Claims

1. A method for the production of lactose, characterised in that said method comprises use of i) a synthase and ii) UDP, for forming UDP-glucose, wherein said method is a fermentation process, a bioconversion, or an enzymatic process characterised in that said synthase is a sucrose synthase , said synthase forms fructose and said method further comprising use of an UDP-glucose-4-epimerase and use of a beta 1,4-galactosyltransferase; and when said method is i) an enzymatic process the reaction is performed between 50°C and 80°C, or ii) a fermentation process or a bioconversion a) 1) the enzymatic conversions are performed by at least one enzyme produced by a cell synthesizing said enzyme; or 2) said lactose is produced by a cell genetically engineered to produce all enzymes needed for production of lactose; and/or b) the fermentation process or bioconversion process is performed at a temperature between about 25°C and about 50°C.
2. The method according to claim 1, wherein said UDP-glucose-4-epimerase converts said UDP-glucose to UDP-galactose.
3. The method according to claim 2, wherein said UDP-galactose is a galactose donor for said beta 1,4-galactosyltransferase to form lactose, wherein preferably said beta 1,4-galactosyltransferase is a lactose synthase.
4. The method according to any one of claims 1 to 3, wherein said beta 1,4-galactosyltransferase converts glucose with UDP-galactose to form lactose and UDP, wherein preferably said beta 1,4-galactosyltransferase is a lactose synthase.
5. The method according to any one of claims 1 to 4, wherein the UDP released by said beta 1,4-galactosyltransferase is recycled to be used by the sucrose synthase to form UDP-glucose.
6. The method according to any one of claims 1 to 5, wherein said beta 1,4-galactosyltransferase uses glucose as an acceptor and UDP-galactose as a donor, wherein preferably said beta 1,4-galactosyltransferase is a lactose synthase.
7. The method according to any one of claims 1 to 8, wherein said sucrose synthase forms a fructose and said fructose is converted to glucose.
8. The method according to any one of claims 1 to 7, wherein said method is an enzymatic process and wherein i) at least one of said enzyme is immobilised and/or ii) the reaction is performed between 55°C and 70°C.
9. The method according to any one of claims 1 to 7, wherein said method is a fermentation process or a bioconversion characterised in that the fermentation process or bioconversion process is performed at a temperature between about 25°C and about 40°C .
10. The method according to any of one of claims 1 to 9, wherein the carbon source used for conversion into lactose is chosen from the list of sucrose or combination of sucrose and glucose.

11. The method according to claim 10 for enzymatic production of lactose using i) sucrose or ii) sucrose and glucose as a carbon source, characterized in that lactose is produced by using i) sucrose or ii) sucrose and glucose as a carbon source, and the reaction thereof is catalysed by a plurality of enzyme combinations.

12. The method according to claim 10 using sucrose synthase, and wherein a) said carbon source is sucrose, wherein i) sucrose is converted with said sucrose synthase into UDP-glucose and fructose, ii) said UDP-glucose is converted into UDP-galactose and iii) fructose is converted into glucose and iv) said UDP-galactose from step ii) and said glucose from step iii) are converted into lactose; or b) said carbon source is a combination of sucrose and glucose, wherein i) sucrose is converted with said sucrose synthase into UDP-glucose and fructose, ii) said UDP-glucose is converted into UDP-galactose and iii) said UDP-galactose from step ii) and said glucose which was provided together with the sucrose are converted into lactose.

13. The method according to any one of claims 1 to 12, wherein said method further comprises a step of purification of said lactose, preferably said lactose is purified by at least one of the following purification steps: microfiltration, centrifugation, ultrafiltration, nanofiltration, ion exchange, cation exchange, anion exchange, Simulated Moving Bed (SMB), colour removal, removal of the carbon source, removal of sucrose or glucose by addition of yeast, removal of sucrose by addition of an invertase.

14. The method according to any one of claims 1 to 13, wherein said method comprises a step of drying and/or crystallisation of said lactose, preferably said crystals are dried, preferably said step of drying or drying of crystals comprises any one or more of spray drying, lyophilization, evaporation, precipitation, spray freeze drying, freeze spray drying, band drying, belt drying, vacuum band drying, vacuum belt drying, drum drying, roller drying, vacuum drum drying, vacuum roller drying, and agitated thin film drying.