being urged.

Force is applied against the activating member (12b, 12c) to urge against the vial. Accordingly, the at least one plunger (13b) of the activating member (12b, 12c) is pressed in contact with one or more of the selected vial(s), urging the selected vial(s) downwardly towards the unsealing means (18) to unseal the sealing layer (15). The unsealing means (18) permits the substance from within the selected vial(s) to flow into the container through the hollow conduit (25) upon fracture or punctual of the sealing layer (15).

In the event that the vial is replaced by the flexible pouch, force is applied against the activating member (12b, 12c) to urge against the flexible pouch. Accordingly, the activating member (12b, 12c) is pressed in contact with the flexible
5 pouch, urging the flexible pouch downwardly towards the unsealing means (18). The unsealing means (18) permits the substance from within the flexible pouch to flow into the container through the hollow conduit (25) upon fracture or punctual of the flexible membrane.

10 For the multi-capsule dispensing closure assembly (50) with bounce means (55), the bounce means (55) permit the activating member (12b) to be bounced back into initial position when the activating member (12b) is pressed and released. Accordingly, when the at least one plunger (13b) of the activating member (12)
15 activating member (12b) forces downwardly and urges at least one of the vial or flexible pouch toward unsealing means (18). The bounce means (55) which acts as a spring to rebound the activating member (12) into initial position ready for the consumer to turn the activating member (12) into other position aligned with other receiving chamber (17b).

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For the multi-capsule dispensing closure assembly (60) without bounce means (55), it permits activating member (12c) to be rotated either clockwise or counter-clockwise to locate the at least one plunger (13b) in alignment with one or more of the selected vial(s) or flexible pouch(s) and force is applied downwardly
25 against the activating member (12c) to urge one or more of the vial(s) or flexible pouch(s) toward unsealing means (18) to discharge substance therewithin into the container. The multi-capsule dispensing closure assembly (60) permits only for one turning and pressing actions.

30 While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation and various changes may be made without departing from the scope of the invention.

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CLAIMS

1. A dispensing closure assembly for a container that permits a substance contained within a sealed capsule to be dispensed and mixed with other substance content contained within the container characterized in that the dispensing closure assembly includes:-
- 5 a) an activating member (12) consisting of a closure cap (13a) disposed with at least one plunger (13b);
- b) at least one storage member (14) that contains substance; and
- 10 c) a dispensing chamber (16) having a cavity (17a) to receive activating member (12), and at least one receiving chamber (17b) with an unsealing means (18) to accommodate the storage member (14);
- 15 wherein the activating member (12) is adapted to be rotated into position where the at least one plunger (13b) is alignable with at least one receiving chamber (17b) and is pressable to urge the at least one storage member (14) against the unsealing means (18) to discharge the substance contained in the storage member (14) into the container; and
- 20 wherein dispensing chamber (16) is securely engageable with mouth opening of the container.
2. A dispensing closure assembly according to Claim 1, wherein the activating member (12) is rotatable, but not dislocateable from the dispensing chamber (16).
- 25 3. A dispensing closure assembly according to Claim 1, wherein least one plunger (13b) is a downward projection member off the central axis of the closure cap (13a).
4. A dispensing closure assembly according to Claim 1, wherein least one plunger (13b) is configured at underside of roof of the closure cap (13a).
- 30 5. A dispensing closure assembly according to Claim 1, wherein least one plunger (13b) is alternatively connected to side portion of inner wall of the closure cap (13a) by an extended member (13d).
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6. A dispensing closure assembly according to Claim 1, wherein least one plunger (13b) is alternatively an elongated member (11a) with actuating member (11b) disposed at bottom end of the elongated member (11a).
- 5 7. A dispensing closure assembly according to Claim 6, wherein the elongated member (11a) extends downwardly at predetermined distance from the central axis of the closure cap (13a).
8. A dispensing closure assembly according to Claim 6, wherein the elongated member (11a) is configured at underside of roof of the closure cap (13a).
- 10 9. A dispensing closure assembly according to Claim 6, wherein the elongated member (11a) is alternatively connected to side portion of inner wall of the closure cap (13a) by the extended member (13d).
- 15 10. A dispensing closure assembly according to Claim 1, wherein the activating member (12) includes at least one engraved slot (13c) in communication with at least one protruding member (19) disposed at inner side wall of the cavity (17a).
- 20 11. A dispensing closure assembly according to Claim 1, wherein the activating member (12) alternatively includes at least one bounce means (55) extending radially downwards from distal end of inner peripheral side wall of the closure cap (13a).
- 25 12. A dispensing closure assembly according to Claim 1, wherein the substance is a flowable material, or tablet, or capsule.
13. A dispensing closure assembly according to Claim 1, wherein the substance is flavouring, colouring, activated oxygen, health supplements, vitamins, herbs, drug, nutrients or minerals, probiotics, botanicals, or micro-organisms.
- 30 14. A dispensing closure assembly according to Claim 1, wherein at least one storage member (14) is a vial.

15. A dispensing closure assembly according to Claim 14, wherein the vial is a cylindrical capsule with a sealing layer (15) sealed at its opening end.
16. A dispensing closure assembly according to Claim 14, wherein the vial can be of
5 different predetermined volumetric size.
17. A dispensing closure assembly according to Claim 14, wherein the sealing layer (15) is frangible membrane.
- 10 18. A dispensing closure assembly according to Claim 14, wherein the vial is provided with at least one projecting annular rib (14a) disposed along outer surface of the cylindrical capsule.
- 15 19. A dispensing closure assembly according to Claim 18, wherein at least one projecting annular rib (14a) is slideably engageable with predetermined groove (17c) disposed at inner surface of the receiving chamber (17b) and to hold the vial into position.
- 20 20. A dispensing closure assembly according to Claim 14, wherein the vial is provided with a seal ring (20) disposed at its outer surface to prevent liquid content or condensation of the liquid content from the container to enter into cavity (17a) of the dispensing chamber (16).
- 25 21. A dispensing closure assembly according to Claim 20, wherein the seal ring (20) is an air or water tight seal.
22. A dispensing closure assembly according to Claim 1, wherein at least one storage member (14) is a flexible pouch.
- 30 23. A dispensing closure assembly according to Claim 22, wherein the flexible pouch is a flexible membrane.
24. A dispensing closure assembly according to Claim 1, wherein at least one receiving chamber (17b) is alternatively provided with fins (17d) disposed along its

inner wall surface to prevent liquid content or condensation of the liquid content from the container to enter into cavity (17a) of the dispensing chamber (16).

25. A dispensing closure assembly according to Claim 24, wherein the fins (17d)
5 also serve as a retaining means to prevent flexible pouch from sliding down to lower portion of the receiving chamber (17b) during inactivate condition.

26. A dispensing closure assembly according to Claim 1, wherein the unsealing
10 means (18) is a projection tip (18a).

27. A dispensing closure assembly according to Claim 1, wherein the unsealing
means (18) further includes outwardly extended radial projections (18b) at its lower
portion defining a passageway to permit the substance from the at least one storage
member (14) to be discharged into the container.

15 28. A dispensing closure assembly according to Claim 1, wherein the unsealing
means (18) is a hollow conduit (25) with incline cutoff portion (27) defining a sharp
edge (29) at its end top portion.

20 29. A dispensing closure assembly according to Claim 28, wherein the hollow
conduit (25) has a predetermined outer cross-sectional length that is marginally
smaller than inner cross-sectional length of the vial.

25 30. A dispensing closure assembly according to Claim 28, wherein the hollow
conduit (25) permits the substance from storage member (14) to be discharged into
the container upon fracture or punctual of the sealing layer (15) or flexible
membrane.

30 31. A dispensing closure assembly according to Claim 1, wherein the dispensing
chamber (16) is threadably secure and/or snap fit enlargeable with various mouth
opening of the container.

35 32. A dispensing closure assembly according to Claim 1, wherein the dispensing
chamber (16) is further provided with a tamper proof ring (22) frangible connected to
a bottom portion of the outer skirt (21) of dispensing chamber (16).

- 33.** A dispensing closure assembly according to Claim 32, wherein the tamper proof ring (22) is detachably engaged to the mouth opening of the container.
- 5 **34.** A method of dispensing a substance from a dispensing closure assembly into a container, comprising:-
- a) rotating an activating member (12) to align at least one plunger (13b) with at least one receiving chamber (17b);
 - 10 b) *applying force against the activating member (12) to urge against the at least one storage member (14); and*
 - c) unsealing the at least one storage member (14).