The invention relates to a portion capsule for producing a beverage or a food, comprising a side wall and a bottom, which together define a volume in which a raw material is located, which is extracted, desorbed, and/or dissolved by means of a liquid in order to produce the beverage.
PORTION CAPSULE HAVING A LIQUID DISTRIBUTOR

[0001] The present invention relates to a portion capsule for producing a beverage or a foodstuff, having a side wall and a base which collectively define a volume in which a raw material, which, for producing the beverage, is extracted, desorbed, and/or dissolved by a liquid, is located.

[0002] Portion capsules of this type are well known from the prior art and are employed for producing coffee, espresso, cappuccino, and milk-and-cocoa beverages, and so forth, for example. However, portion capsules of this type may also serve for producing foodstuffs, for example soups. To this end, a liquid, in particular hot water, which extracts, desorbs, and/or dissolves the beverage to be produced from the raw material, is induced into the portion capsule. However, the yield which is achieved thereby is often unsatisfactory.

[0003] It has therefore been the object of the present invention to provide a portion capsule which does not exhibit the disadvantages of the prior art.

[0004] The object is achieved with a portion capsule for producing a beverage or a foodstuff, having a side wall and a base which collectively define a volume in which a raw material, which, for producing the beverage, is extracted, desorbed, and/or dissolved by a liquid, is located, wherein a liquid distributor which distributes the liquid perfusing into the portion capsule at least partially across the cross section thereof is preferably provided in the volume, wherein the liquid distributor is provided so as to be movable and/or deformable, and/or modifiable in terms of its volume.

[0005] The present invention equally applies to the other subject matter and vice-versa.

[0006] The present invention relates to a portion capsule for producing a beverage or a foodstuff. The portion capsule has a side wall which may be designed so as to be cylindrical or conical, for example, or else so as to have a rectangular, square, or elliptic cross section. A base is provided, in particular in an integral manner, at one end of the side wall. The side wall and the base may be produced by vacuum forming a film web or by injection molding, for example. The base and the side wall define a volume in which a raw material, which, for producing the beverage, is extracted, desorbed, and/or dissolved by a liquid, is provided. The liquid here perfuses through the portion capsule in a main flow direction, in particular from the base to the opposite end of the portion capsule, or vice-versa. The raw material is typically provided in the form of particles. The particles may be compressed in the portion capsule. The raw material is coffee powder or tea, for example, the leaves of the latter having preferably been comminuted. Alternatively or additionally, there is milk powder, cocoa powder, a pulvulent substance for producing a nutritional supplement, or for example a substance by way of which a foodstuff, for example soup, is produced, in the capsule. However, there may also be other foodstuff raw materials in the portion capsule. Furthermore, the raw material may be a cleaning agent by way of which the automatic coffee machine in which the portion capsules for producing the beverage or the foodstuff at least partially distributes the liquid, in particular hot water, which perfuses into the portion capsule across the cross section thereof. This liquid distributor is provided upstream of the raw material and so as to be movable in the volume, that is to say that the liquid distributor is not connected in a materially integral, form-fitting, and/or force-fitting manner to the side wall, a flange at the upper periphery of the side wall, and/or to the base or the cover film of the portion capsule such that said liquid distributor cannot move. The liquid distributor is movable, for example, by the liquid in the flow direction thereof and preferably compresses the raw material, or at least prevents the formation of an undesired flow duct in the raw material. However, on account of environmental influences, the distributor may be deformed even during storage or shipping. However, it is also possible for the liquid distributor to modify its angular position in relation to the portion capsule. Alternatively or additionally, the liquid distributor is configured so as to be deformable, that is to say that it may be deformed during the production operation of the liquid or of the foodstuff, for example. The distributor is elastically or plastically deformed in particular under pressure from the inflowing liquid. However, the distributor may under circumstances also be deformed on account of environmental influences during storage or shipping. According to one further embodiment according to the invention or preferred embodiment, the volume of the distributor is modified in particular during production of the beverage or of the foodstuff, preferably under the influence of the liquid and/or temperature. The distributor preferably swells as soon as it is in contact with the inflowing liquid.

[0007] The liquid distributor is provided so as to be upstream of the liquid supply into the portion capsule, preferably between the base and the raw material, or between the raw material and the limitation of the portion capsule which is opposite the base, for example a cover film. According to one further subject matter according to the invention or a preferred subject matter of the present invention, the liquid distributor bears on the raw material, that is to say the liquid distributor also at least partially limits the freedom of movement of the raw material in the portion capsule.

[0008] The narrative offered for this subject matter of the present invention applies equally to the other subject matter, and vice-versa.

[0009] The cross section of the liquid distributor at least in portions is preferably smaller than the cross section of the portion capsule in that region in which the liquid distributor bears on the raw material. This preferred embodiment of the present invention has the advantage that in particular axial movement, that is to say movement along a symmetry axis of the portion capsule in the main flow direction of the liquid through the portion capsule, is enabled, in particular when the side wall of the portion capsule is provided so as to be conical.

[0010] According to one further preferred embodiment or an embodiment according to the invention, the liquid distributor is a granulate material.

[0011] According to the invention, the portion capsule, in particular in the volume, has a liquid distributor which at least partially distributes the liquid, in particular hot water, which perfuses into the portion capsule across the cross section thereof. This liquid distributor is provided upstream of the raw material and so as to be movable in the volume, that is to say that the liquid distributor is not connected in a materially integral, form-fitting, and/or force-fitting manner to the side wall, a flange at the upper periphery of the side wall, and/or to the base or the cover film of the portion capsule such that said liquid distributor cannot move. The liquid distributor is moved, for example, by the liquid in the flow direction thereof and thereby preferably compresses the raw material, or at least prevents the formation of an undesired flow duct in the raw material. However, on account of environmental influences, the distributor may be deformed even during storage or shipping. However, it is also possible for the liquid distributor to modify its angular position in relation to the portion capsule. Alternatively or additionally, the liquid distributor is configured so as to be deformable, that is to say that it may be deformed during the production operation of the liquid or of the foodstuff, for example. The distributor is elastically or plastically deformed in particular under pressure from the inflowing liquid. However, the distributor may under circumstances also be deformed on account of environmental influences during storage or shipping. According to one further embodiment according to the invention or preferred embodiment, the volume of the distributor is modified in particular during production of the beverage or of the foodstuff, preferably under the influence of the liquid and/or temperature. The distributor preferably swells as soon as it is in contact with the inflowing liquid.
The granulate material is preferably a plastics material, an organic material, or an inorganic material.

According to one preferred embodiment, the granulate material is composed of the same material as the raw material or has at least one component of the raw material, wherein the granulate material has a larger cross section than the mean particle diameter of the raw material. The granulate material is, for example, very coarsely ground coffee beans or very coarsely cut tea leaves. The granulate material here does not have the task of having a beverage or foodstuffs component part being extracted or desorbed to any significant extent therefrom and/or of the granulate material being dissolved, but substantially has a liquid distribution function.

According to one preferred embodiment, the granulate material has a swellable component. The granulate material may at least in part be composed of cellulose and/or starch.

According to one preferred embodiment, the granulate material is provided as a layer which very particularly preferably adjoins the raw material layer. This layer preferably has a larger thickness than the largest diameter of the particles of which the granulate material is composed.

A separating agent, for example a woven or non-woven material or a film which is permeable to the liquid, is preferably provided between the layer and the raw material, in order to prevent the granulate material and the raw material from mixing. The separating agent may be made from a natural material or a plastics material. Examples of a non-woven material include a felt or a non-woven structure, or a paper filter.

The granulate material is preferably at least in portions, in particular completely, surrounded by a casing. This casing has the advantage that the granulate material remains in a particular shape and/or that it cannot mix with the raw material. The casing may be passed through by the liquid.

According to one further preferred subject matter of the present invention, or a subject matter according to the invention, a filler material has been added to the raw material.

The narrative offered for the portion capsule according to the invention also applies equally to the method according to the invention, and vice-versa. Features of the method may be combined with features of the other subject matter of the present invention, and vice-versa.

This filler material is at least not as heavily extracted, desorbed, and/or dissolved as the raw material. The filler material preferably serves for liquid distribution and/or for filling the portion capsule in the case where the raw material does not completely fill the volume in the portion capsule.

The narrative offered for the portion capsule according to the invention also applies equally to the method according to the invention, and vice-versa. Features of the method may be combined with features of the other subject matter of the present invention, and vice-versa.

The granulate material and/or the filler material are/is preferably provided from a swellable material.

Preferably, or according to one embodiment according to the invention, the liquid distributor is provided from a fibrous material or from a material which is composed of one or a plurality of threads.

The narrative offered for the portion capsule according to the invention also applies equally to the method according to the invention, and vice-versa. Features of the method may be combined with features of the other subject matter of the present invention, and vice-versa.
To this end, skin residue of the coffee cherries, or coffee skins, respectively, and/or sugar-beet chips are preferably used and particularly preferably pressed to form a disk, particularly preferably having a thickness which is smaller than the intermediate space between the surface of the beverage substance/foodstuff substance and the cover film. Upon commencement of the brewing operation, the liquid percolates through the layer which immediately begins to swell, on account of which the intermediate space between the beverage substance/foodstuff substance and the cover film inner side is at least partially closed off.

A further subject matter of the present invention is a method in which a connection between particles of the beverage substance/foodstuff substance, which has been established by an adhesive, is released again upon perfusion of the beverage substance/foodstuff substance.

The narrative offered for the portion capsule according to the invention also applies equally to the method according to the invention, and vice-versa. Features of the method may be combined with features of the other subject matter of the present invention, and vice-versa.

The inventions will be explained hereunder by means of FIGS. 1 to 7. These explanations are merely exemplary and do not limit the general concept of the invention. In the figures:

FIGS. 1 to 4 show in each case one embodiment of the portion capsule according to the invention;

FIGS. 5 to 7 show in each case the granulate material and the raw material.

FIG. 1 shows the portion capsule 1 according to the invention. This portion capsule has a capsule body 16 which in the present case is composed of a conically shaped side wall 2 and a base 5. The side wall 2 and the base 5 define a volume 14. The side wall, at the end thereof which is opposite the base, in the present case has a flange 4 on which a cover film 3 is attached, in particular sealed, said cover film 3 separating the volume 14 from the environment. The beverage raw material or foodstuff raw material is provided in the volume. Furthermore, a retaining element 6, for example a sleeve, which prevents raw-material particles reaching the beverage, may be provided in the volume. The raw material may be coffee powder, tea leaves, or else milk powder, cocoa powder, a nutritional supplement powder, or a raw material by way of which a foodstuff, for example soup, is produced. In order for a beverage or a foodstuff to be produced, the portion capsule is perfused by a liquid which extracts the raw material and/or desorbs substances therefrom and/or dissolves the raw material. The liquid is preferably hot water which perfuses the portion capsule preferably from the base 5 to the cover 3, or vice-versa. According to the invention, a liquid distributor 8 by way of which the inflowing liquid is distributed across the cross section of the portion capsule is furthermore provided in the volume. In the present case the liquid distributor is provided between the raw material and the cover film. However, the liquid distributor may also be interposed between the base and the raw material. This liquid distributor distributes the liquid by way of which the beverage or the foodstuff is produced at least partially across the cross section of the portion capsule. The liquid perfuses the liquid distributor and then comes into contact with the raw material and extracts or desorbs therefrom flavoring substances and/or dissolves beverage particles or foodstuff particles. In order for the beverage to be produced, the portion capsule is perforated preferably in the region of the cover 3 and in the region of the base 5. The liquid flows into the portion capsule through one of these openings and flows out therefrom through the other.

FIG. 2 shows a first embodiment of the portion capsule according to the invention, Reference may substantially be made to the narratives according to FIG. 1, wherein in the present case the liquid distributor 8 is provided such that the latter is moved in the direction identified by the arrow and on account thereof compresses the raw material 7 for example, when the liquid flows in through the cover 3.

According to one further embodiment (not illustrated) of the present invention, the liquid distributor swells when liquid flows into the volume, that is to say that the volume of the liquid distributor is preferably enlarged so much that the space between the raw material and the cover or the base is at least partially, preferably completely, filled, and/or the raw material is compressed.

In FIG. 3 one further embodiment of the portion capsule according to the invention is illustrated. Reference is again made to the narratives according to FIG. 1. In the present case the distributor is provided such that the latter is deformed in particular during production of the beverage or of the foodstuff, in particular on account of the influence of a hot pressurized liquid, and on account thereof in turn preferably compresses the raw material 7. In the present case the distributor is also perfused by the liquid during production of the beverage or of the foodstuff.

FIG. 4 shows one further embodiment of the portion capsule according to the invention. In the present case the raw material 7 has a filler material 10 which in the present case is provided so as to be particulate. This filler material may be from a plastics material, an organic material, or an inorganic material. The filler material may be at least partially identical to the raw material and/or have one component thereof, wherein the filler material has a larger, preferably a much larger particle size than the mean diameter of the raw material provided in a pulverulent manner. The filler material is coarsely ground coffee beans or coarse tea particles, for example. The filler material is preferably provided to be from a swellable material, for example cellulose or starch.

FIG. 5 shows the raw material 7 and the liquid distributor 8, which are both located in the volume 14 of the portion capsule. In the present case the liquid distributor 8 is provided as a layer 15 of a granulate material 11. In the present case this granulate material is located at that side at which the liquid flows into the portion capsule. Fluid ducts, through which the liquid can perfuse and which distribute the liquid at least partially across the cross section of the portion capsule, are located between the individual particles of the granulate material 11. The individual particles of the granulate material are preferably substantially larger than the mean grain diameter of the raw material. The thickness D of the granulate material layer is preferably larger than the largest diameter of the particles of the granulate material. The granulate material is preferably from the same or a similar material as the raw material, or has at least one component thereof. The granulate material is coarsely ground coffee beans or coarse tea particles, for example.

A preferred embodiment of the embodiment according to FIG. 5 is illustrated in FIG. 6. In the present case a separating agent, for example a liquid-permeable film which prevents the granulate material mixing with the raw material, is provided between the granulate material 11 and the raw material 7.
FIG. 7 shows one further preferred embodiment of the liquid distributor 8 which is provided as a granulate material. In the present case the granulate material is provided in a casing which may be perfused by the liquid. The liquid distributor is held in a particular shape by this casing, and/or mixing with the raw material is avoided thereby. The casing is permeable to the liquid for producing the beverage or foodstuff.

LIST OF REFERENCE SIGNS

1 Portion capsule
2 Side wall
3 Cover film
4 Flange
5 Base
6 Filter element
7 Raw material
8 Liquid distributor
9 Cross section
10 Filler material
11 Granulate material
12 Separating agent
13 Casing of the granulate material
14 Volume
15 Layer
16 Capsule body
17 Thickness of the granulate material layer

1. A portion capsule for producing a beverage or a foodstuff, having a side wall and a base which collectively define a volume in which a raw material, which, for producing the beverage, is extracted by a liquid, is located, wherein a liquid distributor which distributes the liquid perfusing into the portion capsule across the cross section thereof is preferably provided in the volume, so as to be upstream of the coffee powder, characterized in that the granulate material is coffee granulate material which has a larger cross section than the mean particle diameter of the coffee powder.

2. The portion capsule as claimed in claim 1, characterized in that the liquid distributor bears on the raw material.
3. (canceled)
4. (canceled)
5. The portion capsule as claimed in claim 1, characterized in that the granulate material is an organic material.
6. (canceled)
7. The portion capsule as claimed in claim 1, characterized in that the granulate material is provided as a layer.
8. The portion capsule as claimed in 5, characterized in that a separating agent is provided between the layer and the raw material.
9. The portion capsule as claimed in claim 1, characterized in that the granulate material at least in portions is surrounded by a casing.
10. (canceled)
11. The portion capsule as claimed in claim 1, characterized in that the granulate material is provided from a swellable material.
12. (canceled)
13. (canceled)
14. (canceled)
15. (canceled)
16. (canceled)
17. (canceled)
18. The portion capsule as claimed in claim 1, characterized in that the liquid distributor at least partially is provided from a natural material, in particular wood, wood fibers, or cork.
19. The portion capsule as claimed in claim 18, characterized in that the liquid distributor is composed of interconnected fibers or pieces.
20. (canceled)