CLAIMS

1. A process for obtaining an encapsulated composition comprising a plurality of core-shell microcapsules, wherein the core-shell microcapsules comprise a core and a shell surrounding the core, wherein the shell is formed by cross-linking of at least one protein with a first cross-linking agent, followed by the addition of at least one polysaccharide to form a complex coacervate, wherein the first cross-linking agent is a trifunctional araliphatic isocyanate; and wherein the volume median diameter Dv(50) of the plurality of core-shell microcapsules is from 35 to 100 µm.

2. The process according to claim 1, wherein the shell is formed by cross-linking of the at least one protein with the first cross-linking agent in order to form a simple coacervate.

3. The process according to claim 1 or claim 2, wherein the shell is formed by cross-linking of the at least one protein and a polyfunctional nucleophile with the first cross-linking agent.

4. The process according to one of claims 1 to 3, wherein the at least one protein is a gelatin, preferably a Type B gelatin.

5. The process according to claim 4, wherein the Type B gelatin has a Bloom strength of 200 to 250 Bloom.

6. The process according to one of claims 4 or 5, wherein the Type B gelatin is obtainable from fish.

7. The process according to claim 1, wherein the trifunctional araliphatic isocyanate is an adduct of 2-ethylpropane-1,2,3-triol or 2-ethyl-2-(hydroxymethyl)propane-1,3-diol with 1-isocyanato-2-(isocyanatomethyl)benzene, 1-isocyanato-3-(isocyanatomethyl)-benzene and/or 1-isocyanato-4-(isocyanatomethyl)benzene.

8. The process according to claim 7, wherein the trifunctional araliphatic isocyanate is an adduct of 2-ethylpropane-1,2,3-triol with 1-isocyanato-3-(isocyanatomethyl)benzene.

9. The process according to claim 3, wherein polyfunctional nucleophile is selected from the group consisting of polyamines, in particular diamines and triamines, polyols, ureas urethanes and thiols.

10. The process according to claim 9, wherein polyfunctional nucleophile is selected from the group consisting of melamine and urea.

11. The process according to one of claims 1 to 10, wherein the at least one polysaccharide comprises carboxylic acid groups.

12. The process according to claim 11, wherein the at least one polysaccharide is selected from the group consisting of carboxymethylcellulose, gum Arabic, alginate, pectin, hyaluronic acid, xanthan gum, gellan gum, and their salts with monovalent alkaline metals, wherein carboxymethylcellulose, sodium carboxymethylcellulose and gum Arabic are particularly preferred.

13. The process according to claim 12, wherein the at least one polysaccharide is selected from the group consisting of carboxymethylcellulose and sodium carboxymethylcellulose, wherein the carboxymethylcellulose and/or the sodium carboxymethylcellulose have a molecular weight of from 50’000 to 250’000 g/mol, preferably from 75’000 to 125’000 g/mol and a degree of substitution of from 0.5 to 1.0, preferably from 0.6 to 0.8.

14. The process according to one of claims 1 to 13, wherein the complex coacervate is cross-liked with a second cross-linking agent.

15. The process according to claim 14, wherein the second cross-linking agent is a difunctional aldehyde selected from the group consisting of succinaldehyde, glutaraldehyde, glyoxal, benzene-1,2-dialdehyde, benzene-1,3-dialdehyde, benzene-1,4-dialdehyde, piperazine-N,N-dialdehyde, and 2,2'-bipyridyl-5,5'-dialdehyde.

16. The process according to one of claims 1 to 15, comprising the steps of:

a) Providing a core composition comprising the first cross-linking agent;

b) Providing an aqueous phase comprising the at least one protein and optionally a polyfunctional nucleophile;

c) Optionally: Heating the aqueous phase in order to dissolve the at least one protein and further optionally the polyfunctional nucleophile;

d) Emulsifying the core composition provided in step a) in the aqueous phase provided in step b) or step c) in order to obtain core composition droplets having a volume median size of 35 to 100 µm, preferably 35 to 75 µm, more preferably 35 to 60 µm even more preferably 35 to 55 µm, dispersed in the aqueous phase;

e) Heating the emulsion obtained in step d), preferably to a temperature of at least 60 °C, more preferably at least 80 °C, even more preferably at least 90 °C, in particular for at least 10 minutes;

f) Letting the emulsion obtained in step e) cool, preferably to a temperature from 25 to 35 °C, more preferably from 30 to 32 °C, in particular in order to form the simple coacervate;

g) Adding an aqueous solution of the polysaccharide to the mixture formed in step f);

h) Adjusting the pH of the mixture formed in step g) in order to induce formation of the complex coacervate;

i) Optionally: Letting the slurry obtained in step h) cool, preferably to a temperature of 10 to 15 °C;

j) Optionally: Adding the second cross-linking agent and maintaining the mixture under stirring while letting it warm up to room temperature;

k) Obtaining the plurality of core-shell microcapsules.

17. The process according to one of claims 1 to 16, wherein the weight ratio of the first cross-linking agent, in particular the trifunctional araliphatic isocyanate, to the at least one protein, in particular the

gelatin, is from 0.08 to 1.2, preferably from 0.12 to 0.8, more preferably from 0.16 to 0.6, even more preferably from 0.2 to 0.4.

18. The process according to one of claims 1 to 17, wherein the volume median diameter Dv(50) of the plurality of core-shell microcapsules is from 35 to 75 µm, preferably 35 to 60 µm, more preferably 35 to 55 µm.

19. The process according to one of claims 1 to 18, wherein the weight ratio between the at least one polysaccharide and the at least one protein is from 0.05 to 0.5, preferably from 0.08 to 0.2.

20. The process according to one of claims 16 to 19, additionally comprising the step of adding after step h) or after step j) or after step k) at least one suspending agent.

21. The process according to one of claims 16 to 20, additionally comprising the step of adding after step h) or after step j) or after step k) at least one preservative.

22. The process according to one of claims 1 to 21, wherein the core or the core composition, respectively, comprises at least one functional material, in particular selected from the group consisting of fragrance ingredients, cosmetic ingredients and biologically active ingredients.

23. The process according to one of claims 1 to 22, wherein the core comprises at least one fragrance ingredient selected from the group consisting of 2,6,10-trimethylundec-9-enal; 2-(tert-butyl)cyclohexyl acetate; decanal; 2-methyldecanal; undec-10-enal); undecanal; dodecanal; 2-methylundecanal; (E)-undec-9-enal; (E)-dodec-2-enal; allyl 2-(isopentyloxy)acetate; allyl 3-cyclohexylpropanoate; allyl heptanoate; 1-((2-(tert-butyl)cyclohexyl)oxy)-butan-2-ol; 1,3,4,5,6,7-hexahydro-.beta.,1,1,5,5-pentamethyl-2H-2,4a-methanonaphthalene-8-ethanol; pentyl 2-hydroxybenzoate; 1-(3,3-dimethylcyclohexyl)ethyl formate; (1R,2S,4R)-2'-isopropyl-1,7,7-trimethyl-spiro[bicyclo[2.2.1]heptane-2,4'-[1,3]dioxane]; 8-(sec-butyl)-5,6,7,8-tetra-hydroquinoline); (ethoxymethoxy)-cyclododecane; (1S,2R,5R)-2-ethoxy-2,6,6-trimethyl-9-methylene-bicyclo[3.3.1]nonane; (2S,4S)-1,7,7-trimethyl-bicyclo[2.2.1]-heptan-

2-yl acetate; 1-butoxy-1-oxopropan-2-yl butyrate; 4-(tert-butyl)cyclohexyl acetate; (Z)-4,11,11-trimethyl-8-methylene-bicyclo[7.2.0]-undec-4-ene; 1,1,2,3,3-pentamethyl-2,3,6,7-tetrahydro-1H-inden-4(5H)-one; 5-tert-butyl-2-methyl-5-propyl-2H-furan; (E)-3,7-dimethylocta-2,6-dienal; (E)-3,7-dimethylocta-2,6-dienal; (Z)-1,1-diethoxy-3,7-dimethylocta-2,6-diene; 3,7-dimethyloct-6-enal; 3,7-dimethyloct-6-en-1-ol 3,7-dimethyloct-6-en-1-yl acetate; 3,7-dimethyloct-6-en-1-yl formate; 3,7-dimethyloct-6-enenitrile; 3,7-dimethyloct-6-en-1-yl propionate; dodecanenitrile; 4-cyclohexyl-2-methylbutan-2-ol; (Z)-3-methylcyclotetradec-5-enone; 3-(4-isopropylphenyl)-2-methylpropanal; (allyl 2-(cyclohexyloxy)acetate; cyclohexyl 2-hydroxybenzoate; 8,8-dimethyl-1,2,3,4,5,6,7,8-octahydronaphthalene-2-carbaldehyde; (E)-1-(2,6,6-trimethylcyclohexa-1,3-dien-1-yl)but-2-en-1-one; (E)-1-(2,6,6-trimethylcyclohex-2-en-1-yl)but-2-en-1-one; (E)-1-(2,6,6-trimethyl-cyclohex-3-en-1-yl)but-2-en-1-one; (E)-dec-4-enal; 2-pentylcyclopentanone; propanedioic acid 1-(1-(3,3-dimethylcyclohexyl)ethyl) 3-ethyl ester; 3-methyl-2-pentylcyclopent-2-enone; 2-methyl-1-phenylpropan-2-ol; 2-methyl-1-phenylpropan-2-yl acetate; 2-methyl-1-phenylpropan-2-yl butyrate; 4,7-dimethyloct-6-en-3-one; 2,6-dimethylheptan-2-ol; 1-methyl-4-(prop-1-en-2-yl)cyclohex-1-ene; (E)-4-((3aS,7aS)-hexahydro-1H-4,7-methanoinden-5(6H)-ylidene)butanal; (E)-3-methyl-5-(2,2,3-trimethylcyclopent-3-en-1-yl)pent-4-en-2-ol; ethyl hexanoate; ethyl octanoate; (E)-3,7-dimethylnona-1,6-dien-3-ol; (Z)-3,7-dimethylnona-1,6-dien-3-yl acetate; ethyl heptanoate; ethyl 2,6,6-trimethylcyclohexa-1,3-diene-1-carboxylate; (1s,4s)-1,3,3-trimethyl-2-oxa-bicyclo[2.2.2]octane; (2S)-1,3,3-trimethylbicyclo[2.2.1]heptan-2-yl acetate; (1S,2R,4R)-1,3,3-trimethylbicyclo[2.2.1]heptan-2-ol); 1-(3,5,5,6,8,8-hexa-methyl-5,6,7,8-tetrahydronaphthalen-2-yl)ethanone; 3-(4-ethylphenyl)-2,2-dimethylpropanal; 3-(3-isopropylphenyl)butanal; (3aR,6S,7aS)-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl propionate; 2,4,6-trimethyl-4-phenyl-1,3-dioxane; 2-(sec-butyl)cyclohexanone); (3aS,4S,7R,7aS)-ethyl octahydro-1H-4,7-methanoindene-3a-

carboxylate; 2-methyldecanenitrile; 1-(3,3-dimethylcyclohex-1-en-1-yl)pent-4-en-1-one; (3aR,6S,7aS)-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl isobutyrate; (E)-3,7-dimethylocta-2,6-dien-1-ol; (E)-3,7-dimethylocta-2,6-dien-1-yl acetate; (E)-3,7-dimethylocta-2,6- 2-one; 1-(2,3,8,8-tetramethyl-1,2,3,4,5,6,7,8-octahydronaphthalen-2-yl)ethanone); 2,4,6-trimethylcyclohex-3-enecarbaldehyde; 3,5,5- dien-1-yl isobutyrate; ethyl 2-ethyl-6,6-dimethylcyclohex-2-enecarboxylate; (E)-oxacyclohexadec-12-en-2-one; methyl 3-oxo-2-pentylcyclopentaneacetate; (2S)-ethyl 3-isopropylbicyclo[2.2.1]hept-5-ene-2-carboxylate; (Z)-hex-3-en-1-yl butyrate; (E)-2-benzylideneoctanal; hexyl isobutyrate; hexyl 2-hydroxybenzoate; 4,4a,5,9b-tetrahydroindeno[1,2-d][1,3]dioxine; (E)-4-(2,6,6-trimethylcyclohex-1-en-1-yl)but-3-en-2-one; (E)-4-(2,6,6-trimethylcyclohex-2-en-1-yl)but-3-en-2-one; (E)-4-(2,5,6,6-tetramethylcyclohex-2-en-1-yl)but-3-en-trimethylhexyl acetate; isopropyl 2-methyl butanoate; (E)-3-methyl-4-(2,6,6-trimethylcyclohex-2-en-1-yl)but-3-en-2-one; (3aR,6S,7aS)-3a,4,5,6,7,7a-hexahydro-1H-4,7-methanoinden-6-yl acetate; (Z)-3-methyl-2-(pent-2-en-1-yl)cyclopent-2-enone; (Z)-3,4,5,6,6-pentamethylhept-3-en-2-one; (Z)-1-(1-ethoxyethoxy)hex-3-ene (2E,6Z)-3,7-dimethylnona-2,6-dienenitrile; (Z)-hex-3-en-1-yl methyl carbonate; 3-(4-(tert-butyl)phenyl)-2-methylpropanal; 3,7-dimethylocta-1,6-dien-3-ol; 3,7-dimethylocta-1,6-dien-3-yl acetate; (4E)-9-hydroxy-5,9-dimethyl-4-decenal; 2-methyl-4-oxo-4H-pyran-3-yl isobutyrate; ethyl 2-methylpentanoate; 2,6-dimethylhept-5-enal; 2-isopropyl-5-methylcyclohexanol; 2-isopropyl-5-methylcyclohexanone; 1-((1S,8aS)-1,4,4,6-tetramethyl-2,3,3a,4,5,8-hexahydro-1H-5,8a-methanoazulen-7-yl)ethanone; undecan-2-one; methyl non-2-ynoate; 6,6-dimethoxy-2,5,5-trimethylhex-2-ene; 4-(4-methylpent-3-en-1-yl)cyclohex-3-enecarbaldehyde; 2-(2-(4-methylcyclohex-3-en-1-yl)propyl)cyclopentanone; 2-methyl-6-methyleneoct-7-en-2-yl acetate; (E)-methyl non-2-enoate; (Z)-3,7,11-trimethyldodeca-1,6,10-trien-3-yl acetate; (Z)-3,7-dimethylocta-2,6-dien-1-yl acetate; 6,8-dimethylnonan-2-ol; (Z)-non-6-enal; 3-(4-isobutyl-2-methylphenyl)propanal; 4-(tert-pentyl)cyclohexanone; 2-ethyl-N-

methyl-N-(m-tolyl)butanamide; 2-methyl-4-methylene-6-phenyltetrahydro-2H-pyran; 2-cyclohexylidene-2-phenylacetonitrile; 2-cyclohexylidene-2-(o-tolyl)acetonitrile; 2,2-dimethyl-2-pheylethyl propanoate; 1-methyl-4-(4-methylpent-3-en-1-yl)cyclohex-3-enecarbaldehyde; 6-(sec-butyl)quinoline; (E)-2-ethyl-4-(2,2,3-trimethylcyclopent-3-en-1-yl)but-2-en-1-ol; 4-(4-hydroxyphenyl)butan-2-one; 2,2,5-trimethyl-5-pentylcyclopentanone; 2,2,2-trichloro-1-phenylethyl acetate); ROSALVA (dec-9-en-1-ol; (1-methyl-2-(5-methylhex-4-en-2-yl)cyclopropyl)-methanol; 4-methylene-2-phenyltetrahydro-2H-pyran; 2-(1-(3,3-dimethylcyclohexyl)-ethoxy)-2-methylpropyl cyclopropanecarboxylate; 3-(4-isobutylphenyl)-2-methylpropanal; 1-(spiro[4.5]dec-6-en-7-yl)pent-4-en-1-one; (E)-5-methylheptan-3-one oxime; (E)-6-ethyl-3-methyloct-6-en-1-ol; (E)-2-((3,5-dimethylhex-3-en-2-yl)oxy)-2-methylpropyl cyclopropanecarboxylate; 1-methyl-4-propan-2-ylcyclohexa-1,4-diene; 1-methyl-4-(propan-2-ylidene)cyclohex-1-ene; 2-(4-methylcyclohex-3-en-1-yl)propan-2-yl acetate; 3,7-dimethyloctan-3-ol; 2,6-dimethyloctan-2-ol; oxacyclohexadecan-2-one; (E)-tridec-2-enenitrile; (E)-4-methyldec-3-en-5-ol; 2,2,5-trimethyl-5-pentylcyclopentanone and (2,2-dimethoxyethyl)benzene and 2-(2,4-dimethylcyclohexyl)pyridine).

24. An encapsulated composition obtainable by the process according to one of claims 1 to 23.

25. A consumer product comprising an encapsulated composition according to claim 24, preferably a fabric care product, a home care product or a personal care product.

26. The use of the encapsulated composition according to claim 24 for obtaining a consumer product.