

(19)



(11)

EP 3 694 354 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

12.01.2022 Bulletin 2022/02

(51) Int Cl.:

A24B 15/167 ^(2020.01)

(21) Application number: **18788833.4**

(86) International application number:

PCT/GB2018/052893

(22) Date of filing: **10.10.2018**

(87) International publication number:

WO 2019/073225 (18.04.2019 Gazette 2019/16)

(54) **AEROSOLISABLE PRODUCT**

AEROSOLFÄHIGES PRODUKT

PRODUIT DESTINÉ À UN AÉROSOL

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

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(43) Date of publication of application:

19.08.2020 Bulletin 2020/34

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(56) References cited:

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WO-A2-2017/004185

US-A1- 2017 065 000

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Description

FIELD OF THE INVENTION

5 [0001] The present disclosure relates to an aerosolisable product, containers in which are contained the aerosolisable product and to electronic aerosol provision systems such as electronic aerosol delivery systems (e.g. e-cigarettes) incorporating said product.

BACKGROUND TO THE INVENTION

10 [0002] Electronic vapour provision systems such as e-cigarettes generally contain a reservoir of liquid which is to be vaporised, typically containing nicotine. When a user inhales on the device, a heater is activated to vaporise a small amount of liquid, which is therefore inhaled by the user.

15 [0003] The use of e-cigarettes in the UK has grown rapidly, and it has been estimated that there are now almost three million people using them in the UK.

[0004] Current vaping products use liquids which are wicked to a heater that generates an aerosol, and this aerosol delivers nicotine and flavour. Current e-cigarette formulations typically utilise glycerol and/or propylene glycol as the liquid. In these systems, liquid can leak both in the device and in the bottles during storage and handling. Additionally, users of combustible cigarettes are accustomed to "punctuated" patterns of use, whereby successive sessions are punctuated by the exhaustion of the combustible cigarette. Consumers wishing to transition to using liquid based systems may experience a more continuous profile of use since such liquid based systems typically provide a longer lasting substrate source which spans the period associated with many conventional punctuated sessions. As a result, users may struggle to transition to the non-punctuated session of use which long lasting liquid systems deliver.

SUMMARY OF THE INVENTION

25 [0005] In one aspect there is provided an aerosolisable product comprising

(a) an aerosol forming material; and
30 (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

35 [0006] The present invention further provides an aerosolisable product comprising

(a) an aerosol forming material; and
(b) a solid substrate material, wherein the solid substrate material is at least calcium carbonate, wherein the aerosolisable product is a solid form.

40 [0007] The present invention further provides an aerosolisable product comprising

(a) an aerosol forming material; and
(b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.

45 [0008] The present invention further provides a dosage form of an aerosolisable product, wherein the dosage form comprises

(a) active agent in an amount of 0.001 to 1 grams;
50 (b) an aerosol forming material; and
(c) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

55 [0009] The present invention further provides a dosage form of an aerosolisable product, wherein the dosage form comprises

(a) active agent in an amount of 0.001 to 1 grams;

- (b) an aerosol forming material; and
- (c) a solid substrate material, wherein the solid substrate material is at least calcium carbonate; wherein the aerosolisable product is a solid form.

5 **[0010]** The present invention further provides a dosage form of an aerosolisable product, wherein the dosage form comprises

- (a) active agent in an amount of 0.001 to 1 grams;
- (b) an aerosol forming material; and
- 10 (c) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt. % based on the aerosolisable nicotine product.

[0011] The present invention further provides a process for forming an aerosol, the process comprising the steps of:

- 15 (i) providing an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m²
 - 20 per gram of aerosol forming material present in the aerosolisable product;
- (ii) heating the aerosolisable product.

25 **[0012]** The present invention further provides a process for forming an aerosol, the process comprising the steps of:

- (i) providing an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a solid substrate material, wherein the solid substrate material is at least calcium carbonate;
 - 30 wherein the aerosolisable product is a solid form;
- (ii) heating the aerosolisable product.

35 **[0013]** The present invention further provides a process for forming an aerosol, the process comprising the steps of:

- (i) providing an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product;
 - 40
- (ii) heating the aerosolisable product.

45 **[0014]** The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

- (i) contacting an aerosol forming material and a substrate material, wherein the substrate material is at least calcium carbonate, to form an initial mixture, wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product; and
- 50 (ii) processing the initial mixture to form the aerosolisable product.

[0015] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

- 55 (i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
- (ii) processing the initial mixture to form the aerosolisable product wherein the aerosolisable product is a solid form.

[0016] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

- (i) contacting an aerosol forming material and a substrate material, wherein the substrate material is at least calcium carbonate, to form an initial mixture, wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product; and
- (ii) processing the initial mixture to form the aerosolisable product.

[0017] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

- (i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
- (ii) compressing the initial mixture to form an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0018] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

- (i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
- (ii) compressing the initial mixture to form an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a solid substrate material, wherein the solid substrate material is at least calcium wherein the aerosolisable product is a solid form.

[0019] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

- (i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
- (ii) compressing the initial mixture to form an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.

[0020] The present invention further provides a contained aerosolisable product comprising

- (a) a container; and
- (b) an aerosolisable product comprising
 - (i) an aerosol forming material; and
 - (ii) a substrate material, wherein the substrate material is at least calcium carbonate wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0021] The present invention further provides a contained aerosolisable product comprising

- (a) a container; and
- (b) an aerosolisable product comprising

- (i) an aerosol forming material; and
 - (ii) a solid substrate material, wherein the solid substrate material is at least calcium carbonate
- wherein the aerosolisable product is a solid form.

[0022] The present invention further provides a contained aerosolisable product comprising

- (a) a container; and
- (b) an aerosolisable product comprising
 - (i) an aerosol forming material; and
 - (ii) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.

[0023] The present invention further provides an electronic aerosol provision system comprising:

- (i) an aerosoliser for aerosolising an aerosolisable product for inhalation by a user of the electronic aerosol provision system;
- (ii) a power supply comprising a cell or battery for supplying power to the aerosoliser; and
- (iii) an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate;

wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0024] The present invention further provides an electronic aerosol provision system comprising:

- (i) an aerosoliser for aerosolising an aerosolisable product for inhalation by a user of the electronic aerosol provision system;
- (ii) a power supply comprising a cell or battery for supplying power to the aerosoliser; and
- (iii) an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a solid substrate material, wherein the solid substrate material is at least calcium carbonate wherein the aerosolisable product is a solid form.

[0025] The present invention further provides an electronic aerosol provision system comprising:

- (i) an aerosoliser for aerosolising an aerosolisable product for inhalation by a user of the electronic aerosol provision system;
- (ii) a power supply comprising a cell or battery for supplying power to the aerosoliser; and
- (iii) an aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.

DETAILED DESCRIPTION

[0026] As discussed herein the present invention provides an aerosolisable product comprising (a) an aerosol forming material; and (b) a solid substrate material, wherein the solid substrate material is at least calcium carbonate, wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0027] In this regard, the term "aerosolisable product" refers to a combination of one or more materials, at least one of which is capable of forming a condensation aerosol following heating to an appropriate temperature. Thus, it is not necessary for all components of the aerosolisable product of the present invention to be "aerosolised".

[0028] The solid products of the present invention and the substrate materials of the present invention can substantially sustain their physical shape when unsupported by external means, e.g. packaging etc. Thus, they are considered to be solid, solid-like, in solid form or in solid-like form.

[0029] We have found that by use of a calcium carbonate substrate such that the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product, it is possible to form a substrate having a substantially solid form which is able to hold aerosol forming materials such as glycerol. As a result, problems associated with leakage and user acceptance of the prior art may be overcome. The substrate may also be used to hold an active agent, such as nicotine, and flavour which are released using heating along with the visible vapour from the aerosol forming material (e.g. glycerol or other humectants). By controlling the surface area of the calcium carbonate relative to the amount of aerosol forming material present in the aerosolisable product it is possible to avoid the issues of leakage and also create a single session for vaping which ends when the aerosolisable product runs out of aerosol forming material (since this then necessitates a change of the entire aerosolisable product).

[0030] Due to the material properties, it is possible through compression and if required the addition of binders (such as CMC) to form a consumable which may be handled as a solid in a pill/pellet/small particle (balls/agglomerated) form.

[0031] Due to the size required for a single session of vaping (8-10 puffs), a consumable may be formed into a small solid <1g. Due to the size of the solid, this may be loaded into a device which may have a much smaller heater (oven) than currently known in the art. A small oven is advantageous since it reduces the power consumption compared to a larger oven and also reduces the size requirement of the device. Further, since the aerosolisable product being heated is a discrete unit, rather than being part of a generally continuous bulk, it liquid, less power may be required to generate a vapour. Also, after use, the substrate used to hold the aerosol generating material will comprise chalk waste which will be easy to dispose of with little worry of environmental impact.

[0032] For ease of reference, these and further aspects of the present invention are now discussed under appropriate section headings. However, the teachings under each section are not necessarily limited to each particular section.

Calcium Carbonate

[0033] As discussed herein the present invention provides an aerosolisable product comprising (a) an aerosol forming material; and (b) a substrate material, wherein the substrate material is at least calcium carbonate, wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product. In this aspect of the present invention, the calcium carbonate may be present in the product in any suitable amount, provided of course that the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0034] In this regard, it is noted that calcium carbonate can have a range of specific surface areas. For example, typical calcium carbonate can have a specific surface area (according to the BET method) of around 7 to 9 m²/g. However, it is possible to "functionalise" the calcium carbonate such that its surface area is increased. Indeed, functionalised calcium carbonates may have a specific surface area (according to the BET method) of around 70m²/g. Therefore, in one aspect, the calcium carbonate used in the aerosolisable product has a specific surface area of at least 5 m²/g based on the weight of the calcium carbonate.

[0035] As discussed herein the present invention provides an aerosolisable product comprising (a) an aerosol forming material; and (b) a solid substrate material, wherein the solid substrate material is at least calcium carbonate, wherein the aerosolisable product is a solid form. In this aspect of the present invention, the calcium carbonate may be present in the product in any suitable amount, provided of course that a solid substrate material is formed.

[0036] In one aspect the substrate is present in an amount of at least 10 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 20 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 30 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 40 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 50 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 60 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 70 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 80 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 85 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 90 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of at least 95 wt.% based on the aerosolisable product.

[0037] In one aspect the substrate is present in an amount of no greater than 99 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of no greater than 95 wt.% based on the aerosolisable product. In one aspect the substrate is present in an amount of no greater than 90 wt.% based on the aerosolisable product.

product. In one aspect the calcium carbonate is present in an amount of from 80 to 90 wt.% based on the aerosolisable product.

[0045] As discussed herein the present invention further provides an aerosolisable product comprising (a) an aerosol forming material; and (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product. Each of the above embodiments which require the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product, equally apply to this aspect of the invention.

Aerosol Forming Material

[0046] The one or more aerosol forming materials may be present in any suitable amount in the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of at least 1 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of at least 5 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of at least 10 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of at least 15 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of at least 20 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of at least 25 wt.% based on the aerosolisable product.

[0047] In one aspect the one or more aerosol forming materials is present in a total amount of from 1 to 30 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of from 5 to 30 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of from 10 to 30 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of from 15 to 30 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of from 20 to 30 wt.% based on the aerosolisable product. In one aspect the one or more aerosol forming materials is present in a total amount of from 25 to 30 wt.% based on the aerosolisable product.

[0048] As discussed herein, the aerosolisable product comprises an aerosol forming material. As will be appreciated by one skilled in the art, that the aerosolisable product comprises an aerosol forming material means that the aerosolisable product contains at least one aerosol forming material. References herein to an aerosol forming material may be read to relate to at least one aerosol forming material.

[0049] The aerosol forming material may be selected from water, polyhydric alcohols, such as glycerol, propylene glycol and triethylene glycol, for example, or esters such as triethyl citrate or triacetin, or high boiling point hydrocarbons, or non-polyols, such as glycols, sorbitol or lactic acid, for example. The aerosol forming material may be selected from polyhydric alcohols, such as glycerol, propylene glycol and triethylene glycol, for example, or esters such as triethyl citrate or triacetin, or high boiling point hydrocarbons, or non-polyols, such as glycols, sorbitol or lactic acid, for example. In one aspect, the aerosol forming material is selected from polyhydric alcohols (such as glycerol, propylene glycol and triethylene glycol), esters (such as triethyl citrate and triacetin), high boiling point hydrocarbons, non-polyols (such as glycols, sorbitol and lactic acid), and mixtures thereof [preferably wherein the aerosol forming material is selected from glycerol, propylene glycol, and mixtures thereof].

[0050] The aerosol forming material may be selected from water, triethylene glycol, triethyl citrate, triacetin, glycols, sorbitol, lactic acid, glycerol, propylene glycol, and mixtures thereof. The aerosol forming material may be selected from triethylene glycol, triethyl citrate, triacetin, glycols, sorbitol, lactic acid, glycerol, propylene glycol, and mixtures thereof.

[0051] In one aspect, the aerosol forming material is selected from water, glycerol, propylene glycol, and mixtures thereof. In one aspect, the aerosol forming material is selected from glycerol, propylene glycol, and mixtures thereof.

[0052] In one aspect the aerosol forming material is at least water. In this aspect, a further aerosol forming material may be present or may not be present. In a further aspect, the aerosol forming material comprises water and at least one aerosol forming material other than water. In one aspect, the one or more aerosol forming materials is mixture of (a) water and (b) glycerol, propylene glycol or a mixture thereof.

[0053] The aerosol forming material(s) may be present in any suitable amount in the aerosolisable product. In one aspect the aerosol forming material is present in a total amount of at least 5 wt.% based on the aerosolisable product. In one aspect the aerosol forming material is present in a total amount of at least 10 wt.% based on the aerosolisable product. In one aspect the aerosol forming material is present in a total amount of at least 15 wt.% based on the aerosolisable product. In one aspect the aerosol forming material is present in a total amount of at least 20 wt.% based on the aerosolisable product. In one aspect the aerosol forming material is present in a total amount of at least 25 wt.% based on the aerosolisable product. In one aspect the aerosol forming material is present in a total amount of at least 30 wt.% based on the aerosolisable product.

[0054] In one aspect the aerosol forming material is present in a total amount of from 5 to 30 wt.% based on the aerosolisable product. In one aspect the aerosol forming material is present in a total amount of from 10 to 30 wt.%

Surface area of solid substrate per gram of aerosol forming material

[0061] As has been explained above, it has been found that by controlling the surface area of the calcium carbonate relative to the amount of aerosol forming material present in the aerosolizable product it is possible to avoid the issues of leakage (since a substantially solid aerosolizable product is formed) and also create a single session for vaping which ends when the aerosolizable product runs out of aerosol forming material.

[0062] In one aspect, the calcium carbonate has a specific surface area (according to the BET [Brunauer-Emmett-Teller] method) of at least 5 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 7 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of 7 to 9 m²/g.

[0063] In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 70 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 72 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 80 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 85 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 90 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 95 m²/g. In one aspect the calcium carbonate has a specific surface area (according to the BET method) of at least 100 m²/g.

[0064] The specific surface area of the calcium carbonate may be measured in accordance with ISO 9277:2010(en) "Determination of the specific surface area of solids by gas adsorption - BET method"

Aerosolizable Product

[0065] The aerosolizable product of the present invention may contain one or more further components. These components may be selected depending on the nature of the formulation. In one aspect, the aerosolizable product further comprises an active agent. By "active agent" it is meant an agent which has a biological effect on a subject when the vapour is inhaled. The one or more active agents may be selected from nicotine, botanicals, and mixtures thereof. The one or more active agents may be of synthetic or natural origin. The active could be an extract from a botanical, such as from a plant in the tobacco family. An example active is nicotine.

[0066] In one aspect, the active agent is at least nicotine. Nicotine may be provided at any suitable amount depending on the desired dosage to be inhaled by the user. In one aspect nicotine is present in an amount of no greater than 6 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.4 to 6 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.8 to 6 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1 to 6 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1.8 to 6 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.4 to 5 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.8 to 5 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1 to 5 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1.8 to 5 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of no greater than 4 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.4 to 4 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.8 to 4 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1 to 4 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1.8 to 4 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of no greater than 3 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.4 to 3 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.8 to 3 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1 to 3 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1.8 to 3 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of no greater than 1.9 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of no greater than 1.8 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.4 to 1.9 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.4 to 1.8 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.5 to 1.9 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.5 to 1.8 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.8 to 1.9 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 0.8 to 1.8 wt% based on the total weight of the aerosolizable product. In one aspect nicotine is present in an amount of from 1 to 1.9 wt% based on the total weight of the aerosolizable product.

product. In one aspect nicotine is present in an amount of from 1 to 1.8 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of less than 1.9 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of less than 1.8 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 0.4 to less than 1.9 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 0.4 to less than 1.8 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 0.5 to less than 1.9 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 0.5 to less than 1.8 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 0.8 to less than 1.9 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 0.8 to less than 1.8 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 1 to less than 1.9 wt% based on the total weight of the aerosolisable product. In one aspect nicotine is present in an amount of from 1 to less than 1.8 wt% based on the total weight of the aerosolisable product.

[0067] In one aspect, the product includes tobacco and/or a tobacco extract.

[0068] When the product is in a solid form, it may be formed into any suitable shape. For example, solid forms may be provided to allow for different surface areas and more airflow paths through/around the material. Such shapes may be hollow centres (single or multiple holes), surface textures/channels/ridges (for less contact to hot surfaces of ovens and increased airflow around the consumable) and loose spheres/agglomerated particles which could fill different heating apparatus e.g. different shaped ovens.

[0069] When the product is in a solid form, the product is typically prepared by combining calcium carbonate with one or more liquids such as the aerosol forming material to form a material capable of being compressed into multiple solid forms. Alternatively, a solid form of calcium carbonate may be prepared into which the liquids are introduced. In either aspect, the present invention allows for the material to be compressed into a suitable form such as a pellet or pill form.

[0070] Alternatively, when higher levels of liquids are required, a paste like or putty like material (for example containing a liquid loading between 20-30%) may be prepared. This semi solid material may be delivered in any suitable manner. For example, it may be added to an aerosol generation system as a paste or putty from a tube. The semi solid systems of the present invention allow for higher aerosol formation and the ability to fill different shapes. The solid systems of the present invention have the advantage that they allow for clear airflow paths for drawing the vapour generated and reduce the amount of system cleaning required.

[0071] As will be understood by one skilled in the art, a putty is malleable. A putty may deform but not be free flowing under gravity. A putty may change shape under its own mass but under its own mass should not change shape dimensionally in any orientation by more than 10 percent over a 24 hour period.

[0072] In a further embodiment of the present invention, the aerosolisable product may be delivered in a form which is then further contained to provide a discreet product. For example, solid product such as loose powder, particles, agglomerates, spheronised material, pills or pellets may be contained within a perforated or porous wrap. This wrap is typically constructed of materials suitable for exposure to temperature ranges up to 300°C. Suitable materials are perforated metal foil, metal mesh, porous or perforated papers and fibre constructed fleece materials. The use of a porous outer wrap is advantageous since it minimises direct contact with the aerosolisable product. Additionally the use of a porous outer wrap minimises the risk of dust being released and potentially being inhaled.

[0073] In one aspect, the aerosolisable product further comprises a binder. The binder agents may be selected from Microcrystalline cellulose (MCC), Carboxymethyl cellulose (CMC) and mixtures thereof.

[0074] The binder may be provided at any suitable amount depending on the product. In one aspect the binder is present in a total amount of from 0.01 to 5 wt.% based on the aerosolisable product. In one aspect the binder is present in a total amount of from 0.1 to 5 wt.% based on the aerosolisable product. In one aspect the binder is present in a total amount of from 0.1 to 3 wt.% based on the aerosolisable product. In one aspect the binder is present in a total amount of from 0.5 to 3 wt.% based on the aerosolisable product. In one aspect the binder is present in a total amount of from 0.5 to 2 wt.% based on the aerosolisable product. In one aspect the binder is present in a total amount of from 1 to 2 wt.% based on the aerosolisable product.

Dosage Form

[0075] As discussed herein, the present invention further provides a dosage form of an aerosolisable nicotine product, wherein the dosage form comprises (a) active agent, such as nicotine, in an amount of 0.001 to 1 grams ; (b) an aerosol forming material; and (c) a solid substrate material, wherein the solid substrate material is at least calcium carbonate wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product. As discussed herein, the present invention further provides a dosage form of an aerosolisable product, wherein the dosage form comprises

- (a) active agent in an amount of 0.001 to 1 grams;
- (b) an aerosol forming material; and
- (c) a solid substrate material, wherein the solid substrate material is at least calcium carbonate; wherein the aerosolizable product is a solid form.

[0076] As discussed herein, the present invention further provides a dosage form of an aerosolizable nicotine product, wherein the dosage form comprises (a) active agent, such as nicotine, in an amount of 0.001 to 1 grams ; (b) an aerosol forming material; and (c) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 30 wt. % based on the aerosolizable nicotine product.

[0077] In one aspect the active agent, such as nicotine, is present in an amount of 0.001 to 0.8 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.001 to 0.8 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.001 to 0.6 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.001 to 0.4 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.001 to 0.2 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.001 to 0.1 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.02 to 0.1 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.03 to 0.1 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.04 to 0.1 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.05 to 0.1 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.01 to 0.09 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.01 to 0.08 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.01 to 0.07 grams. In one aspect the active agent, such as nicotine, is present in an amount of 0.01 to 0.06 grams.

[0078] The dosage form may be prepared from an aerosolizable product as defined herein.

Process

[0079] The present invention further provides a process for forming an aerosol, the process comprising the steps of:

(i) providing an aerosolizable product comprising

- (a) an aerosol forming material; and
- (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the total surface area of the calcium carbonate present in the aerosolizable product is at least 25m² per gram of aerosol forming material present in the aerosolizable product;

(ii) heating the aerosolizable product.

[0080] The present invention further provides a process for forming an aerosol, the process comprising the steps of:

(i) providing an aerosolizable product comprising

- (a) an aerosol forming material; and
- (b) a solid substrate material, wherein the solid substrate material is at least calcium carbonate; wherein the aerosolizable product is a solid form;

(ii) heating the aerosolizable product.

[0081] The present invention further provides a process for forming an aerosol, the process comprising the steps of:

(i) providing an aerosolizable product comprising

- (a) an aerosol forming material; and
- (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt. % based on the aerosolizable product;

(ii) heating the aerosolizable product.

[0082] The present invention further provides a process for preparing an aerosolizable product, the process comprising the steps of:

(i) contacting an aerosol forming material and a substrate material, wherein the substrate material is at least calcium carbonate, to form an initial mixture, wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product; and
(ii) processing the initial mixture to form the aerosolisable product.

[0083] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

(i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
(ii) processing the initial mixture to form the aerosolisable product wherein the aerosolisable product is a solid form.

[0084] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

(i) contacting an aerosol forming material and a substrate material, wherein the substrate material is at least calcium carbonate, to form an initial mixture, wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product; and
(ii) processing the initial mixture to form the aerosolisable product.

[0085] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

(i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
(ii) compressing the initial mixture to form an aerosolisable product comprising
(a) an aerosol forming material; and
(b) a substrate material, wherein the substrate material is at least calcium carbonate wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0086] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

(i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
(ii) compressing the initial mixture to form an aerosolisable product comprising
(a) an aerosol forming material; and
(b) a solid substrate material, wherein the solid substrate material is at least calcium wherein the aerosolisable product is a solid form.

[0087] The present invention further provides a process for preparing an aerosolisable product, the process comprising the steps of:

(i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
(ii) compressing the initial mixture to form an aerosolisable product comprising
(a) an aerosol forming material; and
(b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.

[0088] The process of the present invention may comprises additional steps either before the steps listed, after the steps listed or between one or more of the steps listed.

[0089] In one aspect, configurations are envisaged in which the aerosolisable product of the present invention can be

heated in line with flavour matrices such as flavour capsules or tobacco. The aerosol may be passed from the aerosolisable product through the flavour or tobacco matrix which may also be heated in an independent zone. As discussed herein, it is also possible to include the tobacco (or other organic media) within the calcium carbonate containing solid substrate material of the present invention.

Further Aspects

[0090] The aerosolisable product may be contained or delivered by any means. In one aspect the present invention further provides a contained aerosolisable product comprising

- (a) a container; and
- (b) an aerosolisable product comprising
 - (i) an aerosol forming material; and
 - (ii) a substrate material, wherein the substrate material is at least calcium carbonate wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0091] In a further aspect the present invention provides a contained aerosolisable product comprising

- (a) a container; and
- (b) an aerosolisable product comprising
 - (i) an aerosol forming material; and
 - (ii) a solid substrate material, wherein the solid substrate material is at least calcium carbonate wherein the aerosolisable product is a solid form.

[0092] In a further aspect the present invention provides a contained aerosolisable product comprising

- (a) a container; and
- (b) an aerosolisable product comprising
 - (i) an aerosol forming material; and
 - (ii) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.

[0093] The container may be any suitable container, for example to allow for the storage or delivery of the aerosolisable product. For example, the container may be a single dose pack or may be a multi dose pack. The container may be a blister pack or may be a dispenser. In one aspect the container is configured for engagement with an electronic vapour provision system. The container may be configured to become fluidly in communication with an electronic vapour provision system so that aerosolisable product may be delivered to the electronic vapour provision system. As described above, the present disclosure relates to a container which may be used in an electronic vapour provision system, such as an e-cigarette. Throughout the following description the term "e-cigarette" is used; however, this term may be used interchangeably with electronic vapour provision system.

[0094] As discussed herein, the container of the present invention is typically provided for the delivery of an aerosolisable product to or within an e-cigarette. The aerosolisable product may be held within an e-cigarette or may be sold as a separate container for subsequent use with or in an e-cigarette. As understood by one skilled in the art, e-cigarettes may contain a unit known as a detachable cartomiser which typically comprises a reservoir of aerosolisable product, a wick material and a device for vaporising the aerosolisable product. In some e-cigarettes, the cartomiser is part of a single-piece device and is not detachable. In one aspect the container is a cartomiser or is part of a cartomiser. In one aspect the container is not a cartomiser or part of a cartomiser and is a container, such as a tank, which may be used to deliver aerosolisable product to or within an e-cigarette.

[0095] In one aspect the container is part of an e-cigarette. In one aspect the present invention further provides an electronic aerosol provision system comprising:

- (i) an aerosoliser for aerosolising an aerosolisable product for inhalation by a user of the electronic aerosol provision system;
- (ii) a power supply comprising a cell or battery for supplying power to the aerosoliser; and

(iii) an aerosolisable product comprising

(a) an aerosol forming material; and

(b) a substrate material, wherein the substrate material is at least calcium carbonate;

wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

[0096] In a further aspect the present invention provides an electronic aerosol provision system comprising:

(i) an aerosoliser for aerosolising an aerosolisable product for inhalation by a user of the electronic aerosol provision system;

(ii) a power supply comprising a cell or battery for supplying power to the aerosoliser; and

(iii) an aerosolisable product comprising

(a) an aerosol forming material; and

(b) a solid substrate material, wherein the solid substrate material is at least calcium carbonate wherein the aerosolisable product is a solid form.

[0097] In a further aspect the present invention provides an electronic aerosol provision system comprising:

(i) an aerosoliser for aerosolising an aerosolisable product for inhalation by a user of the electronic aerosol provision system;

(ii) a power supply comprising a cell or battery for supplying power to the aerosoliser; and

(iii) an aerosolisable product comprising

(a) an aerosol forming material; and

(b) a substrate material, wherein the substrate material is at least calcium carbonate;

wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.

[0098] The invention will now be described with reference to the following non-limiting example.

Examples

[0099] Samples of aerosolisable product were prepared in accordance with the details of Table 1.

Materials used were

[0100]

Calcium Carbonate (CC): Pumex Calcitec, Calcitec Puro v/100 99% < 500 micron

Microcrystalline cellulose (MCC): Avicel® PH Microcrystalline Cellulose

Carboxymethyl cellulose (CMC): Carboxymethyl cellulose sodium

Functionalised Calcium Carbonate (FCC): a Calcium Carbonate product having the following properties

Property	Test Method	Values	Unit
Calcium carbonate	XRF(0014)	52,5	%
Particle-size distribution D50	Malvern MS 2000	6,7	µm
Particle-size distribution D98	Malvern MS 2000	19	µm
Specific Surface Area (BET)	ISO 9277	70	m ² /g
Blancheur CIE L •	ISO 11664-4	97.1	
Sieve residue at 45µm	ISO 787/7	0.00	%

[0101] The specific surface area of the calcium carbonate may be measured in accordance with ISO 9277:2010(en) "Determination of the specific surface area of solids by gas adsorption - BET method"

Table 1

Sample	Ingredients/ Description	CC (%)	CC (g)	Glycerol (%)	Glycerol (g)	Binder (%)	Binder (g)	Water (%)	Water (g)	Nicotine (%)	Nicotine (g)	Flavour (%)	Flavour (g)	QTY (g)	CC sur- face area (m ² /g)	Sample CC area g of aero- sol	Surface area per g of aero- sol
S16	MCC test (Avi- cel PH-102)	65.04	8.00	26.83	3.30	8.13	1.00	0.00	0.00	0.00	0.00	0.00	0.00	12.30	8.00	64.00	19.39
S15	MCC test (Avi- cel PH-102)	66.67	8.00	25.00	3.00	8.33	1.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	8.00	64.00	21.33
S14	MCC test (Avi- cel PH-102) plus Zamony flavour	66.67	8.00	24.50	2.94	8.33	1.00	0.00	0.00	0.00	0.00	0.50	0.06	12.00	8.00	64.00	21.77
S3	25% Glycerol, 75% CC	75.00	7.50	25.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	8.00	60.00	24.00
S17	Dual binder test 50% MCC / 50% CMC	65.00	6.50	20.00	2.00	10.00	1.00	5.00	0.50	0.00	0.00	0.00	0.00	10.00	8.00	52.00	26.00
S12	CMC binder test (7H3SF) - no water	70.00	7.00	20.00	2.00	10.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	8.00	56.00	28.00
S19	MCC/CMC/CC A type blended Tobacco 12mg	70.07	7.02	19.95	2.00	9.98	1.00	0.00	0.00	0.00	0.00	0.00	0.00	10.01	8.00	56.12	28.10
S1	20% Cirro Cur- rant Affairs 70/30 Glycerol/ Propylene gly- col (6mg/ml nic), 80% CC Calcium Car- bonate	80.00	8.00	20.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	8.00	64.00	32.00
S18	Dual binder test 50% MCC / 50% CMC	70.00	7.00	15.00	1.50	10.00	1.00	5.00	0.50	0.00	0.00	0.00	0.00	10.00	8.00	56.00	37.33

(continued)

Sample	Ingredients/ Description	CC (%)	CC (g)	Glycerol (%)	Glycerol (g)	Binder (%)	Binder (g)	Water (%)	Water (g)	Nicotine (%)	Nicotine (g)	Flavour (%)	Flavour (g)	QTY (g)	CC sur- face area (m2/g)	Sample CC area (g)	Surface area per g of aero- sol
S25	FCC/CMC/ Glycerol	30.00	0.30	50.00	0.50	20.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00	1.00	70.00	21.00	42.00
S26	FCC/CMC/ Glycerol	40.00	0.40	55.00	0.55	5.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	1.00	70.00	28.00	50.91
S27	FCC/CMC/ Glycerol	40.00	0.40	50.00	0.50	10.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	1.00	70.00	28.00	56.00
S8	CMC Binder	70.00	7.00	10.00	1.00	20.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	8.00	56.00	56.00
S28	FCC/CMC/ Glycerol	40.00	0.40	45.00	0.45	15.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	1.00	70.00	28.00	62.22
S11	CMC binder	66.67	8.00	8.33	1.00	8.33	1.00	16.67	2.00	0.00	0.00	0.00	0.00	12.00	8.00	64.00	64.00
	test (7H3SF)																
S13	MCC test (Avi- cel PH-102)	61.54	8.00	7.69	1.00	7.69	1.00	23.08	3.00	0.00	0.00	0.00	0.00	13.00	8.00	64.00	64.00
S6	10 % Glycerol, 88% Calcium Carbonate, 2% Nicotine	88.00	88.00	10.00	10.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00	0.00	100.00	8.00	704.00	70.40
S5	10% Glycerol, 89% CC Calci- um Carbonate 1% nicotine,	89.00	89.00	10.00	10.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	100.00	8.00	712.00	71.20
S2	10% Glycerol, 90% CC Calci- um Carbonate	90.00	9.00	10.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	8.00	72.00	72.00
S4	10% Glycerol, 90% CC Calci- um Carbonate	90.00	90.00	10.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	8.00	720.00	72.00

(continued)

Sample	Ingredients/ Description	CC (%)	CC (g)	Glycerol (%)	Glycerol (g)	Binder (%)	Binder (g)	Water (%)	Water (g)	Nicotine (%)	Nicotine (g)	Flavour (%)	Flavour (g)	QTY (g)	CC sur- face area (m ² /g)	Sample CC area	Surface area per g of aero- sol
S7	5g S5, 5g S4, 0.2g Gluhan Flavour	88.61	8.95	8.91	0.90	0.00	0.00	0.00	0.00	0.50	0.05	1.98	0.20	10.10	8.00	71.60	79.56

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[0102] Each of the samples was visually assessed and based on this assessment, a potential delivery form was selected and this form was tested. The results are shown in Table 2.

Table 2

Sample	Assessment (Pass/Fail)	Visual observations	Form testing	Potential form	Device testing
S16	Fail - Difficult to form dough	Worked by hand until consistent dough formed, glycerol visible on gloves while working			
S15	Fail - Difficult to form dough	Worked by hand until consistent dough formed			
S14	Fail - Difficult to form dough	Worked by hand until consistent dough formed			
S3	Fail	Paste like consistency/ thick liquid	Testing for separation, solution maintained for 2 days, ongoing	Paste/viscous liquid	Glycerol layer visible on top of sample 21/11/2016
S17	Pass	Loose mix, pellets form and hold form, slightly soft	Hollow pellets		
S12	Pass	Dough not formed, material stays loose when compressed by hand			
S19	Pass	Loose when mixed, pressed into hollow pellets. Break easily immediately after pressing			
S1	Pass	Clumpy and damp outer when shook, dry when re-mixed	Pill press, forms hard pellet with some liquid on surface.	Loose large particles/pill compressible (wet and soft)	Pax 2 oven vaporiser, max temperature setting. Loose particles tested with vapour generated, lower than cig-alike delivery but consistent aerosol generated
					over 20-30 puffs. Some flavour noted in aerosol
S18	Pass	Harder pellet formed than s17	Hollow pellets	Compressed/ extruded	Vicod 5g, hollow pellet form. Output form very hard. Softened when left over time

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(continued)

Sample	Assessment (Pass/Fail)	Visual observations	Form testing	Potential form	Device testing
S25	Pass	Able to thoroughly mix. Produced large granules. Successfully formed a pill in press. No signs of liquid escaping the solid matrix. After heating, appearance changed to brown speckles. Consumable was strong and springy after heating			
S26	Pass	Formed large granules. Experienced shear thinning when under pressure of the pill press			
S27	Pass	Formed small free flowing granules. Successfully formed a pill. Pill structure was strong. No signs of liquid escaping the solid matrix. Lightly speckled after heating			
S8	Pass	Powder when mixed stayed free flowing	Hollow 6mm pellets with 3mm hollow core made, pellets held shape but were notably softer and break down easily. When left	Pellet/ extrusion	
			over night in ambient conditions the solid form became softer but with robust structure		
S28	Pass	Formed a fine powder once thoroughly mixed. Free flowing. Formed a solid pill. Dry in appearance. Formed a strong and dry pill. No signs of liquid leakage			

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(continued)

Sample	Assessment (Pass/Fail)	Visual observations	Form testing	Potential form	Device testing
S11	Pass	Dough made, rollable and soft	Hollow pellet formed, soft for pelletising but mimics extrusion. Flattened by hand and left to dry	Drying process would be required in manufacturing process	Vicod 5g, hollow pellet form. Output form very hard and not possible to break by hand. Softened when left over time
S13	Pass	With no water material is loose and brittle if formed into pellet. Dough made after water added			
S6	Pass	Dry free flowing, hold shape when compressed	Pills made with pill press, compressible and holds form, easy to impact in auto loader	Powder/pill	Pax oven device, temp on high, nicotine level too high
S5	Pass	Dry free flowing, hold shape when compressed	Pills made with pill press, compressible and holds form, easy to impact in auto loader	Powder/pill	Pax oven device, temp on half, nicotine high with high impact
S2	Pass	Dry free flowing, hold shape when compressed	Pellets made with hand punch and die. Pills made with pill press, compressible and holds form, easy to impact in auto loader	Powder/pill	Half of one pellet loaded into pax, vapour generated. One pill loaded into pax, vapour generated, light be
					consistent delivery. Pill hot to handle on exit and breaks easily when handled.
S4	Pass	Dry free flowing, hold shape when compressed. Flakes visible in mixing need time to homogenise		Paste/viscous liquid	
S7	Pass	Dry free flowing, hold shape when compressed, clumping after mixing		Powder/pill	

Delivery

[0103] Pellets were prepared according to Samples S19 and S20 and were placed in an oven based vaporiser (Vicod 5G, <http://www.atmosrx.com/Vicod-5G.html>) to assess the ability of each product to generate an aerosol. Three repetitions

were carried out for each sample. Two tests were run whereby for the first test, pellets were inserted into the device with the oven already at 200°C (results of Table 3), and for the second test, pellets were inserted into the device and then the oven was heated to 200°C. Airflow was drawn through the device whilst it was turned on and any resulting aerosol captured on a Cambridge Filter Pad (CFP). The CFP (and holder) was weighed before and after the test to check the mass change which is indicative of aerosol formation from the aerosolisable product.

[0104] It can be noted from the information in Tables 3 and 4 that heating the aerosolisable product inside the device 200°C led to an aerosol being generated (due to the various mass changes). Accordingly, it is clear that the present invention allows the preparation of the aerosolisable products which are less prone to leakage (owing to their solid-like nature) and which can provide users with a more punctuated experience compared to liquid based systems.

Table 3 - Pellet inserted at 200°C

Sample	CFP + Holder Weight (g)	CFP + Holder Weight after (g)	Difference (g)	Device Weight (g)	Device Weight after (g)	Difference (g)	Pellet (g)	Pellet after (g)	Difference (g)	Notes
s19-1	64.328	64.361	0.034	99.701	99.639	-0.062	0.459	0.370	-0.089	Cream to Brown colour change
s19-2	64.995	65.026	0.030	99.744	99.678	-0.066	0.485	0.400	-0.085	Cream to Brown colour change
s19-3	63.834	63.864	0.030	99.710	99.652	-0.058	0.434	0.351	-0.084	Cream to Brown colour change
s20-1	63.924	63.944	0.020	99.708	99.664	-0.044	0.504	0.451	-0.053	No Colour Change
s20-2	63.574	63.599	0.025	99.767	99.724	-0.043	0.555	0.486	-0.069	Part of the pellet broke as it left device
s20-3	64.593	64.617	0.024	99.764	99.718	-0.046	0.560	0.497	-0.063	No Colour Change
CFP - Cambridge Filter Pad										

Table 4 - Pellet inside for heating up to 200°C

Sample	CFP + Holder Weight (g)	CFP + Holder Weight after (g)	Difference (g)	Device Weight (g)	Device Weight after (g)	Difference (g)	Pellet (g)	Pellet after (g)	Difference (g)	Notes
S19-1	64.6806	64.7088	0.028	99.6748	99.6148	-0.060	0.4666	0.3797	-0.087	Cream to Brown colour change
S19-2	64.8805	64.9140	0.034	99.7001	99.6330	-0.067	0.4589	0.3723	-0.087	Cream to Brown colour change
S19-3	63.4928	63.5243	0.031	99.6947	99.6353	-0.059	0.4350	0.3521	-0.083	Cream to Brown colour change
S20-1	64.0401	64.0627	0.023	99.7789	99.7338	-0.045	0.5749	0.5076	-0.067	No Colour Change
S20-2	63.5779	63.6011	0.023	99.7422	99.3178	-0.424	0.5020	0.4683	-0.034	No Colour Change
S20-3	64.5976	64.6191	0.022	99.7677	99.7181	-0.050	0.5460	0.4865	-0.060	Device charging 20 min break, No Colour Change

[0105] Various modifications and variations of the present invention will be apparent to those skilled in the art without departing from the scope of the invention. Although the invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the described modes for carrying out the invention which are obvious to those skilled in chemistry or related fields are intended to be within the scope of the following claims.

Claims

1. An aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.
2. An aerosolisable product according to claim 1 wherein the calcium carbonate has a specific surface area (according to the BET method) of at least 5 m²/g
3. An aerosolisable product according to claim 1 or 2 wherein the calcium carbonate has a specific surface area (according to the BET method) of from 7 to 9 m²/g
4. An aerosolisable product according to claim 1, 2 or 3 wherein the calcium carbonate has a specific surface area (according to the BET method) of at least 70 m²/g
5. An aerosolisable product comprising
 - (a) an aerosol forming material; and
 - (b) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable product.
6. An aerosolisable product according to any one of claims 1 to 5 wherein the aerosol forming material is selected from water, triethylene glycol, triethyl citrate, triacetin, glycols, sorbitol, lactic acid, glycerol, propylene glycol, and mixtures thereof. The aerosol forming material may be selected from triethylene glycol, triethyl citrate, triacetin, glycols, sorbitol, lactic acid, glycerol, propylene glycol, and mixtures thereof.
7. An aerosolisable product according to any one of claims 1 to 6 wherein the aerosol forming material is selected from glycerol, propylene glycol and mixtures thereof.
8. An aerosolisable product according to any one of claims 1 to 7 wherein the aerosol forming material is a combination of glycerol and propylene glycol.
9. An aerosolisable product according to claim 8 further comprising water.
10. An aerosolisable product according to any one of claims 1 to 9 wherein the aerosol forming material is present in an amount of 1 to 15 wt.% based on the aerosolisable product.
11. An aerosolisable product according to any one of claims 1 to 10 wherein the calcium carbonate is present in an amount of at least 85 wt.% based on the aerosolisable product.
12. An aerosolisable product according to any one of claims 1 to 11 wherein the substrate material consists of calcium carbonate
13. An aerosolisable product according to any one of claims 1 to 12 further comprising nicotine.
14. An aerosolisable product according to claim 13 comprising nicotine in an amount of no greater than 2 wt% based on the total weight of the aerosolisable product.

15. An aerosolisable product according to claim 14 comprising nicotine in an amount of no greater than 1.8 wt% based on the total weight of the aerosolisable product.

16. A dosage form of an aerosolisable product, wherein the dosage form comprises

- (a) active agent in an amount of 0.001 to 1 grams;
- (b) an aerosol forming material; and
- (c) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the total surface area of the calcium carbonate present in the aerosolisable product is at least 25m² per gram of aerosol forming material present in the aerosolisable product.

17. A dosage form according to claim 16 wherein the aerosolisable nicotine product is an aerosolisable product as defined in any one of claims 2 to 4.

18. A dosage form of an aerosolisable nicotine product, wherein the dosage form comprises

- (a) nicotine in an amount of 0.001 to 1 grams;
- (b) an aerosol forming material; and
- (c) a substrate material, wherein the substrate material is at least calcium carbonate; wherein the calcium carbonate is present in an amount of at least 80 wt.% based on the aerosolisable nicotine product.

19. A dosage form according to any one of claims 16 to 18 wherein the aerosolisable nicotine product is an aerosolisable product as defined in any one of claims 6 to 15.

20. A process for forming an aerosol, the process comprising the steps of:

- (i) providing an aerosolisable product as defined in any one of claims 1 to 15; and
- (ii) heating the aerosolisable product.

21. A process for preparing an aerosolisable product as defined in any one of claims 1 to 15, the process comprising the steps of:

- (i) contacting an aerosol forming material and a solid substrate material, wherein the solid substrate material is at least calcium carbonate, to form an initial mixture; and
- (ii) compressing the initial mixture to form the aerosolisable product.

22. A contained aerosolisable product comprising

- (a) a container; and
- (b) an aerosolisable product as defined in any one of claims 1 to 15.

23. A contained aerosolisable product according to claim 22 wherein the container is configured for engagement with an electronic aerosol provision system.

24. An electronic aerosol provision system comprising:

- (i) an aerosoliser for aerosolising an aerosolisable product for inhalation by a user of the electronic aerosol provision system;
- (ii) a power supply comprising a cell or battery for supplying power to the aerosoliser; and
- (iii) an aerosolisable product as defined in any one of claims 1 to 15.

Patentansprüche

1. Aerosolisierbares Produkt, umfassend

- (a) ein aerosolbildendes Material; und
- (b) ein Substratmaterial, wobei das Substratmaterial zumindest Calciumcarbonat ist;

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wobei die Gesamtoberfläche des in dem aerosolisierbaren Produkt vorhandenen Calciumcarbonats mindestens 25 m² pro Gramm des in dem aerosolisierbaren Produkt vorhandenen aerosolbildenden Materials beträgt.

- 5 **2.** Aerosolisierbares Produkt nach Anspruch 1, wobei das Calciumcarbonat eine spezifische Oberfläche (nach dem BET-Verfahren) von mindestens 5 m²/g aufweist.
- 3.** Aerosolisierbares Produkt nach Anspruch 1 oder 2, wobei das Calciumcarbonat eine spezifische Oberfläche (nach dem BET-Verfahren) von 7 bis 9 m²/g aufweist.
- 10 **4.** Aerosolisierbares Produkt nach Anspruch 1, 2 oder 3, wobei das Calciumcarbonat eine spezifische Oberfläche (nach dem BET-Verfahren) von mindestens 70 m²/g aufweist.
- 5.** Aerosolisierbares Produkt, umfassend
 - 15 (a) ein aerosolbildendes Material; und
 - (b) ein Substratmaterial, wobei das Substratmaterial zumindest Calciumcarbonat ist; wobei das Calciumcarbonat in einer Menge von mindestens 80 Gew.-% bezogen auf das aerosolisierbare Produkt vorhanden ist.
- 20 **6.** Aerosolisierbares Produkt nach einem der Ansprüche 1 bis 5, wobei das aerosolbildende Material ausgewählt ist aus Wasser, Triethylenglycol, Triethylcitrat, Triacetin, Glycolen, Sorbit, Milchsäure, Glycerin, Propylenglycol und Gemischen davon, das aerosolbildende Material kann aus Triethylenglycol, Triethylcitrat, Triacetin, Glycolen, Sorbit, Milchsäure, Glycerin, Propylenglycol und Gemischen davon ausgewählt sein.
- 25 **7.** Aerosolisierbares Produkt nach einem der Ansprüche 1 bis 6, wobei das aerosolbildende Material ausgewählt ist aus Glycerin, Propylenglycol und Gemischen davon.
- 8.** Aerosolisierbares Produkt nach einem der Ansprüche 1 bis 7, wobei das aerosolbildende Material eine Kombination aus Glycerin und Propylenglycol ist.
- 30 **9.** Aerosolisierbares Produkt nach Anspruch 8, das ferner Wasser umfasst.
- 10.** Aerosolisierbares Produkt nach einem der Ansprüche 1 bis 9, wobei das aerosolbildende Material in einer Menge von 1 bis 15 Gew.-% bezogen auf das aerosolisierbare Produkt vorhanden ist.
- 35 **11.** Aerosolisierbares Produkt nach einem der Ansprüche 1 bis 10, wobei das Calciumcarbonat in einer Menge von mindestens 85 Gew.-% bezogen auf das aerosolisierbare Produkt vorhanden ist.
- 12.** Aerosolisierbares Produkt nach einem der Ansprüche 1 bis 11, wobei das Substratmaterial aus Calciumcarbonat besteht.
- 40 **13.** Aerosolisierbares Produkt nach einem der Ansprüche 1 bis 12, ferner umfassend Nikotin.
- 14.** Aerosolisierbares Produkt nach Anspruch 13, umfassend Nikotin in einer Menge von nicht mehr als 2 Gew.-%, bezogen auf das Gesamtgewicht des aerosolisierbaren Produkts.
- 45 **15.** Aerosolisierbares Produkt nach Anspruch 14, umfassend Nikotin in einer Menge von nicht mehr als 1,8 Gew.-%, bezogen auf das Gesamtgewicht des aerosolisierbaren Produkts.
- 50 **16.** Dosierungsform eines aerosolisierbaren Produkts, wobei die Dosierungsform Folgendes umfasst:
 - (a) Wirkstoff in einer Menge von 0,001 bis 1 Gramm;
 - (b) ein aerosolbildendes Material; und
 - (c) ein Substratmaterial, wobei das Substratmaterial zumindest Calciumcarbonat ist;
- 55 wobei die Gesamtoberfläche des in dem aerosolisierbaren Produkt vorhandenen Calciumcarbonats mindestens 25 m² pro Gramm des in dem aerosolisierbaren Produkt vorhandenen aerosolbildenden Materials beträgt.
- 17.** Dosierungsform nach Anspruch 16, wobei das aerosolisierbare Nikotinprodukt ein aerosolisierbares Produkt, wie

in einem der Ansprüche 2 bis 4 definiert, ist.

18. Dosierungsform eines aerosolisierbaren Nikotinprodukts, wobei die Dosierungsform Folgendes umfasst:

- (a) Nikotin in einer Menge von 0,001 bis 1 Gramm;
- (b) ein aerosolbildendes Material; und
- (c) ein Substratmaterial, wobei das Substratmaterial zumindest Calciumcarbonat ist; wobei das Calciumcarbonat in einer Menge von mindestens 80 Gew.-% bezogen auf das aerosolisierbare Nikotinprodukt vorhanden ist.

19. Dosierungsform nach einem der Ansprüche 16 bis 18, wobei das aerosolisierbare Nikotinprodukt ein aerosolisierbares Produkt, wie in einem der Ansprüche 6 bis 15 definiert, ist.

20. Vorgang zur Bildung eines Aerosols, wobei der Vorgang die folgenden Schritte umfasst:

- (i) Bereitstellen eines aerosolisierbaren Produkts, wie in einem der Ansprüche 1 bis 15 definiert; und
- (ii) Erhitzen des aerosolisierbaren Produkts.

21. Vorgang zur Herstellung eines aerosolisierbaren Produkts, wie in einem der Ansprüche 1 bis 15 definiert, wobei der Vorgang die folgenden Schritte umfasst:

- (i) Kontaktieren eines aerosolbildenden Materials und eines festen Substratmaterials, wobei das feste Substratmaterial zumindest Calciumcarbonat ist, um ein Ausgangsgemisch zu bilden; und
- (ii) Komprimieren des Ausgangsgemischs, um das aerosolisierbare Produkt zu bilden.

22. Enthaltene aerosolisierbares Produkt, umfassend

- (a) einen Behälter; und
- (b) ein aerosolisierbares Produkt wie in einem der Ansprüche 1 bis 15 definiert.

23. Enthaltene aerosolisierbares Produkt nach Anspruch 22, wobei der Behälter zum Eingriff mit einem elektronischen Aerosolbereitstellungssystem konfiguriert ist.

24. Elektronisches Aerosolbereitstellungssystem, umfassend:

- (i) einen Vernebler zum Vernebeln eines aerosolisierbaren Produkts zur Inhalation durch einen Benutzer des elektronischen Aerosolbereitstellungssystems;
- (ii) eine Stromversorgung, die eine Zelle oder Batterie umfasst, um den Vernebler mit Strom zu versorgen; und
- (iii) ein aerosolisierbares Produkt wie in einem der Ansprüche 1 bis 15 definiert.

Revendications

1. Produit pouvant être aérosolisé comprenant

- (a) un matériau formant aérosol ; et
- (b) un matériau substrat, ledit matériau substrat étant au moins du carbonate de calcium ; la surface totale du carbonate de calcium présent dans le produit pouvant être aérosolisé étant d'au moins 25 m² par gramme de matériau formant aérosol présent dans le produit pouvant être aérosolisé.

2. Produit pouvant être aérosolisé selon la revendication 1, ledit carbonate de calcium ayant une surface spécifique (selon la méthode BET) d'au moins 5 m²/g.

3. Produit pouvant être aérosolisé selon la revendication 1 ou 2, ledit carbonate de calcium ayant une surface spécifique (selon la méthode BET) allant de 7 à 9 m²/g.

4. Produit pouvant être aérosolisé selon la revendication 1, 2 ou 3, ledit carbonate de calcium ayant une surface spécifique (selon la méthode BET) d'au moins 70 m²/g.

5. Produit pouvant être aérosolisé comprenant

(a) un matériau formant aérosol ; et

(b) un matériau substrat, ledit matériau substrat étant au moins du carbonate de calcium ;

ledit carbonate de calcium étant présent en une quantité d'au moins 80 % en poids par rapport au produit pouvant être aérosolisé.

6. Produit pouvant être aérosolisé selon l'une quelconque des revendications 1 à 5, ledit matériau formant aérosol étant choisi parmi l'eau, le triéthylène glycol, le citrate de triéthyle, la triacétine, les glycols, le sorbitol, l'acide lactique, le glycérol, le propylène glycol et leurs mélanges, le matériau formant aérosol pouvant être choisi parmi le triéthylène glycol, le citrate de triéthyle, la triacétine, les glycols, le sorbitol, l'acide lactique, le glycérol, le propylène glycol et leurs mélanges.

7. Produit pouvant être aérosolisé selon l'une quelconque des revendications 1 à 6, ledit matériau formant aérosol étant choisi parmi le glycérol, le propylène glycol et leurs mélanges.

8. Produit pouvant être aérosolisé selon l'une quelconque des revendications 1 à 7, ledit matériau formant aérosol étant une combinaison de glycérol et de propylène glycol.

9. Produit pouvant être aérosolisé selon la revendication 8, comprenant en outre de l'eau.

10. Produit pouvant être aérosolisé selon l'une quelconque des revendications 1 à 9, ledit matériau formant aérosol étant présent en une quantité représentant de 1 à 15 % en poids par rapport au produit pouvant être aérosolisé.

11. Produit pouvant être aérosolisé selon l'une quelconque des revendications 1 à 10, ledit carbonate de calcium étant présent en une quantité représentant au moins 85 % en poids par rapport au produit pouvant être aérosolisé.

12. Produit pouvant être aérosolisé selon l'une quelconque des revendications 1 à 11, ledit matériau substrat étant constitué de carbonate de calcium.

13. Produit pouvant être aérosolisé selon l'une quelconque des revendications 1 à 12, comprenant en outre de la nicotine.

14. Produit pouvant être aérosolisé selon la revendication 13, comprenant de la nicotine en une quantité non supérieure à 2 % en poids par rapport au poids total du produit pouvant être aérosolisé.

15. Produit pouvant être aérosolisé selon la revendication 14, comprenant de la nicotine en une quantité non supérieure à 1,8 % en poids par rapport au poids total du produit pouvant être aérosolisé.

16. Forme posologique d'un produit pouvant être aérosolisé, ladite forme posologique comprenant

(a) un agent actif en une quantité de 0,001 à 1 gramme ;

(b) un matériau formant aérosol ; et

(c) un matériau substrat, ledit matériau substrat étant au moins du carbonate de calcium ;

ladite surface totale du carbonate de calcium présent dans le produit pouvant être aérosolisé étant d'au moins 25 m² par gramme de matériau formant aérosol présent dans le produit pouvant être aérosolisé.

17. Forme posologique selon la revendication 16, ledit produit de nicotine pouvant être aérosolisé étant un produit pouvant être aérosolisé tel que défini dans l'une quelconque des revendications 2 à 4.

18. Forme posologique d'un produit de nicotine pouvant être aérosolisé, ladite forme posologique comprenant

(a) de la nicotine en une quantité de 0,001 à 1 gramme ;

(b) un matériau formant aérosol ; et

(c) un matériau substrat, ledit matériau substrat étant au moins du carbonate de calcium ;

ledit carbonate de calcium étant présent en une quantité d'au moins 80 % en poids par rapport au produit de nicotine pouvant être aérosolisé.

19. Forme posologique selon l'une quelconque des revendications 16 à 18, ledit produit de nicotine pouvant être aéro-

solisé étant un produit pouvant être aérosolisé tel que défini dans l'une quelconque des revendications 6 à 15.

20. Procédé de formation d'un aérosol, le procédé comprenant les étapes de :

- 5 (i) fourniture d'un produit pouvant être aérosolisé tel que défini dans l'une quelconque des revendications 1 à 15 ; et
(ii) chauffage du produit pouvant être aérosolisé.

10 **21.** Procédé de préparation d'un produit pouvant être aérosolisé tel que défini dans l'une quelconque des revendications 1 à 15, le procédé comprenant les étapes de :

- (i) mise en contact d'un matériau formant aérosol et d'un matériau substrat solide, ledit matériau substrat solide étant au moins du carbonate de calcium, pour former un mélange initial ;
et
15 (ii) compression du mélange initial pour former le produit pouvant être aérosolisé.

22. Produit pouvant être aérosolisé conditionné comprenant

- (a) un contenant ; et
20 (b) un produit pouvant être aérosolisé tel que défini dans l'une quelconque des revendications 1 à 15.

23. Produit pouvant être aérosolisé conditionné selon la revendication 22, ledit contenant étant conçu pour s'engager avec un système électronique de distribution d'aérosol.

25 **24.** Système électronique de distribution d'aérosol comprenant :

- (i) un aérosolisateur destiné à aérosoliser un produit pouvant être aérosolisé pour l'inhalation par un utilisateur du système électronique de distribution d'aérosol ;
(ii) une alimentation électrique comprenant une pile ou une batterie pour fournir de l'électricité à l'aérosolisateur ;
30 et
(iii) un produit pouvant être aérosolisé tel que défini dans l'une quelconque des revendications 1 à 15.

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