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(54) **Title:** CONTAINER ENCLOSING A DOSE OF A FOOD OR BEVERAGE INGREDIENT, ASSEMBLY INCLUDING SUCH A CONTAINER AND A FOOD OR BEVERAGE PREPARATION MACHINE, AND FOOD OR BEVERAGE PREPARATION PROCESS IMPLEMENTING SUCH AN ASSEMBLY

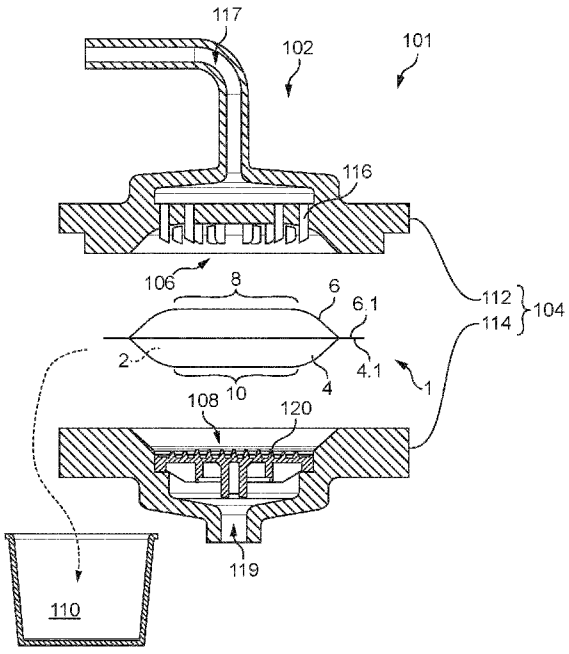

FIG. 1

(57) **Abstract:** The invention is directed to a container (1) for enclosing a dose (2) of a food or beverage ingredient. The container (1) has a first region (8) for cooperating with a liquid injection device (106) that has several injectors (116) distributed over an injection area (118). The container (1) has a second region (10) for being punctured by a puncturing device (108) that has several puncturing elements (120) distributed over a puncturing area (122). The container (1) is composed of at least one dissolvable material. The invention is also directed to an assembly (101) including such a container (1) and a food or beverage preparation machine (102). The invention is further directed to a food or beverage preparation process implementing such an assembly (101).

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CONTAINER ENCLOSING A DOSE OF A FOOD OR BEVERAGE INGREDIENT, ASSEMBLY INCLUDING SUCH A CONTAINER AND A FOOD OR BEVERAGE PREPARATION MACHINE, AND FOOD OR BEVERAGE PREPARATION PROCESS IMPLEMENTING SUCH AN ASSEMBLY

1. Field of the invention

The invention is directed to a container enclosing a dose of a food or beverage ingredient. The invention is further directed to an assembly including such a container and a food or beverage preparation machine, for preparing a food or beverage product.

2. Technical background

Such containers are configured to enclose a dose of a food or beverage ingredient, e.g. coffee ground or tea extract, so as to prepare a food or beverage, e.g. coffee or tea, when placed in a food or beverage preparation machine. During a preparation process, the food or beverage preparation machine is configured to inject a drinkable liquid like water in the container. After interaction of the food or beverage ingredient with the injected liquid, the beverage is discharged out of the container and dispensed in a cup or a glass, from which the user may ingest the beverage or food. Such containers are commonly made of plastics or plastic laminates.

However, the materials composing these containers are difficult or long to recycle or compost. As a result, a certain amount of waste can be produced and it requires quite some energy to handle this waste.

3. Summary of the invention

It is thus an object of the invention to provide a container enclosing a dose of a food or beverage ingredient, which can alleviate or obviate the shortcomings of the existing containers. Another object of the invention is to provide an assembly including such a container and a food or beverage preparation machine. In the following are described various aspects and embodiments of the invention.

According to a first aspect, the invention is directed to a container for enclosing a dose of a food or beverage ingredient,
wherein the container has a first region configured to cooperate with a liquid injection device that is part of a food or beverage preparation machine and that has a plurality of injectors distributed over an injection area, the liquid injection device being for example in the form of a shower,
wherein the container has a second region configured to be punctured by a puncturing device that is part of the food or beverage preparation machine and that has a plurality of puncturing elements, the puncturing elements being distributed over a puncturing area, the puncturing device being for example in the form of a pyramid plate,
wherein the container is composed of at least one dissolvable material, the container optionally consisting essentially in said at least one dissolvable material, the container preferably consisting only in said at least one dissolvable material.

Thus, the container, together with or separated from the food or beverage ingredient used, can be easily and quickly composted or recycled, while requiring little or no energy from the user to handle the produced waste. In particular, this is made possible since the container and the used food or beverage ingredient are wet, i.e. covered or impregnated by the liquid after the food or beverage preparation process.

Further, as the first and second regions may have relatively large surface areas with respect to the overall surface area of the container in order to respectively cooperate with a large injection device and a large puncturing device, the liquid may quickly cover and impregnate most or all of the container including the food or beverage ingredient. This increases the ease and speed of composting or recycling the container.

Further, the container may enhance the user experience, since the user does not need to open or empty any envelope or packaging before having the food or beverage product prepared. Also, the usual plastic waste due to such an envelope or packaging is not generated by a container according to the present invention.

In the present disclosure, the term “food or beverage ingredient” may be construed as encompassing also ingredients suitable for preparing a food product and a beverage product concomitantly.

In the present disclosure, the term “dissolvable” may be construed as qualifying a material that has a relatively high solubility in the liquid, say in water, in particular under the following conditions: A membrane made out of a dissolvable material and having 100 μm (microns) of thickness dissolves in water in less than 10 minutes at ambient temperature and under atmospheric pressure.

In the present disclosure, the term “consisting essentially in” may be construed as meaning that that specific further components can be present, namely those not materially affecting the essential characteristics of the container. For example, a container consisting essentially in the at least one dissolvable material may comprise between 90 and 99% of said dissolvable material.

In the present disclosure, the term “consisting only in” or “consisting in” may be construed as meaning that no further materials are present in the container other than the at least one dissolvable material.

In a pyramid plate, most or all of the puncturing elements may substantially be shaped as pyramids or truncated pyramids or similar polyhedrons like sharp tetrahedrons.

According to an embodiment, the container may be configured such that, when the container is arranged in an extraction cell of the food or beverage preparation machine during a food or beverage preparation process:

- a liquid injected by the liquid injection device may enter the container via the first region,
- the liquid entered in the container may interact with the dose,
- a food or beverage product resulting from said interacting may exit the container via the second region, and
- the container may start dissolving or at least partially dissolve, preferably after leaving the extraction cell, most preferably after reaching a collecting chamber of the food or beverage preparation machine.

Thus, most or all of the container may resist dissolution during a predetermined length of time, which avoids that the container sticks or loses bits in the extraction cell.

In some embodiments, the thickness of the at least one dissolvable material may be selected such that most or all of the container may start dissolving after the predetermined length of time.

In some embodiments, the thickness of the at least one dissolvable material may be selected such that the container can hold water, injected under a pressure of 7 to 15 bar of and a temperature of 75 to 95°C (Celsius) for a duration comprised in 10 to 120 seconds. Typically, a food or beverage preparation process, for example a brewing process, may be operated during 1 min at 90°C.

According to an embodiment, the at least one dissolvable material may have oxygen barrier properties.

Thus, the food or beverage ingredient may be relatively well preserved from oxidation before use, hence have a relatively long shelf life.

In the present disclosure, the term "oxygen barrier properties" may be construed as meaning that less than 3 $cm^3/m^2/day/bar$ (cubic centimeter per square meter per day per bar) of oxygen may pass through a membrane consisting in the dissolvable material at 23°C (Celsius) and 50% (percent) of relative humidity (RH).

According to an embodiment, the container may be coated with a film made of a material having high moisture barrier properties.

Thus, the high moisture barrier properties may enhance the preservation of the container and the food or beverage ingredient therein. Such film may be selected as at least partially dissolvable.

Preferably, such film may be secured to the container by lamination before shaping the container. Preferably, such a film may be selected in the group consisting of: gums, waxes, celluloses, and mixtures thereof. Optionally, the gum may be selected in the group consisting of: xanthan gum, gellan gum, seed gum, and mixtures thereof. More preferably, the wax may be selected in the group consisting of: bees wax, carnauba, paraffin, and mixtures thereof. More preferably, the cellulose may be selected in the group consisting of: methylcellulose (MC), carboxymethylcellulose (CMC),

hydroxypropylcellulose (HPC), hydroxyethylcellulose (HEC), hydroxypropylmethylcellulose (HPMC).

In the present disclosure, the expression “high moisture barrier properties” may be construed as designating a material that lets pass, through a membrane, less than 3 g/m^2/day (grams per square meter per day) of humidity at 23°C (Celsius) and 85% of relative humidity (RH) under atmospheric pressure.

In some embodiments, the container may include, in the formulation of the at least one dissolvable material, at least one additive selected to increase the moisture barrier properties of the dissolvable material. Preferably, such an additive may be a plasticizer, which may optionally be selected in the group consisting in: glycerol, alginates, and mixtures thereof.

In some embodiments, the container may be composed of a blend of dissolvable materials, for example: a blend of sodium alginate and pullulan film, a blend of calcium caseinate and citrus pectin, or a blend of various starches. Thus, the moisture barrier properties may be enhanced.

According to an embodiment, the at least one dissolvable material may consist essentially in at least one edible material, the container preferably consisting only in said at least one edible material.

Thus, the container may be eaten by a user, in particular after the preparation of the food or beverage product.

According to an embodiment, the at least one dissolvable material, preferably the at least one edible material, may be selected in the group consisting of: seaweed, seaweed extract, celluloses, polysaccharides, proteins, and mixtures thereof, the seaweed including in particular alginates, polysaccharides including in particular pullulan.

Thus, the edible material may preserve the food or beverage ingredient, and the container may be relatively easy to manufacture, manipulate and transport. Each one of these edible materials has been subject to a complete assessment under a number of criteria, including functional, mechanical and safety criteria as well as the suitability of the edible material for liquids. In particular, these edible materials may provide

relatively high oxygen barrier properties and/or moisture barrier properties. Besides, some, most or all of these edible materials may be tasteless and odourless and offer a good processability to shape the container, in particular an ability to be printed on and heat-sealed.

In particular embodiments:

- pullulans are for example available under the tradenames Listerine Pocketpaks® and Capsugel Plantcaps®;
- the seaweed or seaweed extract may be selected in the group consisting of: alginates, agars, algae, carrageenan, and mixtures thereof;
  seaweeds are for example available under the tradenames Evoware and Loliware;
- the cellulose may be selected in the group consisting of: methylcellulose (MC), carboxymethylcellulose (CMC), hydroxypropylcellulose (HPC), hydroxyethylcellulose (HEC), hydroxypropylmethylcellulose (HPMC), and mixtures thereof;
  a CMC and a HPMC are for example available respectively under the tradenames NatureFlex™ and Capsugel Licaps®;
- the polysaccharides may be selected in the group consisting of: corn starch, potato starch, tapioca starch, maize starch, and mixtures thereof;
- the proteins may be selected in the group consisting of: soy protein isolate, corn zein, whey, caseins, caseinates, and mixtures thereof;
- the alginates may be selected among salts of alginic acid;
  alginates are for example available under the tradenames Ooho!® commercialized by the company Skipping Rocks Lab, and WikiCell.

According to an embodiment, the food or beverage ingredient may be selected in the group consisting of: ground coffee, coffee extract, tea leaves, tea extract, milk powder, vegetable powder, fruit powder, and mixtures thereof.

Thus, the containers may be provided with various food or beverage ingredients in order to prepare various food or beverage products.

According to an embodiment, the thickness of the container may be comprised between 10 μm and 200 μm (microns).

Thus, the container may hold the liquid during the food or beverage preparation process, while being compostable in a relatively short time.

In some embodiments, the thickness of the container may be substantially constant. Alternatively, the thickness of the container may vary.

In some embodiments, the thickness of the container may be selected, in conjunction with a composition of the at least one dissolvable material, so as to achieve a composting over a certain length of time.

According to an embodiment, the container may comprise at least one part defining a cavity for housing the dose and at least one part configured to close said cavity, said parts having respective flanges sealed together, preferably in a liquid-tight manner, such that the container may be configured as a closed package.

Thus, the container may prevent an ingress of moisture or other external element that could otherwise alter the food or beverage ingredient.

According to an embodiment, the flanges may be flexible. Optionally, the flanges may have an annular protruding shape extending partially or totally around the cavity.

Thus, the container may easily be inserted in the food and beverage preparation machine. Since the flanges may accommodate slightly inaccurate positions, hence small stresses, during the manipulation, storage, transportation, and installation of the container in the food or beverage preparation machine, it may be avoided that the rest of the container be subject to such stresses.

According to an embodiment, the container may further comprise at least one paper layer including paper or paper fibers, said at least one paper layer preferably consisting in paper or paper fibers, said at least one paper layer surrounding the at least one dissolvable material.

Thus, such paper layer(s) may enhance the preservation, hence increase the shelf life, of the food or beverage ingredient, while enhancing its ability to be manipulated, stored, transported and used. The paper layer may form a secondary packaging, while the

dissolvable material may form a primary packaging that is directly in contact with the food or beverage ingredient.

According to an embodiment, the first region may have a substantially flat surface, preferably a flat surface, and/or the second region may have a substantially flat surface, preferably a flat surface,
the first region optionally having substantially or exactly the shape of a circular disc, and/or the second region optionally having substantially or exactly the shape of a circular disc.

Thus, such design of the first region and/or of the second region may simplify the design and manufacturing of the injection device and/or of the puncturing device.

According to an embodiment, the first region may have substantially or exactly the shape of a circular disc, and/or the second region may have substantially or exactly the shape of a circular disc.

Thus, such design of the first region may promote a uniform distribution in the flow of the liquid entering the container and the food or beverage ingredient, which optimizes the use of the food or beverage ingredient. Further, such design of the second region may promote a uniform distribution in the flow of the food or beverage product exiting from the container, hence facilitate the collection of the food or beverage product.

A container according to the first aspect may form, together with a dose enclosed therein, a capsule, a pod, a cartridge or any similar portion enclosing the food or beverage ingredient.

According to a second aspect, the invention is directed to an assembly including a food or beverage preparation machine and a container according to any of the preceding aspect and embodiments, wherein the food or beverage preparation machine comprises:

- an extraction cell configured to hold the container during a food or beverage preparation process,
- a liquid injection device having a plurality of injectors distributed over an injection area, the injection device being configured to cooperate with the first region of the container, the liquid injection device being for example in the form of a shower,

- a puncturing device having a plurality of puncturing elements distributed over a puncturing area, the puncturing device being configured to cooperate with the second region of the container, the puncturing device being for example in the form of a pyramid plate, and
- preferably, a collecting chamber configured to collect the container after it has been removed from the extraction cell, such that the container may at least partially dissolve in the collecting chamber.

Thus, such an assembly may enhance the ease and speed of composting or recycling of the containers used therein, while requiring little or no energy to handle the produced waste. The container may be part of the extraction cell itself.

In some embodiments, the pyramid plate may have most or all of the puncturing elements substantially shaped as pyramids or truncated pyramids or similar polyhedrons like sharp tetrahedrons.

According to a third aspect, the invention is directed to food or beverage preparation process for preparing a food or beverage product, the food or beverage preparation process comprising:

- implementing an assembly according to any of the preceding aspect and embodiments,
- placing the container in the extraction cell,
- closing the extraction cell, such that the plurality of injectors pierce the container, preferably the first region,
- injecting liquid in the container via the liquid injection device, such that the plurality of puncturing elements puncture the container, preferably the second region,
- stopping the injection of liquid,
- discharging the food or beverage product via the puncturing device, preferably through a discharging duct arranged downstream the puncturing device,
- opening the extraction cell,
- removing the container and the food or beverage ingredient from the extraction cell, and preferably putting the container in a collecting chamber, and
- at least partially or completely dissolving of the container, preferably (at least partially) in the collecting chamber.

Thus, such a food or beverage preparation process may be operated easily, while enhancing the ease and speed of composting or recycling of the containers used therein, and requiring little or no energy to handle the produced waste.

4. Brief description of drawings

Further features, details and advantages of the invention will now be described in relation to the embodiments of the enclosed figures.

Fig.1 shows a schematic perspective cut view of an assembly according to an embodiment of the invention and including a container according to an embodiment of the invention, the food or beverage preparation machine being in an open position.

Fig.2 shows a schematic perspective cut view of the assembly of Fig.1, the food or beverage preparation machine being in a closed position.

Fig.3 shows a schematic perspective view, from below, of a part of the assembly of Fig.2, in particular of the container.

Fig.4 shows a schematic perspective view, from above, of a part of the assembly of Fig.2, in particular of the container.

Fig.5 shows a flow diagram of a food or beverage preparation process according to an embodiment of the invention and implementing the assembly and container of Fig.1-4.

5. Detailed description

Fig. 1, 2, 3 and 4 show, in accordance with the invention, an assembly 101 including a container 1 and a beverage preparation machine 102. An object of the assembly 101 is to enhance the ease and speed of composting or recycling of the container 1 that is used therein, while requiring little or no energy to handle the produced waste.

The beverage preparation machine 102 comprises an extraction cell 104, a liquid injection device 106, a puncturing device 108 and a collecting chamber 110.

The extraction cell 104 is configured to hold the container 1 during a food or beverage preparation process, the so-called extraction. The extraction cell 104 may include an upstream component 112 and a downstream component 114. The upstream component 112 and the downstream component 114 may be movable between:

- an open configuration as visible in Fig.1, where a container 1 may be introduced in or removed from the extraction cell 104, and
- a closed configuration as visible in Fig.2, where the container 1 may be processed.

The liquid injection device 106 has a plurality of injectors 116, which are distributed over an injection area 118 as visible in Fig.3. The injection area 118 may extend over a circle where the injectors 116 are distributed. In particular, the liquid injection device 106 may be in the form of a shower. The injection device 106 may be integral with or secured to the upstream component 112. The injectors 116 may be configured to pierce an upstream part of the container 1.

The upstream component 112 may further have an injection duct 117 as visible in Fig.1. The injection duct 117 may fluidly connect the liquid injection device 106 to a non-illustrated liquid displacing unit, for example a pump, arranged upstream the injection duct 117. The liquid injection device 106 may be configured to guide a liquid, for example water, flowing from the injection duct 117 and the upstream component 112 into the container 1 in order to inject this liquid into the container 1 and have it interact with the beverage ingredient.

The puncturing device 108 has a plurality of puncturing elements 120 for puncturing the container 1. The puncturing elements 120 are distributed over a puncturing area 122 as visible in Fig.4. The puncturing area 122 may extend over a circle where the puncturing elements 120 are distributed.

The puncturing device 108 may be in the form of a pyramid plate, in which most or all of the puncturing elements 120 may substantially be shaped as pyramids or truncated pyramids or similar polyhedrons like sharp tetrahedrons. The puncturing device 108 may be integral with or secured to the downstream component 114. The puncturing device 108 may be configured to pierce a downstream part of the container 1.

The puncturing device 108 may be configured to guide out of the container 1 the beverage product resulting from an interaction of the liquid with the beverage ingredient inside the container 1. The puncturing device 108 may be configured to let the beverage product pass through it.

The downstream component 114 may further have a discharging duct 119 as visible in Fig.1. The discharging duct 119 may fluidly connect the puncturing device 108, hence the container 1, to a non-illustrated liquid dispensing unit, which may in turn dispense the beverage product into a receptacle like a cup.

The collecting chamber 110 may be configured to collect a container 1 after it has been removed from the extraction cell 104. The collecting chamber 110 may be formed by a receptacle of a volume suitable for receiving several used containers 1. The collecting chamber 110 may be detachably coupled to the beverage preparation machine 102. A user may detach the collecting chamber 110 to empty it from the used containers 1 and then recouple the collecting chamber 110 to the beverage preparation machine 102.

An exemplary structure of the container 1 will now be described in relation to Fig.1, 3 and 4. The container 1 encloses a dose 2 of ground coffee as a beverage ingredient, as symbolized by the arrow 2 in Fig.1. the container 1 and the dose 2 may form a capsule, a pod, a cartridge or any similar portion.

The container 1 may comprise a part 4 defining a cavity for receiving the dose 2 and a part 6 configured to close said cavity. The parts 4 and 6 may have respective flanges 4.1 and 6.1 sealed together in a liquid-tight manner, such that the container 1 may be configured as a closed package and prevent an ingress of, e.g., moisture. The parts 4 and 6 may be flexible. In particular, the flanges 4.1 and 6.1 may be flexible. The flanges 4.1 and 6.1 may have an annular protruding shape extending all around the cavity containing the dose 2. The flanges 4.1 and 6.1 may be flat.

The container 1 has a first region 8 configured to cooperate with the liquid injection device 106. In particular, the first region 8 may be configured to be pierced by the injectors 116. The container 1 has a second region 10 configured to be punctured by the puncturing device 108, in particular by the puncturing elements 120.

As visible in Fig.1-4 the first region 8 may have a flat surface, and the second region 10 may have a flat surface. The first region 8 may have exactly the shape of a circular disc, and the second region 10 may have exactly the shape of a circular disc. Such a design of the first region 8 may promote a uniform distribution in the flow of the liquid entering the container 1 and the dose 2. Further, such a design of the second region 10 may promote a uniform distribution in the flow of the beverage product exiting from the container 1.

As visible in Fig.2, the container 1 may be configured such that, when the container 1 is arranged in the extraction cell 104 during a beverage preparation process:

- a liquid, say water, injected by the liquid injection device 106 may enter the container via the first region 8,
- the liquid entered in the container 1 may interact with the dose 2,
- a beverage product resulting from said interacting may exit the container 1 via the second region 10.

Then, the beverage product may flow through the discharging duct 119 and downstream to the dispensing unit and a user's cup.

The first region 8 and the second region 10 may have relatively large surface areas to enhance respectively the ingress of the liquid in the container 10 and the discharge of the liquid out of the container 10, as well as to reduce the time required for the complete composting or recycling of the container 10.

An exemplary nature or composition of the container 1 will now be described. The container 1 is composed of at least one dissolvable material. In the example of Fig.1-4, the container may consist essentially in a dissolvable material. After the beverage preparation process, the container 1 may start dissolving, preferably after leaving the extraction cell 104, most preferably after reaching the collecting chamber 110.

In the example of Fig.1-4 the dissolvable material may consist in one or more polysaccharides, for example in starches like corn starch. The dissolvable material may have oxygen barrier properties, so as to preserve the beverage ingredient from oxidation before use. The dissolvable material may consist only in an edible material.

In addition, the container 1 may include a non-illustrated film be coated on a layer of the dissolvable material. The film may be secured to the dissolvable material by lamination before forming the container 1 into its final shape of Fig.1-4. The film may be made of a material having high moisture barrier properties. In the example of Fig.1-4 the film may be consist in a xanthan gum. Thus, the container may have moisture barrier properties.

Thus, a used container 1, together with its dose 2, can be easily and quickly composted or recycled, while requiring little or no energy from the user to handle the produced waste. In particular, this is made possible since the container 1 and the used dose 2 are wet, i.e. covered or impregnated by the liquid after the corresponding beverage preparation process.

The first region 8 and the second region 10 may have relatively large surface areas with respect to the overall surface area of the container 1 in order to respectively cooperate with the injection device 106 and the puncturing device 108. Thus, the liquid may quickly cover and impregnate most or all of the container 1 including the dose 2, which increases the ease and speed of composting or recycling the container 1.

In the example of Fig.1-4, the container 1 forms the sole packaging for the dose 2. This may enhance the user experience, since the user does not need to open or empty any envelope or additional packaging before having the beverage product prepared. Also, the usual plastic waste due to such an envelope or additional packaging is not generated with the container 1.

Further, the thickness of the dissolvable material may be selected such that most or all of the container 1 may start dissolving after a predetermined length of time. Most or all of the container 1 may resist dissolution during the predetermined length of time, which approximately corresponds to the duration of the beverage preparing process.

For example, the thickness of the dissolvable material may be selected such that the container 1 can hold the liquid injected therein. The thickness of the container 1 may be selected between 10 μm and 200 μm (microns). The thickness of the container 1 may be substantially constant.

Further, the thickness of the container 1 and the composition of the dissolvable material may be selected, so as to achieve a composting over a certain length of time, for example of between a few hours and several weeks, e.g. up to 12 weeks.

Fig.5 illustrates a beverage preparation process 201, which implements the assembly 101 along with a container 1,, the beverage preparation process comprising:

- 202) implementing the assembly 101,
- 204) placing the container 1 in the extraction cell 104,
- 206) closing the extraction cell 104, such that the plurality of injectors 116 pierce the container 1, preferably the first region 8,
- 208) injecting liquid in the container 1 via the liquid injection device 106, such that the plurality of puncturing elements 120 puncture the container 1, preferably the second region 10,
- 210) stopping the injection of liquid,
- 212) discharging the beverage product via the puncturing device 108, preferably through the discharging duct 119 arranged downstream the puncturing device 108,
- 214) opening the extraction cell 104,
- 216) removing the container 1 and the beverage ingredient from the extraction cell 104, and preferably putting the container 1 in the collecting chamber 110, and
- 218) at least partially or even completely dissolving of the container 1, preferably (at least partially) in the collecting chamber 110.

The invention is not limited to the afore-described embodiments, and other embodiments may be implemented as long as they are covered by the scope of protection conferred by one of the appended claims.

Claims

1. Container (1) for enclosing a dose (2) of a food or beverage ingredient,
wherein the container (1) has a first region (8) configured to cooperate with a liquid injection device (106) that is part of a food or beverage preparation machine (102) and that has a plurality of injectors (116) distributed over an injection area (118), the liquid injection device (106) being for example in the form of a shower,
wherein the container (1) has a second region (10) configured to be punctured by a puncturing device (108) that is part of the food or beverage preparation machine (102) and that has a plurality of puncturing elements (120), the puncturing elements (120) being distributed over a puncturing area (122), the puncturing device (108) being for example in the form of a pyramid plate,
wherein the container (1) is composed of at least one dissolvable material, the container (1) optionally consisting essentially in said at least one dissolvable material, the container (1) preferably consisting only in said at least one dissolvable material.

2. Container (1) according to claim 1, wherein the container (1) is configured such that, when the container (1) is arranged in an extraction cell (104) of the food or beverage preparation machine (102) during a food or beverage preparation process:
   - a liquid injected by the liquid injection device (106) may enter the container (1) via the first region (8),
   - the liquid entered in the container (1) may interact with the dose (2),
   - a food or beverage product resulting from said interacting may exit the container (1) via the second region (10), and
   - the container (1) may start dissolving or may at least partially dissolve, preferably after leaving the extraction cell (104), most preferably after reaching a collecting chamber (110) of the food or beverage preparation machine (102).

3. Container (1) according to any one of the preceding claims, wherein the at least one dissolvable material has oxygen barrier properties.

4. Container (1) according to any one of the preceding claims, wherein the at least one dissolvable material consists essentially in at least one edible material, the container (1) preferably consisting only in said at least one edible material.

5. Container (1) according to any of the preceding claims, wherein the at least one dissolvable material, preferably the at least one edible material, is selected in the group consisting of: seaweed, seaweed extract, celluloses, polysaccharides, proteins, and mixtures thereof, the seaweed including in particular alginates, polysaccharides including in particular pullulan.

6. Container (1) according to any one of the preceding claims, wherein the food or beverage ingredient is selected in the group consisting of: ground coffee, coffee extract, tea leaves, tea extract, milk powder, vegetable powder, fruit powder, and mixtures thereof.

7. Container (1) according to any one of the preceding claims, wherein the thickness of the container, or the thickness of the at least one dissolvable material as the case may be, is comprised between 10 μm and 200 μm.

8. Container (1) according to any one of the preceding claims, wherein the container (1) comprises at least one part (4) defining a cavity for housing the dose (2) and at least one part (6) configured to close said cavity, said parts (4, 6) having respective flanges (4.1, 6.1) sealed together, preferably in a liquid-tight manner, such that the container (1) may be configured as a closed package.

9. Container (1) according to claim 8, wherein the flanges (4.1, 6.1) are flexible, the flanges (4.1, 6.1) optionally having an annular protruding shape extending partially or totally around the cavity.

10. Container according to any one of the preceding claims, wherein the container is coated with a film made of a material having high moisture barrier properties, the film being preferably secured to the container by lamination before shaping the container (1), the film being preferably selected in the group consisting of: gums, waxes, celluloses, and mixtures thereof.

11. Container according to any one of the preceding claims, wherein the container further comprises at least one paper layer including paper or paper fibers, said at least one paper layer preferably consisting in paper or paper fibers, said at least one paper layer surrounding the at least one dissolvable material.

12. Container (1) according to any one of the preceding claims, wherein the first region (8) has a substantially flat surface, preferably a flat surface, and/or wherein the second region (10) has a substantially flat surface, preferably a flat surface,
the first region (8) optionally having substantially or exactly the shape of a circular disc, and/or the second region (10) optionally having substantially or exactly the shape of a circular disc.

13. Assembly (101) including a food or beverage preparation machine (102) and a container (1) according to any one of the preceding claims, wherein the food or beverage preparation machine (102) comprises:

- an extraction cell (104) configured to hold the container (1) during a food or beverage preparation process,
- a liquid injection device (106) having a plurality of injectors (116) distributed over an injection area (118), the injection device (106) being configured to cooperate with the first region (8) of the container (1), the liquid injection device (106) being for example in the form of a shower,
- a puncturing device (108) having a plurality of puncturing elements (120) distributed over a puncturing area (122), the puncturing device (108) being configured to cooperate with the second region (10) of the container (1), the puncturing device (108) being for example in the form of a pyramid plate, and
- preferably, a collecting chamber (110) configured to collect the container (1) after it has been removed from the extraction cell (104), such that the container (1) may at least partially dissolve in the collecting chamber (110).

14. Food or beverage preparation process (201) for preparing a food or beverage product, the food or beverage preparation process comprising:

- 202) implementing an assembly (101) according to claim 13,
- 204) placing the container (1) in the extraction cell (104),
- 206) closing the extraction cell (104), such that the plurality of injectors (116) pierce the container (1), preferably the first region (8),
- 208) injecting liquid in the container (1) via the liquid injection device (106), such that the plurality of puncturing elements (120) puncture the container (1), preferably the second region (10),
- 210) stopping the injection of liquid,

- 212) discharging the food or beverage product preferably via the puncturing device (108), more preferred through a discharging duct (119) arranged downstream the puncturing device (108),
- 214) opening the extraction cell (104),
- 216) removing the container (1) and the food or beverage ingredient from the extraction cell (104), and preferably putting the container (1) in a collecting chamber (110), and
- 218) at least partially dissolving of the container (1), preferably in the collecting chamber (110).

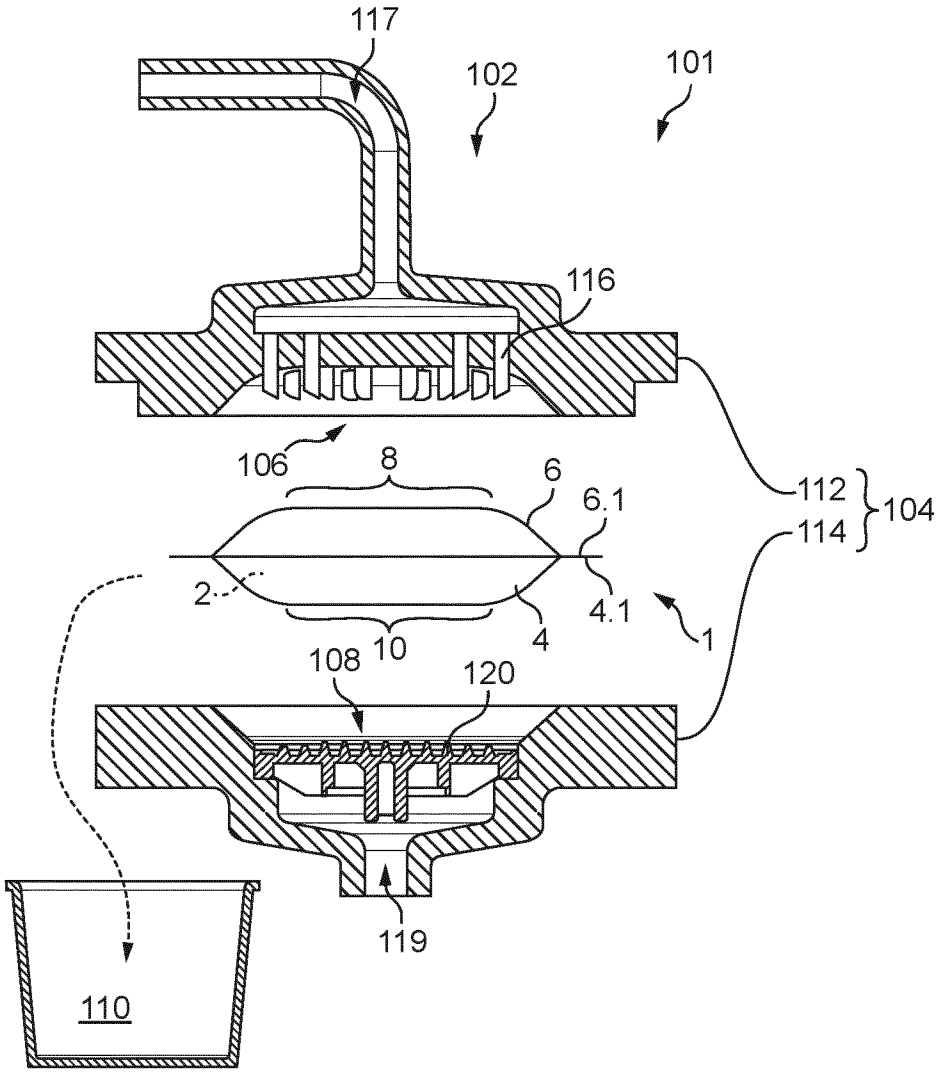
117
102
101
116
106
8
6
6.1
112
104
114
2
4.1
1
10
4
108
120
119
110

FIG. 1

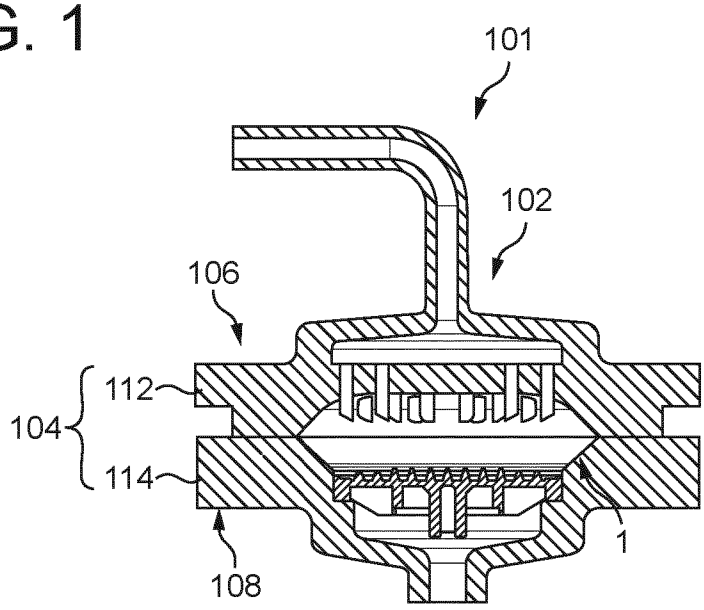
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FIG. 2

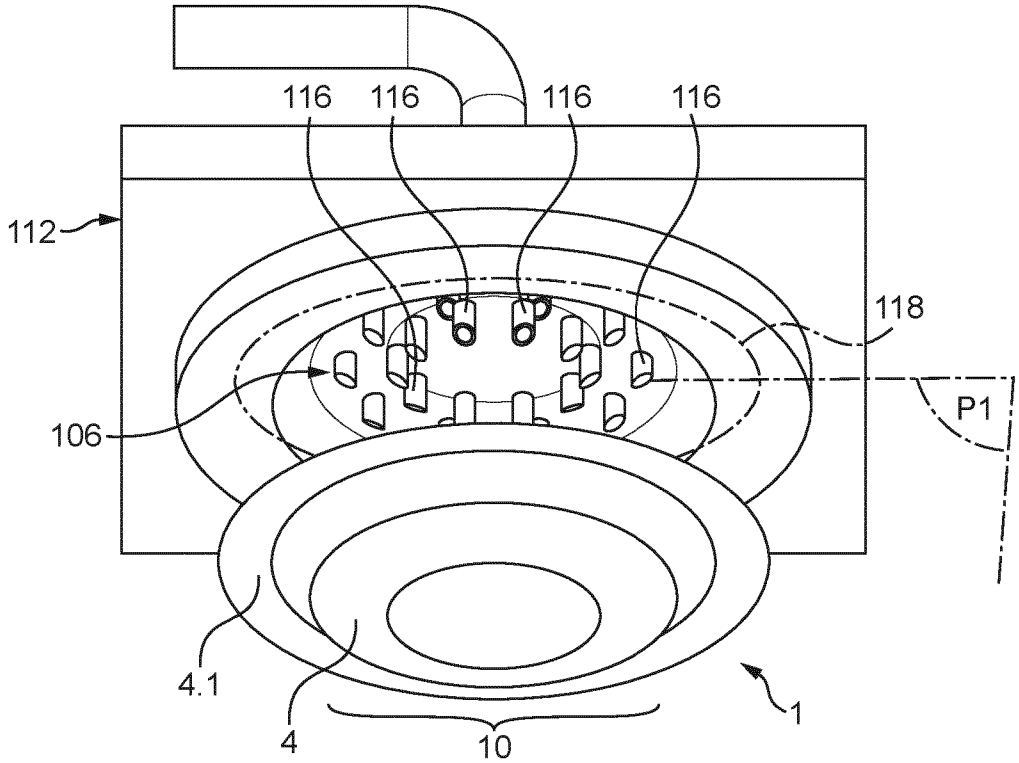

FIG. 3

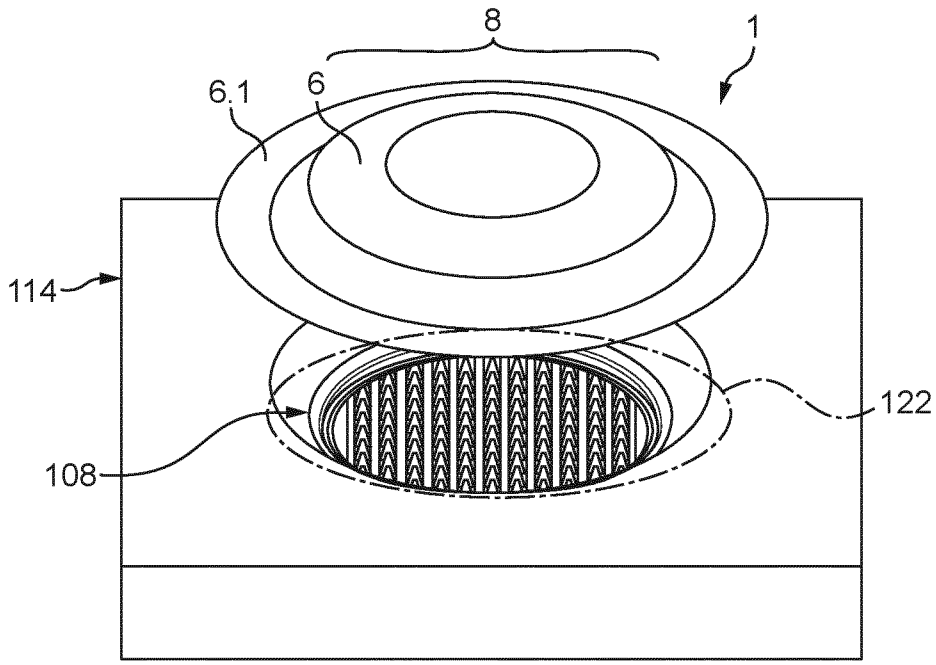

FIG. 4

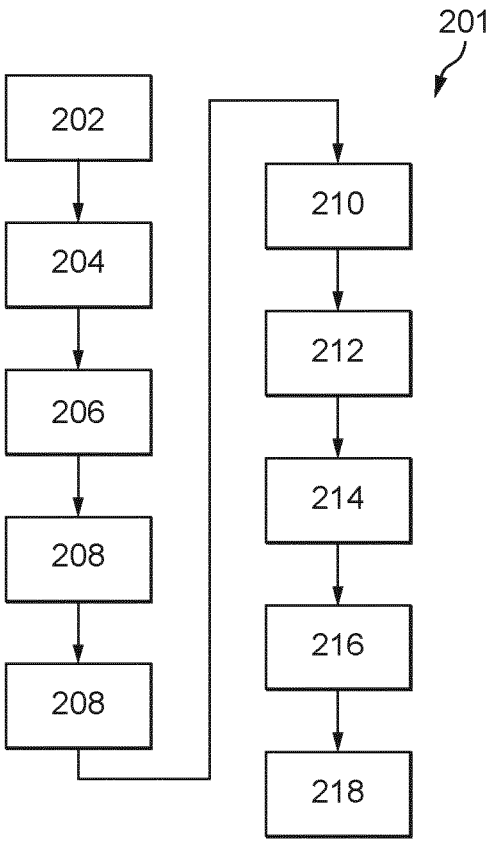

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2021/077154

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D85/804
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	paragraph [0054]; claims 1-15; figures 3a,3b,3c,3d	1-14

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Y	paragraph [0038]; claims 1-15; figures 5a,5b,6,6a paragraph [0071]	1-14

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 November 2021	18/11/2021

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Brochado Garganta, M

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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