Claims

1. A process for the purification of L-fucose from a fermentation broth, comprising the following steps:

   removing biomass from a fermentation broth comprising L-fucose, wherein a clarified solution is provided,

   providing a purified solution by subjecting the clarified solution to

   a cationic ion exchanger treatment and

   an anionic ion exchanger treatment; and

   removing salts from the purified solution by electrodialysis and/or nanofiltration.

2. The process according to claim 1, wherein the cationic ion exchanger treatment is performed under conditions in which L-fucose passes the cationic ion exchanger material and is present in the flow-through and wherein the anionic ion exchanger treatment is performed under conditions in which L-fucose passes the anionic exchanger material and is present in the flow-through.

3. The process according to claim 1 or 2, wherein the biomass

   i) is removed from the fermentation broth by centrifugation and/or filtration, wherein the filtration is preferably selected from the group consisting of microfiltration, ultrafiltration, cross-flow filtration, diafiltration and combinations thereof; and/or

   ii) comprises cells which produce L-fucose, preferably bacterial cells, more preferably recombinant bacterial cells, most preferably recombinant *E. coli* cells, recombinant *Bacillus* sp. cells and/or recombinant *Corynebacterium sp.* cells, especially recombinant *Bacillus subtilis and/or recombinant Bacillus megaterium.*

4. The process according to any one of the preceding claims, wherein the

cationic ion exchanger treatment, a strong cationic ion exchanger is used and/or in the anionic ion exchanger treatment, a strong anionic exchanger is used.

5. The process according to any one of the preceding claims, wherein the cationic ion exchanger treatment is performed to remove unspecific cations and replace them by specific cations, preferably to replace them by the specific cation H^+ or Na^+, wherein if the unspecific cations are replaced by H^+, the pH of the flow-through is preferably adjusted to a pH of 6 to 8 before performing a further treatment step, most preferably by addition of NaOH to the flow-through.

6. The process according to any one of the preceding claims, wherein the anionic exchanger step is performed to remove unspecific anions and replace them by specific anions, preferably by the specific anion Cl^- or OH^-,wherein if the unspecific anions are replaced by Cl^-, the pH of the flow-through is preferably adjusted to a pH of 6 to 8 before performing a further treatment step, most preferably by addition of NaOH to the flow-through.

7. The process according to any one of claims 2 to 6, wherein the conditions under which the L-fucose passes the anionic exchanger material and cationic exchanger material are established by adjusting the pH and/or salt concentration of the clarified solution, preferably by adjusting the pH of the clarified solution to a pH in the range of 6 to 8.

8. The process according to any one of the preceding claims, wherein the cationic ion exchanger treatment and the anionic ion exchanger treatment, the purified solution comprises the L-fucose, color-giving substances and salt, wherein the salt is preferably NaCl.

9. The process according to any one of the preceding claims, wherein the anionic ion exchanger treatment, an anionic exchanger material in the chloride form is used and/or in the cationic ion exchanger treatment, a cationic ion exchanger material in the hydrogen form is used.

10. The process according to any one of the preceding claims, wherein the

clarified solution is subjected firstly to the cationic ion exchanger treatment and subsequently to the anionic ion exchanger treatment.

11. The process according to any one of the preceding claims, wherein the purified solution is concentrated, preferably by nanofiltration and/or reverse osmosis, more preferably by nanofiltration, wherein most preferably a nanofiltration membrane is used which has a molecular weight cut-off in the range of 100 to 200 kDa.

12. The process according to any one of the preceding claims, wherein the clarified solution and/or the purified solution is concentrated

i) up to a concentration of ≥ 100 g/L, preferably ≥ 200 g/L, more preferably ≥ 300 g/L, of L-fucose; and/or

ii) by nanofiltration at a temperature of < 80 °C, preferably < 50°C, more preferably 4 °C to 45 °C, more preferably 10 °C to 40 °C, even more preferably 15 °C to 30 °C, most preferably 15 °C to 20 °C; and/or

iii) by reverse osmosis at a temperature of 20 °C to 50 °C, more preferably 30 °C to 45 °C, most preferably 35 °C to 45 °C; and/or

iv) by nanofiltration at a pressure between > 5 bar and < 50 bar, preferably at a pressure between > 10 bar and < 40 bar, more preferably at a pressure between > 15 and < 30 bar; and/or

v) by reverse osmosis at a pressure between > 5 bar and < 100 bar, preferably at a pressure between > 10 bar and < 80 bar, more preferably at a pressure between > 15 and < 70 bar.

13. The process according to any one of the preceding claims, wherein the electrodialysis is an electrodialysis under neutral conditions or an elec-trodialysis under acidic conditions.

14. The process according to any one of the preceding claims, wherein after removing salts from the purified solution,

i) the amount of salt in the purified solution is < 10% (w/w), preferably < 5% (w/w), more preferably ≤ 1 % (w/w), even more pref-

erably ≤ 0.5 % (w/w), most preferably ≤ 0.4 % (w/w), especially ≤ 0.2 % (w/w); and/or

ii) the conductivity is between 0.2 mS/cm^2 and 10.0 mS/cm^2, preferably between 0.4 mS/cm^2 and 5.0 mS/cm^2, more preferably between 0.5 mS/cm^2 and 1.0 mS/cm^2.

15. The process according to any one of the preceding claims, wherein the clarified solution and/or purified solution is subjected to a step of discolouring, preferably by a treatment with activated charcoal and/or a treatment with a cationic ion exchanger and an anionic ion exchanger which are coupled in series, wherein said removal is optionally performed

i) before or after a step of diafiltration and/or concentration of the clarified solution; and/or

ii) before or after a step of electrodialysis and/or diafiltration of the clarified solution.

16. The process according to any one of the preceding claims, wherein the purified solution is subjected to

i) granulation;

ii) spray-drying;

iii) roller-drying; or

iv) lyophilization.

17. The process according to any one of the preceding claims, wherein the purified solution is subjected to crystallisation, optionally by addition of butanol to the purified solution or without addition of any organic solvent to the purified solution.