Fixing volatiles in an amorphous substrate and products therefrom.

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Technical field

The present invention relates to a method for fixing volatile substances, and more particularly to a method for fixing a volatile substance in an amorphous substrate and the products derived therefrom.

In the quest for giving the consumer a fresher tasting reconstitutable beverage mix, it has been found that certain natural or synthetic volatile compounds, improve the consumer's taste perception thereof. Unlike liquid systems, systems which can be loaded with volatile flavorants without adverse stability problems, it is within a dry comestible mix like convenience-beverage mixes, that the instilling of flavor enhancers to increase the consumer's perception of freshness is of paramount importance.

Such compounds as coffee arome, esters, acetaldehyde, various essential oils, and sulphur compounds, augment or enhance the taste perception of convenience foods. Dry comestible mix systems as stated hereinabove, present special problems when one tries to introduce volatile or aromatic flavorants therein. For example, such flavor enhancers as acetaldehyde escape through and from the mix, or react so as to degrade into compounds which are recognized to be less desirable. Therefore, there has been a longstanding need to, reversibly fix by encapsulation, and prevent the escape of, a volatile within a "powdered-mix" comestible. Moreover, the method for fixing a volatile must produce a product which is easily reconstitutable and is capable of holding the fix over prolonged periods and under adverse storage conditions.

A major problem inherent in fixing aromatics in food acceptable substrates is the fact that those fixation substrates display idiosyncratic fixation characteristics. The substrate media may be sensitive to moisture, interact with the entrained volatile or produce off-notes of flavor. Carbohydrates as a class offer a food-acceptable substrate wherein volatiles and aromatics have been fixed. However, most water-soluble carbohydrate substrates are hygroscopic and will not reliably hold the fix for long periods. In view of the foregoing, there is a recognized need for a moisture-stable, water-soluble food-approved substrate to encapsulate aromatic or volatile flavorants.

Prior art

There have been many attempts to fix volatiles and aromatics. The most notable attempts to create such dry products are outlined hereinbelow.

U.S. Patent 2,856,291 issued to Schulte discloses a method for incorporating a volatile flavoring substance in a sugar substrate. He accomplishes this by preparing an emulsion of the sugar, flavor oil and water, and he blends said components to form an emulsion. Among the flavoring materials which he uses are flavor oils, such as orange oil and lemon oil and synthetic agents such as aldehydes, alcohols, esters, and other volatile agents. Among the aldehydes that he lists are decanal and cinnamaldehyde.

U.S. Patent 3,314,803 issued to Dame et al., provides a method for fixing a volatile flavor such as acetaldehyde in a mannitol substrate. The acetaldehyde is fixed in mannitol by first forming a solution of mannitol and water and preferably a supersaturated solution of mannitol of between 25%—45% by weight. The supersaturated solution is formed by heating with agitation 2 to 10 parts by weight of mannitol with 10 parts by weight of water at 180°—212°F until all of the mannitol is dissolved in the water and no mannitol crystals remain in the solution. The solution is then cooled while acetaldehyde is added thereto. A controlled reflux admixes the volatile. The reference solution is then spray-dried.

U.S. Patent 3,554,768 issued to Feldman, provides a method for fixing acetaldehyde in selected carbohydrates, said method relying on a carbohydrate substance and acetaldehyde, said substances being uniformly mixed in water and the resulting mixture being dried to form a flavor enhancing composition.

It should be noted that stability of the Feldman product is dependent on maintaining the product in a hermetically-sealed environment. It was found, after producing samples according to the teachings of the above-identified patent, that the samples produced thereby were exquisitely sensitive to moisture. In fact, within 28 hours after exposure to ambient conditions, partial collapse of the product was noted. The extent of structural collapse over time was so extreme that the product "clumped" into a sticky, ball-like mass. In distinction, the present invention displays a marked tolerance to moisture, and will not cake when exposed to ambient conditions.

In the aforementioned prior art examples, the disadvantage of using the above-enumerated compounds or methodologies is the low fix obtained therefrom or the moisture-lability of the resultant products. Stability of previously available products is in most cases dependent on a hermetically sealed product environment, which is kept free from ambient moisture levels.

Previously available fixation media display a great degree of crystallinity. Crystallinity appears to reduce the interstitial macro-molecular space wherein volatile flavorants may be entrapped and held. It has been found that with an increase in crystallinity there is a concomitant decrease in the ability of the substrate to "fix" volatiles. On the other hand, there are several classes of non-crystalline compounds which appear to be unsuitable fixation media. Gums and waxy starches, present "leaky" substrates, a substrate whose structure will not retain the entrapped acetaldehyde component over time.

U.S. 4,271,202 discloses a process for fixing volatile flavorants in an amorphous substrate comprising the steps of:
a) admixing lactose and starch hydrolysate in an aqueous system;
b) incorporating a volatile flavorant in the aqueous mixture; and
c) spray-drying the aqueous mixture.

This publication discloses proportions of lactose; starch hydrolysate ranging from 20%; 80% to 77%;
23% and teaches that the range 40% to 70% lactose; 60% to 30% starch hydrolysate results in superior
retention of flavorant.

Summary of the invention
In one aspect the invention provides a process for fixing volatile flavorants in an amorphous substrate
comprising the steps of:
a) admixing a low molecular weight water-soluble material having a molecular weight of 90 to 500 and
a melting point of 80°C to 180°C and a high molecular weight, water-soluble polymeric material having a
molecular weight of 1,000 to 6,000 in an aqueous system so that the low molecular weight material
comprises from 10% to 30% by weight and the high weight molecular material comprises not less than
70% by weight of the solids contained in the aqueous system;
b) incorporating a volatile flavorant within the aqueous mixture; and
c) spray-drying said aqueous mixture.

Preferably the low molecular weight material is chosen from glucose, maltose, mannose, malic acid,
citric acid, adipic acid and combinations thereof.

Preferably the volatile flavorant is chosen from aldehydes, essential oils, esters, sulfur compounds and
coffee aroma.

Preferably the high molecular weight water-soluble material is malto-dextrin with a D.E. of from 5 to 15
containing not more than 10% monosaccharides or disaccharides.

In another aspect, the invention provides a spray-dried moisture stable fixed flavorant comprising:
a) a substrate of from 10% to 30% of a low molecular weight water-soluble material having a molecular
weight of 90 to 500 and a melting point of 80°C to 180°C and at least 70% of a high molecular weight
material having a molecular weight of 1,000 to 6,000; and
b) a volatile flavorant fixed therein.

Preferably said low molecular weight material is high maltose corn syrup solids.

A preferred flavorant comprises:
a) a substrate consisting of 20% maltose and 80% malto-dextrin; and
b) acetaldehyde fixed therein.

The combination of high and low molecular weight material is dissolved in an aqueous
solution with the temperature preferably being maintained at around 10—90°C. In the case of a highly
volatile substance like acetaldehyde, the solution may be allowed to cool to about 20°C. The volatile or
aromatic flavorant is then added to the solution, the solution suitably being maintained at from 10°C to
50°C. The solution is then spray-dried in an atmospheric spray-drier wherein the inlet temperature is
typically about 100°C to 180°C and the outlet temperature is suitably from 50°C to 80°C with the resultant
fixed product being moisture-stable and of a prolonged shelf life.

Detailed description
Set out hereinbelow is the preferred methodology for fixing volatile agents in an amorphous or
"glassy" substrate, so that a moisture-stable product of an elevated fix results. The volatile agent will be
described as an aldehyde-type agent (acetaldehyde, butyraldehyde) although essential oils (e.g. orange oil)
and aromas (e.g. coffee aroma) may be operatively substituted.

The term high molecular weight water-soluble polymer includes such materials as malto-dextrin, a
detergent possessing a predominate amount of polysaccharide. Typically, malto-dextrin or other dextrins of
suitable D.E. (dextrose equivalents) are composed of varying numbers of monosaccharides, disaccharides
and larger saccharide units. For example, LO-DEX 5 and 15 (malto-dextrins manufactured by American
Maize Products Company, 1100 Indianapolis Boulevard, Hammond, Indiana) contains less than 1%
monosaccharides, less than 2% disaccharides and less than 2% trisaccharides for LO-DEX 5 and less than
3% monosaccharides, 2% disaccharides, and 2% trisaccharides for LO-DEX 15. In the malto-dextrins used
herein (LO-DEX 5, 10, 15) the content of tetrasaccharides or higher member carbohydrates exceeds 93% by
weight of the malto-dextrin. Low molecular weight water-soluble materials, for illustrative purposes of the
present invention, are such crystalline materials as adipic acid, malic acid, citric acid, mannose, maltose or
other mono or disaccharides having melting points of from 80°C to 180°C. and combinations thereof.

The procedure of spray drying, for purposes of the present invention may be defined as follows. A
solute of the product one wishes to form is prepared. The term solution is understood to mean mixtures of
solutes and a solvents encompassing such mixtures as emulsions. The solution is fed into an atomizer
which creates a fine mist, composed of regular-sized droplets. The misted-solution is introduced, usually
through the top of a drying tower or chamber. Heated air is usually fed into the bottom of the chamber or
the chamber is heated so that as the droplets fall from the top of the chamber evaporation of the liquid
phase or drying occurs. The product is collected from an outlet port. Examples of spray drying apparatus
are the Anhydro Dryers (manufactured by Anhydro Corp. of Brattleboro Falls, Massachusetts) or the Niro
Dryer (manufactured by Niro Atomizer Ltd., Copenhagen, Denmark).
It appears that the operative principle, which characterizes the instant invention, is the maximization of the inherent fixative qualities of high molecular weight materials. For example, it has been found that a malto-dextrin (D.E. 10) enables one to obtain a 4.6% fix. The problem inherent therein, is that although the fix is quite high, it is ephemeral, and rapidly dissipates. This fixative material is structurally weak and the volatile "leaks" through the inadequate infra-structure.

A solution to the problem of how to optimize the inherent fixative properties of polysaccharides or other higher molecular weight materials, is by way of combining the high molecular weight material with a second selected material to increase the structural integrity of the structurally weak high molecular weight material, giving unexpectedly dense substrate which is relatively non-hygroscopic. It appears that although small amounts of low molecular weight materials beneficially affect the fixation qualities of such high molecular weight materials as malto-dextrins, a minimum amount of the low molecular weight material is necessary. The minimum amount may be defined as the amount necessary to make the substrate truly amorphous, that is, a substrate without even a partially crystalline substructure. For example, in the present invention, it appears that the low molecular weight material should comprise from 10% to 30% of the combination of low and high molecular weight materials. More preferably, it has been found that about 20% low molecular weight material provides the optimum amount to the combination. As illustrated hereinbelow, a ratio of less than 30% low molecular weight material and at least 70% of high molecular weight material yields a spray-dried substrate capable of entrapping volatiles in an essentially non-hygroscopic "glassy" (amorphous) substrate for prolonged periods.

Set out hereinbelow are ten examples (1—10) of the instant process outlining the methodology proposed therein. The examples are merely for illustrative purposes and are not designed to in any way limit the instant invention.

Example 1

An aqueous solution of maltose (monohydrate) of a molecular weight (M.W.) of 342 and a melting point 102°C was prepared by dissolving 60 g of maltose in 600 ml of water at 25°C. Upon complete solubilization of the maltose 240 g of LO-DEX 10 (maltodextrin) with an average molecular weight of 2800 was added, and the solution was heated to about 95°C until the solution became clear. This solution was allowed to cool to about 30°C. To this solution 30 ml of acetaldehyde was added and the solution was kept at about 25°C. The mixture was dried in a NIRO Dryer, the drying temperatures ranging from an inlet temperature of 110°—165°C to an outlet temperature of 75°C. The fix of acetaldehyde of the sample, was found to be 3.56% which was stable and non-hygroscopic; after 8 days at ambient an open beaker the fix stabilized at 3.07%.

Example 2

An aqueous solution containing 240 grams of LO-DEX 10 (a malto-dextrin manufactured by American Maize Products Company, Hammond, Indiana) (a malto-dextrin of 10 D.E.), 60 grams of mannose and 300 grams of water was prepared. The aqueous mixture was heated to about 80°C to accelerate dissolution of the maltodextrin. Upon clearing, the solution was cooled to ambient temperature; 23.6 grams of acetaldehyde were added thereto. The mannose-maltodextrin-acetaldehyde solution was introduced into a Niro Dryer (see above). The spray drier was maintained with an inlet temperature of 115°C and an outlet temperature of 75°C. The solution was atomized and dried within the spray-drying apparatus. A dry free flowing product was obtained from the spray drier; the powder was found to have an acetaldehyde fix of 3%. A ten gram sample was set out at ambient temperature and humidity in an open beaker. After 16 days the fix stabilized at around 2%, and the powder-like product remained free flowing.

Example 3

An aqueous solution containing 85 grams of commercially produced spray dried instant coffee of an average weight of about 3,000 M.W. (at least 90% of the solids contained herein are from 1,000 to 5,000 M.W.) 15 grams of mannose and 200 mls. of water was prepared. The solution was maintained at 25°C and 7.3 grams of acetaldehyde was added thereto. The solution was spray dried in accordance with Example 1 above. The acetaldehyde fix was initially found to be .99% on a dry weight basis, remaining at .93% after being exposed to ambient temperatures and humidities for three days; no caking was noted.

Example 4

240 g of LO-DEX 10, 30 g of mannose and 30 g of maltose were dissolved in 600 ml water. The mixture was heated to 90°C to accelerate the rate of dissolution. The clear solution was then cooled to 15°C and 22 ml (17.3 g) acetaldehyde was added thereto followed by spray-drying (Niro, inlet 110°C, outlet 70°C). A free-flowing powder was obtained with an initial acetaldehyde level of 3.5%. A sample was exposed for 4 days (open beaker at ambient temperatures and humidities), the acetaldehyde fix content was 3.34%. There was no observable signs of caking and the powder was free-flowing.

Example 5

An aqueous solution of high maltose corn syrup having an average molecular weight of 430 M.W. and being further composed of 80.7% solids, (A. E. Staley Decatur, Illinois) was prepared by mixing 215 kg (474
0 146 308

lbs.) of syrup with 1582 kg (3487 lbs.) water. Upon complete solubilization 693 kg (1527 lbs.) of LO-DEX 10 of 2600 M.W.) was added and the solution was maintained at ambient temperature. The solution was maintained at about 22°C and 41,8 kg (91.6 lbs.) of acetaldehyde was added, with the solution being kept at between 22°—25°C. The mixture was then dried in an Anhydro-Type Dryer. An inlet temperature 132°C and an outlet temperature of between 60°C—75°C was employed, the aldehyde fix was found to be 3.1%, and after 13 days at ambient, stabilized at 2.7%.

Example 6

240 g of LO-DEX 10 and 60 g of citric acid were dissolved in 600 ml of water (80°C). The clear aqueous solution was allowed to cool to room temperature and 18 g of diacetyl (a volatile flavorant) was added thereto. The solution was spray-dried wherein the inlet temperature was maintained at 110°C, and the outlet temperature was maintained at 55°C. On spray-drying a non-hygroscopic free-flowing powder was obtained with an initial diacetyl level of 2.91% (w/wt). After storage for 3 days in an open container (ambient conditions) a diacetyl fix of 2.88% was measured with no signs of caking or loss of flowability.

Example 7

240 g of LO-DEX 10 and 60 g of adipic acid were dissolved in 1150 ml of water. 18 g of diacetyl was mixed therein, and the solution was spray dried in a “Niro”-type dryer. The inlet air temperature was maintained at about 110°C and the outlet air temperatures was maintained at about 73°C. Upon spray drying a free flowing powder was obtained with an initial diacetyl fix of 2.4%. After 8 days in an open beaker, the powder remained free flowing and retained a 1.44% diacetyl fix.

Example 8

240 g of LO-DEX 10 and 60 g of malic acid were dissolved in 600 ml of water. To the solution, 18 g of diacetyl was added. The solution was spray dried in accordance with Example 7. An initial fix of 3.2% diacetyl was obtained and after 4 days under ambient conditions, the fix stabilized at about 2.2%.

Example 9

Stability of acetaldehyde in maltose—maltodextrin mixtures

In all experiments reported in this example, LO-DEX 10 was used. According to manufacturer (Amaizo, see above) it contains approximately 1% monosaccharides and 4% disaccharides. The total monosaccharides and disaccharides are calculated on the following page. The table of Example 9 illustrates the relative stabilities of the asserted combination-type substrate, showing optimization of fix as related to stability in view of composition. As one can deduce from the table, an optimal combination is approached when the added disaccharide (maltose) is about 20% to about 30% by weight of the combination of the mixture of LO-DEX 10 and maltose.
<table>
<thead>
<tr>
<th>Sample</th>
<th>Maltose added (wt.%)</th>
<th>LO-DEX 10 added (wt.%)</th>
<th>Total mono- and disacch. (%)</th>
<th>Total disacch. (%)</th>
<th>Acetald. fix Initial</th>
<th>Acetald. fix 5 days</th>
<th>Product performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>0</td>
<td>100</td>
<td>5%</td>
<td>4%</td>
<td>4.6</td>
<td>1.2</td>
<td>Not stable, Low Density</td>
</tr>
<tr>
<td>(2)</td>
<td>15</td>
<td>85</td>
<td>19.3</td>
<td>18.4</td>
<td>3.5</td>
<td>3.1</td>
<td>Stable</td>
</tr>
<tr>
<td>(3)</td>
<td>20</td>
<td>80</td>
<td>24.3</td>
<td>23.2</td>
<td>3.6</td>
<td>3.2</td>
<td>v-stable, Dense</td>
</tr>
<tr>
<td>(4)</td>
<td>25</td>
<td>75</td>
<td>28.8</td>
<td>28.0</td>
<td>4.7</td>
<td>3.8</td>
<td>v-stable, Dense</td>
</tr>
<tr>
<td>(5)</td>
<td>30</td>
<td>70</td>
<td>33.5</td>
<td>32.8</td>
<td>4.1</td>
<td>3.4</td>
<td>Slightly caked after 5 days</td>
</tr>
<tr>
<td>(6)</td>
<td>40</td>
<td>60</td>
<td>43.0</td>
<td>42.4</td>
<td>5.0</td>
<td>0.9</td>
<td>Caked in 2 days</td>
</tr>
</tbody>
</table>
Example 10
Correlation of high molecular weight and fix

<table>
<thead>
<tr>
<th>Sample</th>
<th>Composition</th>
<th>Average mol. wt. of polymer</th>
<th>Acetaldehyde level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Initial</td>
</tr>
<tr>
<td>A</td>
<td>30% Maltose 35% Lodex 10 35% Tapioca Dextrin (DE 1) (mfc. Staley Inc.)</td>
<td>18,000</td>
<td>3.9%</td>
</tr>
<tr>
<td>B</td>
<td>30% Maltose 70% Lodex 10</td>
<td>2,600</td>
<td>4.95%</td>
</tr>
<tr>
<td>C</td>
<td>30% Maltose 70% Malto-dextrin with a D.E. of 5</td>
<td>4,000</td>
<td>4.19%</td>
</tr>
<tr>
<td>D</td>
<td>25% Saccharin 75% Polyvinylpyrrolidone</td>
<td>40,000</td>
<td>1.3%</td>
</tr>
<tr>
<td>E</td>
<td>30% Mannitol 70% Capsul (Modified Starch)</td>
<td>10,000</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

As stated hereinabove, it appears that the molecular weight of the high molecular weight component is critical to the fixative qualities of the substrate as a whole. Where average molecular weights of food-approved components approaches 10,000, the substrate becomes "leaky". The substrate is composed of interstitial spaces which are unable to retain sufficient integrity to retain the volatile component entrapped therein. It appears that an increase in molecular weight exceeding a molecular weight of 6,000 results in a more fibrous less dense, with a concomitant inability to retain a deposited volatile substance. Such high molecular weight materials, which do not adequately retain highly volatile components are polyvinylpyrrolidone M.W. 10,000—360,000, tapioca dextrins M.W. 10,000 and arabinoxylan M.W. 70,000—90,000. Therefore, for purposes of the present fixation methodology a molecular weight of from 1,000 to 6,000 molecular weight is desirable. This weight allows for a high fix to be deposited, with little resultant loss.

Spray drying appears to be the method of choice in the present invention. Other drying techniques compromise the integrity of either the structure of the substrate or the presence of the volatile flavors. Freeze-drying results in a product with a porous substrate from which a volatile would easily escape. Drum drying requires maintaining fairly high temperatures for prolonged periods of time during which volatile flavorant loss form volatilization or degradation can occur. Spray drying yields a substrate of higher density and appears to have the least deleterious effect on the volatile flavorant.

Therefore, while the present invention is drawn to mainly food acceptable carbohydrates it is understood that other materials may be substituted within the scope of the claims.

The trade marks as used in the above are acknowledged as such.

Claims

1. A process for fixing volatile flavorants in an amorphous substrate comprising the steps of:
   a) admixing a low molecular weight water-soluble material having a molecular weight of 90 to 500 and a melting point of 80ºC to 180ºC and a high molecular weight, water-soluble polymeric material having a molecular weight of 1,000 to 6,000 in an aqueous system so that the low molecular weight material comprises from 10% to 30% by weight and the high weight molecular material comprises not less than 70% by weight of the solids contained in the aqueous system;
   b) incorporating a volatile flavorant within the aqueous mixture; and
   c) spray-drying said aqueous mixture.
2. A process according to Claim 1 wherein the low molecular weight water-soluble material is crystalline.
3. A process according to Claim 1 or Claim 2 wherein the low molecular weight water-soluble material is chosen from glucose, maltose, mannanose, malic acid, citric acid, adipic acid and combinations thereof.
4. A process according to any one of Claim 1 to 3 wherein the volatile flavorant is chosen from aldehydes, essential oils, esters, sulfur compounds and coffee aromas.
5. A process according to any one of Claim 1 to 4 wherein the high molecular weight water-soluble material is malto-dextrin with D.E. of from 5 to 15 containing not more than 10% monosaccharides or disaccharides.

6. A spray dried moisture stable fixed flavorant comprising:
   a) a substrate of from 10% to 30% of a low molecular weight water-soluble material having a molecular weight of 90 to 500 and a melting point of 80°C to 180°C and at least 70% of a high molecular weight material having a molecular weight of 1,000 to 6,000; and
   b) a volatile flavorant fixed therein.

7. A flavorant according to Claim 6 wherein said low molecular weight water-soluble material is chosen from glucose, maltose, mannose, adipic acid, citric acid, malic acid and combinations thereof.

8. A flavorant according to Claim 6 or Claim 7 wherein said high molecular weight material is contained in a malto-dextrin of dextrose equivalent of from 4 D.E. to 20 D.E.

9. A flavorant according to Claim 7 or Claim 8 wherein said low molecular weight material is high maltose corn syrup solids.

10. A flavorant according to any one of Claims 6 to 9 wherein said volatile flavorant is chosen from aldehydes, essential oils, esters, sulfur compounds and coffee aroma.

11. A flavorant according to Claim 10 wherein said volatile flavorant is acetaldehyde.

12. A spray dried moisture-stable fixed flavorant as claimed in Claim 6 comprising:
   a) a substrate consisting of 20% maltose and 80% maltodextrin; and
   b) acetaldehyde fixed therein.

Patentansprüche

1. Verfahren zum Fixieren von flüchtigen Aromastoffen in einem amorphen Substrat mit folgenden Schritten:
   a) ein niedrigmolekulare wasserlösliche Substanz mit einem Molekulargewicht von 90 bis 500 und einem Schmelzpunkt von 80 bis 180°C und eine hochmolekulare wasserlösliche polymer Substanz mit einem hohen Molekulargewicht von 1000 bis 6000 werden in einem wäbrigen System derart gemischt, daß die niedrigmolekulare Substanz 10 bis 30 Gew.-% und die hochmolekulare Substanz mindestens 70 Gew.-% der in dem wäbrigen System enthaltenen Feststoffe ausmacht;
   b) in das wäbrige Gemisch wird ein flüchtiger Aromastoff eingeführt; und
c) das wäbrige Gemisch wird sprühgetrocknet.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die niedrigmolekulare Substanz kristallin ist.


5. Verfahren nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß der hochmolekulare wasserlösliche Substanzen Maltodextrin ist, das ein Glukoseäquivalent von 5 bis 15 hat und nicht mehr als 10% Monosaccharide oder Disaccharide enthält.

6. Sprühgetrockneter, feuchtigkeitsbeständiger fixierter Aromastoff mit
   a) einem Substrat, das zu 10 bis 30% aus einer niedrigmolekularen wasserlöslichen Substanz mit einem Molekulargewicht von 90 bis 500 und einem Schmelzpunkt von 80 bis 180°C und zu mindestens 70% aus einer hochmolekularen Substanz mit einem Molekulargewicht von 1000 bis 6000 besteht, und
   b) einem darin fixierten, flüchtigen Aromastoff.


9. Aromastoff nach Anspruch 7 oder 8, dadurch gekennzeichnet, daß die niedrigmolekulare Substanz aus malzzereichen Malzmürpfraststoffen besteht.

10. Aromastoff nach einem der Ansprüche 6 bis 9, dadurch gekennzeichnet, daß der flüchtige Aromastoff aus den Aldehyden, ätherischen Ölen, Estern, Schwefelverbindungen und dem Kaffee aromastoff ausgewählt ist.

11. Aromastoff nach Anspruch 10, dadurch gekennzeichnet, daß der flüchtige Aromastoff Acetaldehyd ist.

12. Sprühgetrockneter, feuchtigkeitsbeständig, fixierter Aromastoff nach Anspruch 6 mit
   a) einem Substrat aus 20% Maltose und 80% Maltodextrin und
   b) darin fixiertem Acetaldehyd.
Reventions

1. Procédé de fixation de parfums volatils sur un substrat amorphe, comprenant les étapes consistant à:
   (a) mélanger un produit soluble dans l’eau de faible masse moléculaire, ayant une masse moléculaire de 90 à 500 et un point de fusion de 80°C à 180°C, et un produit polymère soluble dans l’eau de masse moléculaire élevée ayant une masse moléculaire de 1 000 à 6 000 dans un système aqueux, de façon à ce que le produit de faible masse moléculaire constitue de 10% à 30% en poids, et que le produit de masse moléculaire élevée constitue au moins 70% en poids des solides contenus dans le système aqueux;
   (b) incorporer un parfum volatil dans le mélange aqueux; et
   (c) Sécher par pulvérisation ledit mélange aqueux.

2. Procédé selon la revendication 1, caractérisé en ce que le produit soluble dans l’eau de faible masse moléculaire est cristallin.

3. Procédé selon la revendication 1 ou 2, caractérisé en ce que le produit soluble dans l’eau de faible masse moléculaire est choisi parmi le glucose, le maltose, le mannose, l’acide malique, l’acide citrique, l’acide adipique et des combinaisons de ceux-ci.

4. Procédé selon l’une quelconque des revendications 1 à 3, caractérisé en ce que le parfum volatil est choisi parmi des aldéhydes, des huiles essentielles, des esters, des composés du soufre et l’arôme de café.

5. Procédé selon l’une quelconque des revendications 1 à 4, caractérisé en ce que le produit soluble dans l’eau de masse moléculaire élevée est une maltodextrine ayant un E.D. de 5 à 15 ne contenant pas plus de 10% de monosaccharides ou de disaccharides.

6. Parfum fixé stable à l’humidité, séché par pulvérisation comprenant:
   (a) un substrat de 10% à 30% d’un produit soluble dans l’eau de faible masse moléculaire, ayant une masse moléculaire de 90 à 500, et un point de fusion de 80°C à 180°C, et au moins 70% d’un produit de masse moléculaire élevée, ayant une masse moléculaire de 1 000 à 6 000; et
   (b) un parfum volatil fixé sur celui-ci.

7. Parfum selon la revendication 6, caractérisé en ce que ledit produit soluble dans l’eau de faible masse moléculaire est choisi parmi le glucose, le maltose, le mannose, l’acide adipique, l’acide citrique, l’acide malique et des combinaisons de ceux-ci.

8. Parfum selon la revendication 6 ou 7, caractérisé en ce que ledit produit de masse moléculaire élevée est contenu dans une maltodextrine ayant un équivalent dextrose de 4 E.D. à 20 E.D.

9. Parfum selon la revendication 7 ou 8, caractérisé en ce que ledit produit de faible masse moléculaire est constitué par les solides d’un sirop de maïs à haute teneur en maltose.

10. Parfum selon l’une quelconque des revendications 6 à 9, caractérisé en ce que ledit parfum volatil est choisi parmi des aldéhydes, des huiles essentielles, des esters, des composés du soufre et l’arôme de café.

11. Parfum selon la revendication 10, caractérisé en ce que ledit parfum volatil est l’acétaldéhyde.

12. Parfum fixé, stable à l’humidité, séché par pulvérisation selon la revendication 6, comprenant:
   (a) un substrat constitué de 20% de maltose et de 80% de maltodextrine; et
   (b) de l’acétaldéhyde fixé sur celui-ci.