CLAIMS

1. A carboxyalkyl chitosan having glucosamine units, N -acetyl -glucosamine units and glucosamine units substituted by a carboxyalkyl group, the said carboxyalkyl chitosan having a zeta potential, measured at pH 7.5, that is lower than or equal to -18 mV, said carboxyalkyl chitosan has a degree of acetylation comprised between 40% and 80%, expressed in number of moles of N -acetyl -glucosamine units in relation to the number of moles of total units and said carboxyalkyl chitosan having a degree of substitution by a carboxyalkyl group that is greater than 20%, for example greater than 50%, expressed as the number of moles of the substituent in relation to the number of moles of total units.

2. A carboxyalkyl chitosan according to claim 1, characterised in that the said carboxyalkyl chitosan has a zeta potential, measured at pH 7.5, that is less than or equal to -20 mV.

3. A carboxyalkyl chitosan chitosan according to claim 1 or 2, the said carboxyalkyl chitosan having a degree of substitution by a carboxyalkyl group that is greater than 70% expressed as the number of moles of the substituent in relation to the number of moles of total units.

4. A carboxyalkyl chitosan according to any one of claims 1 to 3, characterised in that the chitosan is derived from the mycelium of a fungus of the type *Ascomycetes*, and in particular from *Aspergillus niger*, and / or from a fungus *Basidiomycetes*, and in particular *Lentinula edodes* (shiitake) and / or *Agaricus bisporus* (button mushroom).

5. A carboxyalkyl chitosan according to any one of claims 1 to 4, characterised in that the carboxyalkyl chitosan is a N-carboxylalkylated and O-carboxylalkylated chitosan.

6. A carboxyalkyl chitosan according to any one of claims 1 to 5, characterised in that the carboxyalkyl chitosan is reacetylated.

7. A carboxyalkyl chitosan according to any one of claims 1 to 6, characterised in that it is sterilised.

8. A composition characterised in that it comprises at least one carboxyalkyl chitosan defined according to any one of claims 1 to 7.

9. A composition according to claim 8, characterized in that the concentration of said carboxyalkyl chitosan is less than 10% by mass relative to the total mass of the composition (m/m).

10. The composition according to claim 8, characterised in that the concentration of carboxyalkyl chitosan is less than 4% by mass in relation to the total mass of the composition (m/m).

11. The composition according to claim 8, characterised in that the concentration of carboxyalkyl chitosan is less than or equal to 3% by mass in relation to the total mass of the composition (m/m).

12. The composition according to claim 8, characterised in that the composition also comprises hyaluronic acid or sodium hyaluronate, either crosslinked or not crosslinked by covalent bonds.

13. An injectable composition characterised in that it comprises at least one carboxyalkyl chitosan defined according to any one of claims 1 to 7.

14. A pharmaceutical composition, characterised in that it comprises at least one carboxyalkyl chitosan defined according to any one of claims 1 to 7.

15. The pharmaceutical composition of claim 14, wherein said composition is an eye drop formulation.

16. The pharmaceutical composition of claim 14, wherein said composition is a viscosupplementation agent.

17. The composition according to claim 13 or 14, characterised in that the composition also comprises hyaluronic acid or sodium hyaluronate, either crosslinked or not crosslinked by covalent bonds.

18. A composition according to any one of claims 8 to 17, characterised in that the composition is an injectable pharmaceutical composition, an implantable pharmaceutical composition, a pharmaceutical composition suitable for instillation, an injectable composition suitable for delivery via an injectable medical device, an implantable composition suitable for delivery via an implantable medical device, and a composition suitable for instillation via an instillation medical device.

19. A carboxyalkyl chitosan defined according to any one of claims 1 to 7 for use in a therapeutic treatment method.

20. Use of at least one carboxyalkyl chitosan defined according to any one of claims 1 to 7 in the manufacture of a composition for the repair or filling in of at least one body tissue requiring repair or filling in, wherein said composition is to be administered by instillation or the injection via a subcutaneous, intradermal, ocular, intraocular, or intra-articular route.

21. The use according to claim 20, characterised in that ~~the body tissue is chosen from tissues belonging to the vocal cords, muscles, ligaments, tendons, cartilages, sexual organs, bones, joints, eyes, dermis, or one any of their combinations, and more particularly at the joint joints.~~ the body tissue is selected from the tissues belonging to the vocal cords, muscles, ligaments, tendons, cartilages, sexual organs, bones, joints, eyes, dermis, epidermis, or any one of the combinations thereof, and more particularly belonging to the articular joints.

22. The use according to claim 20, characterised in that said composition is for the therapeutic treatment of dry eye syndrome or corneal damage or injury.

23. The use according to claim 22, characterised in that said composition is to be administered by instillation on the ocular surface.

24. The use according to claim 20, characterised in that said composition is for treating an inflammatory pathology~~.~~ of a cutaneous tissue, an ocular tissue, a cartilage tissue or a bone tissue.

25. The use according to claim 20, characterised in that said composition is for the treatment of arthrosis, osteoarthritis, arthritis, or the repair of a cartilage defect.

26. The use according to claim 20, characterised in that said composition is for filling the dermis and said composition is to be administered by injection or implantation.

27. The use according to claim 20, characterised in that said composition is for the treatment of wrinkled appearance and wherein said composition is to be administered by injection.

28. A composition according to any one of claims 8 to 17 comprising a reducing sugar.

29. A medical device, characterised in that it comprises or consists of a composition as defined in any one of claims 8 to 17.

30. An articles or packaging comprising one or more instillation or injection devices pre-filled with a composition according to claim 8 to 18.

31. A use of a composition according to claim 8 to 12 for the preparation of composition for an aesthetic care comprising the injection of said composition for a non-therapeutic purpose.

32. The use of claim 31, characterised in that said use comprises the filling in of wrinkles or the filling in of one or more areas of damaged visible tissue.

33. The use of at least one carboxyalkyl chitosan defined according to any one of claims 1 to 7 for the preparation of a pharmaceutical composition.

34. A use of a composition according to claim 8 to 12 for the preparation of composition for an aesthetic care comprising the injection of said composition for a non-therapeutic purpose.

35. The use of claim 34, characterised in that said use comprises the filling in of wrinkles or the filling in of one or more areas of damaged visible tissue

36. A preparation method for preparing a composition comprising a carboxyalkyl

chitosan defined according to any one of claims 8 to 17, the said method including:

- the dissolution of a carboxyalkyl chitosan defined according to any one of claims 1 to 9 in an aqueous solution, optionally buffered;
- the optional adjustment of the pH to a desired pH;
- the optional addition of other excipients;
- the optional adjustment of the final osmolality of the composition.

37. The preparation method according to claim 36, characterised in that the composition is steam sterilized.

38. The preparation method according to claim 36, characterised in that the composition is steam sterilized by raising the temperature to a temperature between 121°C and 138°C in an autoclave, for a period of time sufficient for sterilization.

39. The preparation method according to claim 36, characterised in that the aqueous solution is an aqueous buffered solution.