Claims

[Claim 1] A solid milk, wherein the surface (12) of the solid milk has X-ray diffraction pattern that has a main peak of 2theta= 10 - 15 degrees at 2theta = 10 - 11 degrees or at 2theta = 12 - 13 degrees.

[Claim 2] The solid milk in accordance with claim 1,
wherein the peak at 2theta = 10 - 11 degrees relates to an anhydrous crystalline lactose, and
wherein the peak at 2theta = 12 - 13 degrees relates to a monohydrate crystalline lactose.

[Claim 3] The solid milk in accordance with claim 1,
wherein the main peak of 2theta= 10 - 15 degrees is at 2theta = 10.25 - 10.75 degrees or at 2theta = 12.25 - 12.75 degrees.

[Claim 4] The solid milk in accordance with claim 1,
wherein Ia/Ib is equal to or more than 2.5,
wherein the Ia is a sum of:
an integrated intensity of a first region of X-ray diffraction pattern of the surface (12) of the solid milk, the center of the first region is a main peak of 2theta = 10 - 11 degrees of the pattern and the width of the first region is twice of the full width of half maximum of said main peak of 2theta = 10 - 11 degrees; and
an integrated intensity of a second region of X-ray diffraction pattern of the surface (12) of the solid milk, the center of the second region is a main peak of 2theta = 12 - 13 degrees of the pattern and the width of the second region is twice of the full width of half maximum of said main peak of 2theta = 12 - 13 degrees; and
wherein the Ib is a sum of:
an integrated intensity of a first region of X-ray diffraction pattern of center area (11) of the solid milk, the center of the first region is a main peak of 2theta = 10 - 11 degrees of the pattern and the width of the first region is twice of the full width of half maximum of said main peak of 2theta = 10 - 11 degrees; and
an integrated intensity of a second region of X-ray diffraction pattern of the center area (11) of the solid milk, the center of the second region is a main peak of 2theta = 12 - 13 degrees of the pattern and the width of the second region is twice of the full width of half maximum of said main peak of 2theta = 12 - 13 degrees.

[Claim 5] The solid milk in accordance with claim 4,

wherein the Ia/Ib is from 2.5 to 15.

[Claim 6] The solid milk in accordance with claim 1,
wherein the amount of crystalline lactose at the surface (12) of the solid milk is larger than that of crystalline lactose at center area (11) of the solid milk.

[Claim 7] The solid milk in accordance with claim 1,
wherein the amount of crystalline lactose at the surface (12) of the solid milk is more than 5 wt % larger than that of crystalline lactose at center area (11) of the solid milk.

[Claim 8] The solid milk in accordance with claim 1,
wherein the amount ratio of crystalline lactose and amorphous lactose at the surface (12) of the solid milk is 25:75 to 90:10, and
wherein center area (11) does not contain crystalline lactose or, the amount ratio of crystalline lactose and amorphous lactose at the center area (11) of the solid milk is less than 90:10.

[Claim 9] The solid milk in accordance with claim 1,
wherein the solid milk has 0.2 mm or more of a hard layer at the surface (12) of the solid milk, and
wherein the hard layer comprises more than 10 wt % of crystalline lactose.

[Claim 10] The solid milk in accordance with claim 1,
wherein the volume of the solid milk is from 1 cm^3 to 50 cm^3.

[Claim 11] The solid milk in accordance with claim 1,
wherein a force, which is caused by a load, in the direction of short axis of the solid milk causing the solid milk be broken is 30 N to 300 N when the solid milk has a rectangular solid shape.

[Claim 12] The solid milk in accordance with claim 1,
wherein ingredient of the solid milk consist only of powdered milk.

[Claim 13] The solid milk in accordance with claim 1,
when the solid milk is dissolved in a liquid the volume of the liquid increases 9.5 ml to 10.5 ml or 19.5 ml to 20.5 ml.

[Claim 14] A method for the manufacture of solid milk, the method comprising steps of:
compressing powdered milk so as to obtain solid compressed powdered milk;
humidifying the compressed powdered milk so as to obtain humidified compressed powdered milk; and
drying the humidified compressed powdered milk so as to obtain the

solid milk,

wherein a part of amorphous lactose at the surface of the solid milk (12) is crystallized at the steps of humidifying step and drying.

[Claim 15] The method for the manufacture of solid milk in accordance with claim 14,

wherein the surface of the solid milk (12) has X-ray diffraction pattern that has a main peak of 2theta= 10 - 15 degrees at 2theta = 10 - 11 degrees or at 2theta = 12 - 13 degrees.

[Claim 16] The method for the manufacture of solid milk in accordance with claim 14,

wherein the step of humidifying is a step for keeping the compressed powdered milk under humidity of 60%RH to 100%RH atmosphere for 5 seconds to 1 hour, and

wherein the step of drying is a step for keeping the humidified compress powdered milk under humidity of 0%RH to 30%RH atmosphere for 0.2 minute to 2 hours.

[Claim 17] The method for the manufacture of solid milk in accordance with claim 14,

wherein the powdered milk comprises more than 30 wt % of lactose.

[Claim 18] The method for the manufacture of solid milk in accordance with claim 14,

wherein the powdered milk comprises more than 20 wt % of amorphous lactose.

[Claim 19] The method for the manufacture of solid milk in accordance with claim 14,

wherein the powdered milk does not contain any crystalline lactose or comprises less than 10 wt % of crystalline lactose.

[Claim 20] The method for the manufacture of solid milk in accordance with claim 14,

wherein the powdered milk comprises 0.5 wt% to 10 wt % of crystalline lactose.

[Claim 21] The method for the manufacture of solid milk in accordance with claim 14,

wherein the powdered milk comprises added crystalline lactose .

[Claim 22] The method for the manufacture of solid milk in accordance with claim 14,

wherein the powdered milk obtains crystalline lactose by humidifying and drying granules of ingredients of the powdered milk.

[Claim 23] The method for the manufacture of solid milk in accordance with claim 14,
wherein the method further comprises a step of cooling the concentrated milk before the step of drying such that the powdered milk obtains crystalline lactose.

Claims

1. A solid milk, wherein the surface (12) of the solid milk has X-ray diffraction pattern that has a main peak of 2θ= 10 - 15° at 2θ = 10 - 11° or at 2θ = 12 - 13°.

wherein Ia/Ib is equal to or more than 2.5,

wherein the Ia is a sum of:

an integrated intensity of a first region of X-ray diffraction pattern of the surface (12) of the solid milk, the center of the first region is a main peak of 2θ = 10 - 11 ° of the pattern and the width of the first region is twice of the full width of half maximum of said main peak of 2θ = 10 - 11 °; and

an integrated intensity of a second region of X-ray diffraction pattern of the surface (12) of the solid milk, the center of the second region is a main peak of 2θ = 12 - 13 ° of the pattern and the width of the second region is twice of the full width of half maximum of said main peak of 2θ = 12 - 13 °; and

wherein the Ib is a sum of:

an integrated intensity of a first region of X-ray diffraction pattern of center area (11) of the solid milk, the center of the first region is a main peak of 2θ = 10 - 11 ° of the pattern and the width of the first region is twice of the full width of half maximum of said main peak of 2θ = 10 - 11 °; and

an integrated intensity of a second region of X-ray diffraction pattern of the center area (11) of the solid milk, the center of the second region is a main peak of 2θ = 12 - 13 ° of the pattern and the width of the second region is twice of the full width of half maximum of said main peak of 2θ = 12 - 13 °.

2. The solid milk in accordance with claim 1,

wherein the peak at 2θ = 10 - 11 ° relates to an anhydrous crystalline lactose, and

wherein the peak at 2θ = 12 - 13 ° relates to a monohydrate crystalline lactose.

3. The solid milk in accordance with claim 1,

wherein the main peak of 2θ= 10 - 15 °is at 2θ = 10.25 - 10.75 ° or at 2θ = 12.25 - 12.75 °.

4. The solid milk in accordance with claim 1
wherein the Ia/Ib is from 2.5 to 15.

5. The solid milk in accordance with claim 1,
wherein the amount of crystalline lactose at the surface (12) of the solid milk is larger than that of crystalline lactose at center area (11) of the solid milk.

6. The solid milk in accordance with claim 1,
wherein the amount of crystalline lactose at the surface (12) of the solid milk is more than 5 wt % larger than that of crystalline lactose at center area (11) of the solid milk.

7. The solid milk in accordance with claim 1,
wherein the amount ratio of crystalline lactose and amorphous lactose at the surface (12) of the solid milk is 25:75 to 90:10, and
wherein center area (11) does not contain crystalline lactose or, the amount ratio of crystalline lactose and amorphous lactose at the center area (11) of the solid milk is less than 90:10.

8. The solid milk in accordance with claim 1,
wherein the solid milk has 0.2 mm or more of a hard layer at the surface (12) of the solid milk, and
wherein the hard layer comprises more than 10 wt % of crystalline lactose.

9. The solid milk in accordance with claim 1,
wherein the volume of the solid milk is from 1 cm^3 to 50 cm^3.

10. The solid milk in accordance with claim 1,
wherein a force, which is caused by a load, in the direction of short axis of the solid milk causing the solid milk be broken is 30 N to 300 N when the solid milk has a rectangular solid shape.

11. The solid milk in accordance with claim 1,
wherein ingredient of the solid milk consist only of powdered milk.

12. The solid milk in accordance with claim 1,

when the solid milk is dissolved in a liquid the volume of the liquid increases 9.5 ml to 10.5 ml or 19.5 ml to 20.5 ml.

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