Brief description of the invention

Summary

In a first aspect, the present disclosure thus first relates to a process for the preparation of a powder by electrostatic spray-drying of an oil-in-water emulsion, wherein said oil-in-water emulsion comprises an octenyl succinate starch and a maltodextrin. The powder comprises an octenyl succinate starch and a maltodextrin and has: a bulk density of at least 0.30 g/ml, a tapped density of at least 0.30 g/ml, and a Carr's index lower than 15 %, wherein the Carr's index (C) is calculated as follows: $C = 100 \times (1 - \frac{\rho_B}{\rho_T})$ wherein ρ_B is the bulk density of the powder, and ρ_T is the tapped density of the powder. In a second aspect, the present disclosure further relates to a powder

obtained from the first aspect, wherein the powder comprises an octenyl succinate starch and a maltodextrin and has: a bulk density of at least 0.30 g/ml, a tapped density of at least 0.30 g/ml, and a Carr's index lower than 15 %, wherein the Carr's index (C) is calculated as follows: $C = 100 \times (1 - \frac{\rho_B}{\rho_T})$ wherein ρ_B is the bulk density of the powder, and ρ_T is the tapped density of the powder. In a third aspect, the present disclosure further relates to a solid dosage form comprising the powder of the second aspect.

Detailed description of the invention

A first object of the present invention is a process for the preparation of a powder by electrostatic spray-drying of an oil-in-water emulsion, wherein the oil-in-water emulsion comprises an octenyl succinate starch and a maltodextrin.

The octenyl succinate starch and maltodextrin useful of the invention both are starchy materials. The expression "starchy material" classically refers to a substance obtained from starch. It is reminded that the expression "starch" classically refers to the starch isolated from any suitable botanical source, by any technique well known to those skilled in the art. Isolated starch typically contains no more than 3 % of impurities; said percentage being expressed in dry weight of impurities with respect to the total dry weight of isolated starch. These impurities typically comprise proteins, colloidal matters and fibrous residues. Suitable botanical source includes for instance legumes, cereals, and tubers.

The first starchy material useful to the invention is an octenyl succinate starch.

Such octenyl succinate starches are well known to those skilled in the art. They are in particular and advantageously food-grade octenyl succinate starches. Such octenyl succinate starches typically are obtainable by esterification, for instance from the reaction of a starchy material with octenyl succinic anhydride.

Preferably, the octenyl succinate starch useful to the invention is cold-water soluble. In particular, this means that the typical insoluble granular structure observed in raw starch is lost in the octenyl succinate starch. This can for instance be done by subjecting the starchy material to a so-called step of cooking. This can for instance be performed on the raw starch, before the step of esterification.

Claims

1. A process for the preparation of a powder by electrostatic spray-drying of an oil-in-water emulsion, wherein said oil-in-water emulsion comprises an octenyl succinate starch and a maltodextrin, wherein the powder comprises an octenyl succinate starch and a maltodextrin and has:
   a bulk density of at least 0.30 g/ml,
   a tapped density of at least 0.30 g/ml, and
   a Carr's index lower than 15 %, wherein the Carr's index (C) is calculated as follows:

$$C = 100 \times (1 - \frac{\rho_B}{\rho_T})$$

   wherein
   ρ_B is the bulk density of the powder, and
   ρ_T is the tapped density of the powder.

2. The process of claim 1, wherein said maltodextrin is derived from starch having at least 20 % of amylose, preferably from 25 to 50 % of amylose, still preferably from 25 to 45 % of amylose, still preferably from 30 to 45 % of amylose, still preferably from 35 to 45 % amylose; expressed as dry weight relative to the total dry weight of said starch.

3. The process according to any of claims 1 and 2, wherein said maltodextrin is derived from legume starch.

4. The process according to any of claims 1 to 3, wherein said octenyl succinate starch is derived from starch having more than 50 % of amylopectin, preferably at least 60 % of amylopectin, still preferably at least 80 % of amylopectin, still preferably at least 90 % of amylopectin, still preferably at least 95 % of amylopectin; expressed as dry weight relative to the total dry weight of said starch.

5. The process according to any of claims 1 to 4, wherein said octenyl succinate starch is sodium octenyl succinate starch.

6. The process according to any of claims 1 to 5, wherein said octenyl succinate starch has a Hydrophilic-Lipophilic Balance (HLB) selected within the range of from 8 to 16, preferably of at least 10, still preferably selected within the range of from 12 to 16, still preferably selected within the range of from 14 to 16, for instance equal to 15.

7. The process according to any of claims 1 to 6 wherein said oil-in-water emulsion exhibits a weight ratio of octenyl succinate starch to maltodextrin selected within the range of from 1:1 to 1:100, still preferably of from 1:2 to 1:50, still preferably of from 1:5 to 1:40, still preferably of from 1:10 to 1:30, still preferably of from 1:15 to 1:25.

8. The process according to any of claims 1 to 7 wherein said oil-in-water emulsion has a solid content selected within the range of from 20 to 80 %, still preferably of from 30 to 70 %, still preferably of from 40 to 60 %, still preferably of from 50 to 55 %; this percentage corresponding to the weight of solids, with respect to the total weight of said oil-in-water emulsion.

9. The process according to any of claims 1 to 8, wherein the oily phase of said oil-in-water emulsion represents from 1 to 50 % by weight the total solid content of said oil-in-water emulsion, still preferably from 5 to 40 %, still preferably from 10 to 30 %.

10. The process according to any of claims 1 to 9, wherein the starchy materials of said oil-in-water emulsion represent at least 40 % by weight the total solid content of said oil-in-water emulsion, still preferably at least 50 %, still preferably at least 60 %, for instance from 70 to 90 %, preferably from 70 to 85 %.

11. A powder obtained by the process of any of claims 1 to 10, wherein the powder comprises an octenyl succinate starch and a maltodextrin and has:
a bulk density of at least 0.30 g/ml,
a tapped density of at least 0.30 g/ml, and
a Carr's index lower than 15 %, wherein the Carr's index (C) is calculated as follows:

$$C = 100 \times (1 - \frac{\rho_B}{\rho_T})$$

wherein
ρ_B is the bulk density of the powder, and
ρ_T is the tapped density of the powder.

12. The powder of claim 11, wherein said powder has bulk density selected within the range of from 0.30 to 0.70 g/ml, preferably of from 0.40 to 0.60 g/ml.

13. The powder of any of claims 11 and 12, wherein said powder has tapped density selected within the range of from 0.30 to 0.70 g/ml, still preferably of from 0.40 to 0.60 g/ml.

14. The powder of any of claims 11 to 13, wherein said powder has Carr's index selected within the range of from 5 up to 15 %, still preferably, lower than 12 %, still preferably lower than 10 %.

15. A solid dosage form comprising the powder of any of claims 11 to 14.

16. The solid dosage form of claim 15, wherein said solid dosage form is selected from a powdery composition, a tablet, or a hard capsule.

17. The solid dosage form of any of claims 15 and 16, wherein said solid dosage form exhibits disintegration time lower than 90 seconds, still preferably lower than 80 seconds, still preferably lower than 70 seconds, still preferably lower than 60 seconds, for instance from 10 to 60 seconds, wherein the disintegration is measured according to US Pharmacopeia of reference "General Methods, Disintegration <701>" as in force in October 1st 2017.