C L A I M S

1. A process for producing a particulate composition comprising crystalline α,α-trehalose dihydrate with an α,α-trehalose content of 98.0% by weight or more, on a dry solid basis, said process comprising the steps of:

allowing to act on liquefied starch an α-glycosyltrehalose-forming enzyme derived from a microorganism of the genus *Arthrobacter* and a trehalose-releasing enzyme derived from a microorganism of the genus *Arthrobacter* along with a starch debranching enzyme and a cyclomaltodextrin glucanotransferase;

allowing a glucoamylase to act on the resulting mixture to obtain a saccharide solution comprising α,α-trehalose;

precipitating crystalline α,α-trehalose dihydrate from said saccharide solution;

collecting the precipitated crystalline α,α-trehalose dihydrate by a centrifuge; and

ageing and drying the collected crystals;

where a natural or recombinant cyclomaltodextrin glucanotransferase derived from a microorganism of the genus *Paenibacillus* or a mutant enzyme thereof is used as said cyclomaltodextrin glucanotransferase to increase the α,α-trehalose content in said saccharide solution to over 86.0% by weight, on a dry solid basis, without passing through a fractionation step by column chromatography.

2. The process of claim 1, wherein said microorganism of the genus *Paenibacillus* is of the species

Paenibacillus illinoisensis, *Paenibacillus pabuli*, or *Paenibacillus amylolyticus*.

3. The process of claim 1 or 2, wherein said cyclomaltodextrin glucanotransferase is an enzyme that has the following partial amino acid sequences of (a) to (d):

(a) Gly-Ser-X_1-Ala-Ser-Asp;

(b) Lys-Thr-Ser-Ala-Val-Asn-Asn;

(c) Lys-Met-Pro-Ser-Phe-Ser-Lys; and

(d) Val-Asn-Ser-Asn-X_2-Tyr;

wherein X_1 means Ala or Ser and X_2 means Ala or Thr, respectively.

4. The process of any one of claims 1 to 3, wherein said cyclomaltodextrin glucanotransferase is the one that has an amino acid sequence of SEQ ID NO: 1, 2, 3, 12 or 13.

5. The process of any one of claims 1 to 4, wherein said step of precipitating crystalline α,α-trehalose dihydrate is conducted by a controlled cooling method or semi-controlled cooling method.

6. A particulate composition comprising crystalline α,α-trehalose dihydrate obtained by the process of claim 5, which comprises α,α-trehalose in an amount of 99.0% by weight or more but not more than 99.6% by weight, on a dry solid basis, and has a degree of crystallinity for crystalline α,α-trehalose dihydrate of 90.0% or higher but not higher than 96.0%, when calculated based on its powder X-ray diffraction profile.

Claims

1. A particulate composition comprising crystalline α,α-trehalose dihydrate,

(1) which comprises α,α-trehalose in an amount of 99.0% by weight or more but not more than 99.7% by weight, on a dry solid basis;

(2) which has a degree of crystallinity for crystalline α,α-trehalose dihydrate of 90.0% or higher but not higher than 96.8%, when calculated based on its powder X-ray diffraction profile; and

(3) which contains particles with a particle size of 53 μm or larger but smaller than 425 μm in an amount of 70% by weight or more to the whole particulate composition, and those with a particle size of 53 μm or larger but smaller than 300 μm in an amount of 50% by weight or more to the whole particulate composition.

2. The particulate composition comprising crystalline α,α-trehalose dihydrate of claim 1,
which has a reducing power of the whole particulate composition being 0.5% by weight or lower.