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(54) **A BEVERAGE CUP LID FOR ENHANCED ORGANOLEPTIC PROPERTIES**

GETRÄNKEBECHERDECKEL FÜR VERBESSERTE ORGANOLEPTISCHE EIGENSCHAFTEN

COUVERCLE DE Gobelet pour boisson pour des propriétés organoleptiques améliorées

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Description

Field of the invention

[0001] The present invention concerns a lid for closing a beverage cup, that allows to enhance the organoleptic experience of a consumer.

Background of the invention

[0002] Cup lids are widely known and used in the consumption of edible liquid or semi-liquid products. They provide a practical and secure way to close a cup, ensuring that no product is spilled when moving the cup, especially for nomadic consumption.

[0003] They are generally of a simple structure, consisting of a flat disc-shaped body having a peripheral rim extending downwardly for attaching to the upper edge of a cup. In the past, they were made of thermoformed plastic (such as polystyrene), but with recent awareness about environmental challenges, and the need to reduce and replace plastic use, other materials, such as paper for instance, are used.

[0004] Most of the known cup lids also comprise a drinking spout, which is integrally formed with the lid body, and allows a consumer to insert a drinking lid, or to sip the contents of the cup directly from said spout.

[0005] Recently, consumers gained more awareness about the need for healthier nutrition while maintaining the pleasant experience of food and beverage intake. No solution exists today which can provide a consumer with a healthier, yet nutritionally-friendly experience, of drinking from cup in a nomadic way. Lids that release a perfume and/or flavour are known from WO 2007/052227 A2 and WO 2020/126210 A1.

Summary of the invention

[0006] The present invention provides a solution to the above mentioned drawbacks of the existing solutions with a lid according to independent claim 1.

[0007] It was surprisingly found by the applicant that when a consumer sips a liquid or semi-liquid product from the drinking spout of a cup lid, a certain amount of air is drawn together with the liquid or semi-liquid product, and enters the oral system (mouth, throat and nose) of the consumer.

[0008] With a cup lid according to the invention, the quantity of air that is sipped together with the liquid, contacts at least the region of the lid that is adjacent to the spout placed in the mouth of the consumer. It was found that the velocity of this air is sufficient to withdraw molecules that are present at the surface of the lid.

[0009] It was found that alternatively or simultaneously to the principle described above, release of the aromas from the coating can occur when the product contained in the cup is hot and generates steam. In this case, steam generated from the product circulates upwardly towards

the lid, contacts the coating and releases the aroma which is then circulated with said steam through the drinking spout of the lid. Aromatic steam is therefore released outside the lid, which creates an appealing scent for the consumer before, and during consumption.

[0010] In one embodiment of the invention, the volatile aromatic product is microencapsulated in the coating. Microencapsulation of scents, flavours and other similar volatile products is known as such and will not be described in more details therein. As said previously, when the consumer sips a product through the drinking spout of the lid, air is withdrawn as well and circulates at a high velocity onto the surface of the lid, close to the mouth of the consumer. Air velocity is sufficient to open the microcapsules and withdraw the volatile aromatic product contained therein, which circulates into the air, towards the oral system of the consumer.

[0011] Alternatively, aromas or scents can be stored in, and released from the surface of the lid by so-called "controlled release". Controlled release may be defined as a method by which one or more active agents or ingredients are made available at a desired site and time and at a specific rate. Flavours, aromas, or scents can be entrapped in a jellified matrix coating; in this case, their release is significantly affected by the texture of the gel that is used. For instance, gelatin gel show large increases in flavour release in the presence of saliva, while starch and pectin gels show a reduction in flavour release under these conditions. In the present application, a gelatin gel matrix is therefore preferred, especially if the jellified matrix coating is located in a portion of the lid which is adjacent the sipping/dispensing opening (drinking spout) of said lid, hence at a location where the saliva of the consumer can activate the release of the scents, flavours or aromas during sipping or drinking.

[0012] The advantages of controlled release are:

- the active ingredients are released at controlled rates over prolonged periods of time,
- loss of ingredients during processing or when the jellified matrix is subject to heat, can be avoided or reduced, and
- reactive or incompatible components can be separated.

[0013] Yet another alternative to store in, and release volatile aromas, scents or flavours products from the lid, is so-called "release of flavour by melting". This mechanism of release involves storing the flavours, scents or aromas within a capsule which is coated or similarly attached to the surface of the lid. Melting of said capsule wall at a predetermined temperature releases the volatile active material. There are numerous materials that can be melted and that are approved for food use (lipids, modified lipids or waxes). In such applications, the coated flavoured particles are stored at temperatures well below the melting point of the coating, then heated above this temperature in order to be released. The

melting point of the capsule can be chosen appropriately such that for instance, they do not melt at ambient temperature, but they melt at a temperature which corresponds to that of a hot beverage (55°C to 85°C). In another alternative, the melting point corresponds to the average temperature of human body, close to the mouth. In this case, the capsule melts when the consumer puts the drinking spout of the lid in the mouth.

[0014] Encapsulation techniques, especially for flavoured control release, are as follows:

- simple coacervation (provides a prolonged controlled release mechanistic)
- complex coacervation (provides a prolonged controlled release mechanistic by diffusion, and started release by pH, dehydration, mechanical effect, dissolution or enzymatic effect)
- spray drying (provides a prolonged controlled release mechanistic, and started release)
- fluid bed drying (started released by pH activation or heat treatment)
- extrusion (provides a prolonged release).

[0015] This allows to provide the consumer with a sensation of drinking a flavoured product, even if the liquid or semi-liquid edible product circulated through the drinking spout of the lid is not itself flavoured.

[0016] The invention therefore provides an excellent means to allow a consumer to experience the tasting and drinking of a flavoured product, without the need to add flavours, or sugar in the edible product itself. The invention even allows a consumer to experience the intake of a flavoured drink, with low calorie products, for instance water.

[0017] Advantageously, the volatile aromatic product is a natural or artificial flavour or aroma, or an essential oil, selected within the list comprising : aroma, extract or essential oil of fruits, flowers, plants, spices, green or roasted coffee, chocolate, candies, or a mixture thereof.

[0018] The cup lid according to the present invention is advantageously manufactured from a sustainable material selected within the list comprising : cellulosic fibers, paper (white or Kraft), cardboard, bamboo fibers, apple fibers, sugarcane fibers, bagasse, avocado fibers, rice or wheat fibers, pectin, a mineral powder (such as stone powder or sand), biodegradable polymers such as polylactic acid (PLA), polyhydroxyalcanoate (PHA), polybutyrate adipate terephthalate (PBAT), le polysuccinate butylene (PBS), or recycled polyolefin or polyesters or a mixture thereof.

[0019] Preferably it is manufactured by thermoforming a flat blank of material into the desired shape of a lid. Alternatively, it can be made from moulded or pressed pulp.

[0020] The internal surface of the cup lid can be advantageously coated with a thin hydrophobic coating. Alternatively, a hydrophobic compound can be integrated into the mass of the material constitutive of the lid. This

ensures that the liquid contacting the internal surface of the lid does not impact negatively its mechanical properties, especially if said liquid is hot (the lid of the invention can be used for closing a cup containing hot or cold products).

[0021] The present invention is further directed to a closed package for packing and dispensing a food or beverage liquid or semi-liquid product, said package comprising a cup closed by a lid as described above.

Brief description of the drawings

[0022] Additional features and advantages of the present invention are described in, and will be apparent from, the description of the presently preferred embodiments which are set out below with reference to the drawings in which:

Figure 1 is a perspective view showing a lid according to the invention and a cup to be closed by such a lid;

Figure 2 is a perspective top view of a lid according to the invention;

Figure 3 is a perspective underneath view of a lid per the invention.

Detailed description of the invention

[0023] In **figure 1** and in **figure 2** is depicted a lid 1 for closing the upper opening of a cup 2. In the embodiment depicted in the drawing, the cup 2 is adapted for containing a hot liquid beverage product. The lid 1 comprises a substantially flat body 3 and a peripheral rim 4 extending downwardly for attaching said lid to the upper edge 5 of the cup. The lid 1 further comprises a drinking spout 6.

[0024] According to the principle of the invention, the lid 1 comprises a coating 7 comprising at least one volatile aromatic product. The coating 7 is adapted to release said volatile aromatic product with the air that is mixed to said liquid or semi-liquid edible product, at the time the latter is sipped through said drinking spout 6 and release said aromatic product by contact with steam generated by the hot product.

[0025] The coating 7 can be placed on the external surface of the lid body 3, as illustrated in **figure 1**. Alternatively, and preferably, the coating is deposited onto the internal surface of the lid, as shown in **figure 3**. It does not necessarily cover the entire surface, but only a portion of said surface. In the embodiments shown in **figure 1** and in **figure 3**, the coating 7 covers a small portion (illustrated with hashed lines) of the surface of the lid, that is adjacent to the drinking spout 6.

[0026] In the embodiments depicted in the drawing, the lid (1) is manufactured from a mixture comprising 95% cellulosic fibers, about 1% of a mineral powder (such as stone powder or sand), and 4% of a biodegradable polymer such as polylactic acid (PLA), or polyhydroxyalcanoate (PHA) to liaise the fibers and ensure structural

integrity of the material. The material is thermoformed from a flat blank to form the lid. Alternatively, it can be made from moulded or pressed pulp.

[0027] When a hot liquid is poured into the cup 2 which is then closed by the lid 1 of the invention, two sensory effects are generated in a sequence.

[0028] First, steam generated by the hot liquid flows upwardly from the hot liquid surface in the cup towards the outside of the cup, through the drinking spout 6. Doing this, it contacts the coating 7 which is adjacent the spout 6, and by contact with steam, aromatic compounds contained therein are released and mix with the steam. Aromatic steam flows around the cup, which provides a nice scent, that is appealing to the consumer.

[0029] Second, when the consumer sips the product from the cup 2 covered by the lid 1, liquid passes through the spout 6 and towards the mouth. On its way, it is also mixed with the steam and air contained in the cup 2. Aromatic steam is sipped together with the liquid, which enhances the sensory perception within the mouth, by allowing a better mixing of the liquid product 9 with aromatized air that is sipped at the same time by the consumer, said air having entrapped aromas taken from the coating 6.

[0030] Notably, hot liquid contained in the cup is not necessarily aromatized itself, and can be hot water only, which generates steam for releasing aromas contained in the coating as described above. This provides the impression to the consumer that the liquid itself contains flavours, hence providing a nice sensory experience, while providing excellent nutritional and hydration value.

[0031] The invention is defined in the appended claims.

Claims

1. A lid (1) for closing the upper opening of a cup (2), said cup (2) containing a cold or hot, liquid or semi-liquid, food or beverage product, said lid (1) comprising a substantially flat body (3) and a peripheral rim (4) extending downwardly for attaching said lid to the upper edge (5) of the cup (2), said lid (1) further comprising a drinking spout (6) and a coating (7) comprising at least one volatile aromatic product, **characterized in that** the volatile aromatic product is microencapsulated in the coating (7); or

entrapped in a jellified matrix coating for controlled release mechanism; or
stored within a capsule which is coated to the surface of the lid, said capsule being adapted to melt at a predetermined temperature to release the volatile active product;

said coating (7) being adapted to release said volatile aromatic product with air that is mixed to a liquid or semi-liquid edible product, at the time the latter is

sipped through said drinking spout (6) and/or release said aromatic product by contact with steam.

2. A lid (1) according to claim 1, wherein the volatile aromatic product is a natural or artificial flavour or aroma, or an essential oil, selected within the list comprising: aroma, extract or essential oil of fruits, flowers, plants, spices, green or roasted coffee, chocolate, candies, or a mixture thereof.
3. A lid (1) according to any one of claims 1 to 2, which is manufactured from a sustainable material selected within the list comprising: cellulosic fibers, paper (white or Kraft), cardboard, bamboo fibers, apple fibers, sugarcane fibers, bagasse, avocado fibers, rice or wheat fibers, pectin, a mineral powder (such as stone powder or sand), biodegradable polymers such as polylactic acid (PLA), polyhydroxyalcanoate (PHA), polybutyrate adipate terephthalate (PBAT), le polysuccinate butylene (PBS), or recycled polyolefin or polyesters, or a mixture thereof.
4. A lid (1) according to any one of claims 1 to 3, which is manufactured by thermoforming a flat blank of material into the desired shape of a lid.
5. A lid (1) according to any one of claims 1 to 4, wherein the internal surface of the lid body (3) is coated with a thin hydrophobic coating.
6. A closed package (2) for packing and dispensing a food or beverage liquid or semi-liquid product, said package comprising a cup (2) closed by a lid (1) according to claims 1 to 3.

Patentansprüche

1. Deckel (1) zum Verschließen der oberen Öffnung eines Bechers (2), wobei der Becher (2) ein kaltes oder heißes, flüssiges oder halbflüssiges Nahrungsmittel- oder Getränkeprodukt enthält, der Deckel (1) umfassend einen im Wesentlichen flachen Körper (3) und einen Umfangsrand (4), der sich zum Anbringen des Deckels an der oberen Kante (5) des Bechers (2) nach unten erstreckt, der Deckel (1) ferner umfassend eine Trinktülle (6) und eine Beschichtung (7), umfassend mindestens ein flüchtiges aromatisches Produkt, **dadurch gekennzeichnet, dass** das flüchtige aromatische Produkt in der Beschichtung (7) mikroverkapselt ist; oder

in einer gelierten Matrixbeschichtung für einen kontrollierten Freisetzungsmechanismus eingeschlossen ist; oder

innerhalb einer Kapsel aufbewahrt ist, die auf die Oberfläche des Deckels aufgeschichtet ist, wobei die Kapsel geeignet ist, um bei einer zu-

vor bestimmten Temperatur zu schmelzen, um das flüchtige aktive Produkt freizusetzen; wobei die Beschichtung (7) geeignet ist, um das flüchtige aromatische Produkt mit Luft freizugeben, die mit einem flüssigen oder halbflüssigen essbaren Produkt vermischt wird, zu dem Zeitpunkt, wenn letzteres durch die Trinktülle (6) getrunken wird, und/oder das aromatische Produkt durch Kontakt mit Dampf freizugeben.

2. Deckel (1) nach Anspruch 1, wobei das flüchtige aromatische Produkt ein natürlicher oder künstlicher Geschmacks- oder Aromastoff oder ein ätherisches Öl ist, ausgewählt aus der Liste, umfassend: Aroma, Extrakt oder ätherisches Öl von Früchten, Blumen, Pflanzen, Gewürzen, grünem oder geröstetem Kaffee, Schokolade, Süßigkeiten oder eine Mischung davon.
3. Deckel (1) nach einem der Ansprüche 1 bis 2, der aus einem nachhaltigen Material hergestellt ist, ausgewählt aus der Liste, umfassend: Zellulosefasern, Papier (weiß oder Kraft), Pappe, Bambusfasern, Apfelfasern, Zuckerrohrfasern, Bagasse, Avocadofasern, Reis- oder Weizenfasern, Pektin, ein Mineralpulver (wie Steinpulver oder Sand), biologisch abbaubare Polymere wie Polymilchsäure (PLA), Polyhydroxyalcanoat (PHA), Polybutyratadiphterphthalat (PBAT), Polysuccinatbutylen (PBS) oder recyceltes Polyolefin oder Polyester oder eine Mischung davon.
4. Deckel (1) nach einem der Ansprüche 1 bis 3, der durch Thermoformen eines flachen Materialrohlings in die gewünschte Deckelform hergestellt wird.
5. Deckel (1) nach einem der Ansprüche 1 bis 4, wobei die Innenoberfläche des Deckelkörpers (3) mit einer dünnen hydrophoben Beschichtung beschichtet ist.
6. Verschlussene Verpackung (2) zum Verpacken und Ausgeben eines flüssigen oder halbflüssigen Nahrungsmittel- oder Getränkeprodukts, die Verpackung umfassend einen Becher (2), der durch einen Deckel (1) nach den Ansprüchen 1 bis 3 verschlossen ist.

Revendications

1. Couvercle (1) destiné à fermer l'ouverture supérieure d'un gobelet (2), ledit gobelet (2) contenant un produit alimentaire ou un produit de boisson froid ou chaud, liquide ou semi-liquide, ledit couvercle (1) comprenant un corps sensiblement plat (3) et un bord périphérique (4) s'étendant vers le bas pour fixer ledit couvercle au bord supérieur (5) du gobelet (2), ledit couvercle (1) comprenant en outre un bec

verseur (6) et un enrobage (7) comprenant au moins un produit aromatique volatil, **caractérisé en ce que** le produit aromatique volatil est microencapsulé dans l'enrobage (7) ; ou

piégé dans un enrobage matriciel gélifié pour un mécanisme de libération commandé ; ou stocké dans une capsule qui est enrobée avec la surface du couvercle, ladite capsule étant adaptée pour fondre à une température prédéterminée afin de libérer le produit actif volatil ; ledit enrobage (7) étant adapté pour libérer ledit produit aromatique volatil avec de l'air qui est mélangé avec un produit comestible liquide ou semi-liquide, au moment où ce dernier est siroté à travers ledit bec verseur (6), et/ou libérer ledit produit aromatique par contact avec de la vapeur.

2. Couvercle (1) selon la revendication 1, dans lequel le produit aromatique volatil est un saveur ou un arôme naturel ou artificiel, ou une huile essentielle, choisi dans la liste comprenant : arôme, extrait ou huile essentielle de fruits, de fleurs, de plantes, d'épices, de café vert ou torréfié, de chocolat, de bonbons, ou d'un mélange de ceux-ci.
3. Couvercle (1) selon l'une quelconque des revendications 1 à 2, qui est fabriqué à partir d'un matériau durable choisi dans la liste comprenant : fibres de cellulose, papier (blanc ou Kraft), carton, fibres de bambou, fibres de pomme, fibres de canne à sucre, bagasse, fibres d'avocat, fibres de riz ou de blé, pectine, poudre minérale (telle que la poudre de pierre ou le sable), polymères biodégradables tels que l'acide polylactique (PLA), le polyhydroxyalcanoate (PHA), le polybutyrate adipate téréphthalate (PBAT), le polysuccinate de butyle (PBS), ou la polyoléfine ou les polyesters recyclés, ou un mélange de ceux-ci.
4. Couvercle (1) selon l'une quelconque des revendications 1 à 3, qui est fabriqué par thermoformage d'une ébauche plate de matériau en la forme voulue d'un couvercle.
5. Couvercle (1) selon l'une quelconque des revendications 1 à 4, dans lequel la surface interne du corps de couvercle (3) est enrobée d'un enrobage hydrophobe fin.
6. Conditionnement fermé (2) pour le conditionnement et la distribution d'un produit alimentaire ou de boisson liquide ou semi-liquide, ledit conditionnement comprenant un gobelet (2) fermé par un couvercle (1) selon les revendications 1 à 3.

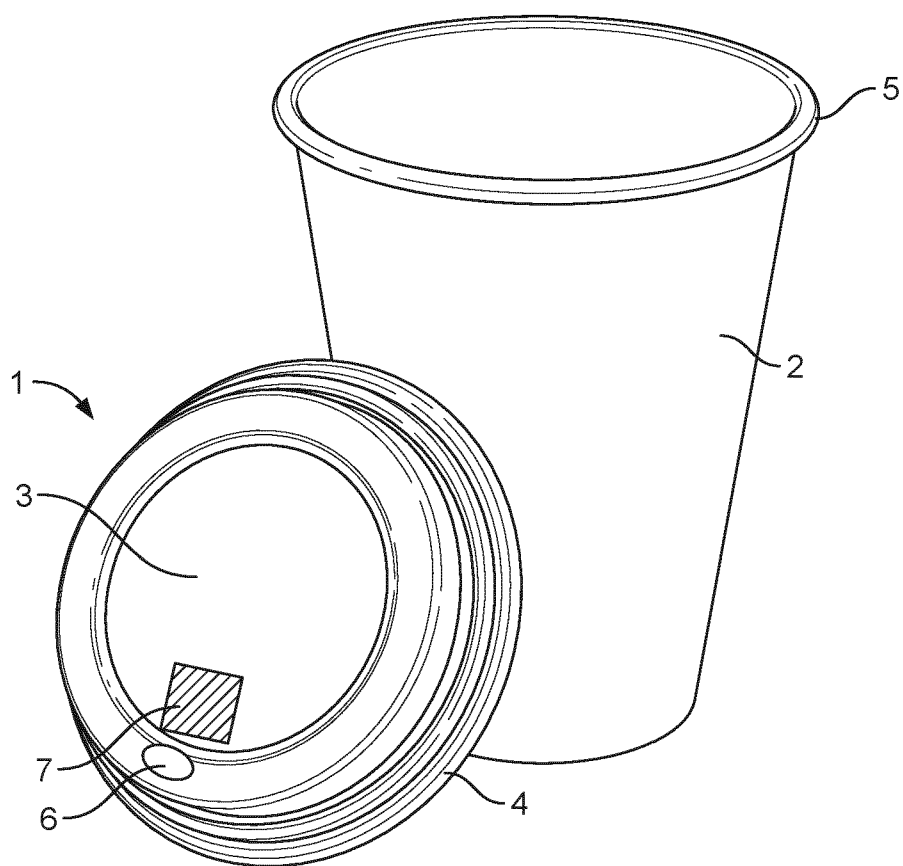


FIG. 1

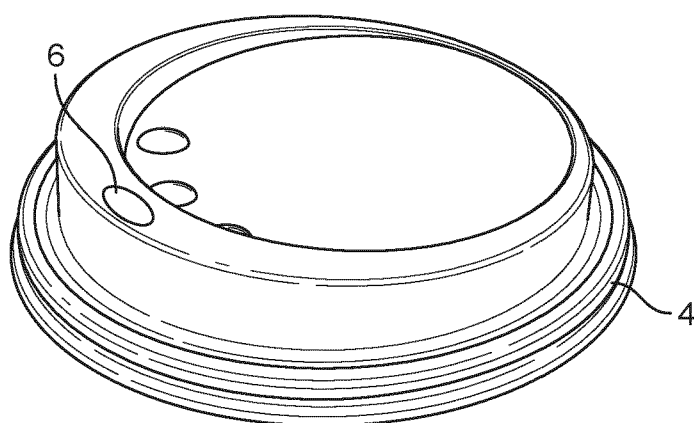


FIG. 2

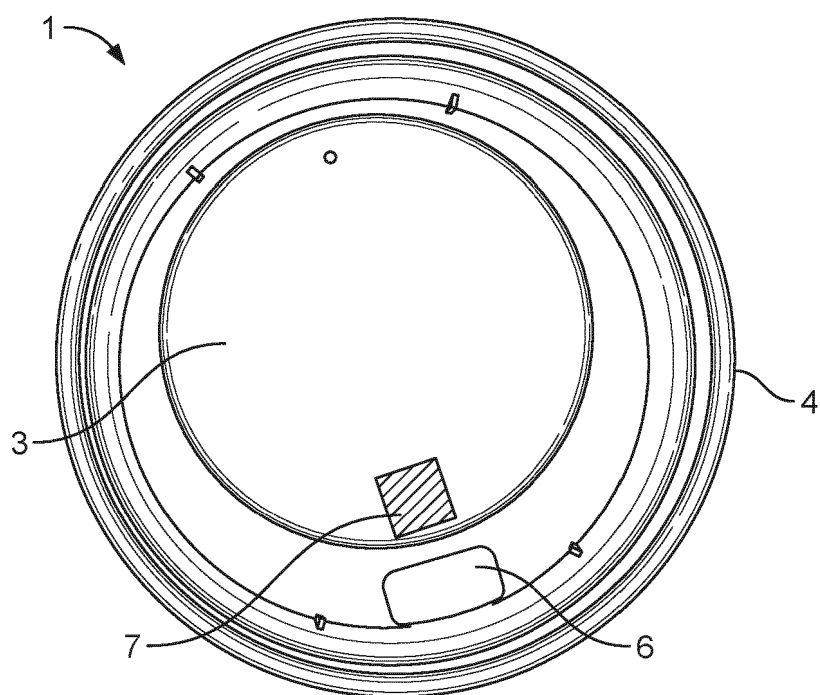


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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