Claims

1. A ~~method for the~~ production method of caviar or a caviar-like product from live, mature, ovulated eggs ~~of~~from fish or crustaceans, ~~wherein live, mature eggs~~ which have three or more layers in an egg envelope, wherein the live, mature, ovulated eggs are in a fertile but unfertilized state and ~~having~~ have a natural potassium content in ~~the~~an egg plasma, the method comprising:-

~~by treating~~ treatment of the live, mature, ovulated eggs with a 0.6 percent to 1.0 percent ~~in~~ a saline solution to remove ovulation fluid ~~which does not damage the eggs~~ and subsequently, in a potassium exposure step, with a potassium-containing solution which acts to ~~in at least one solution of water and at least one cationic component dissolved therein which causes stabilization of~~ stabilize the egg envelope of the live, mature, ovulated eggs,

~~**characterized in that**~~ wherein in ~~a~~ the potassium exposure step, the potassium-containing solution comprises potassium ~~is~~ dissolved in ~~the~~deionized water ~~as the cationic component~~ in a concentration of potassium cations of between 0.1 mmol/l and 3.0 mmol/l, ~~which does not damage the live mature eggs and does not change their natural potassium content, the water being deionized~~ wherein prior to the addition of a potassium donor for the formation of the ~~cationic component~~ potassium cations, the deionized water is at a temperature in the natural spawning temperature range for the fish and crustaceans of between 1ºC and 29ºC, and wherein the live, mature, ovulated eggs are treated in the potassium-containing solution for a potassium exposure time of between 5 min to 30 min, and finally, dipping of the live, mature, ovulated eggs in a 0.6 percent to 1.0 percent saline solution. ~~having a temperature which does not damage the live mature eggs, and in that the live mature eggs are treated in the solution for a potassium exposure time until a desired elastic stabilization of the egg envelope is achieved.~~

2. The method according to claim 1,

~~**characterized in that**~~ wherein the potassium donor employed is at least one potassium salt, and wherein said at least potassium salt is a ~~preferably the~~ salt of citric acid, ~~and/or the~~ salt of hydrochloric acid, ~~and/or the~~ salt of sorbic acid, ~~is used as the potassium donor~~ or any combination thereof.

3. The method according to claim 1 or 2,
~~**characterized in that**~~ wherein the concentration of the potassium cations in the ~~one~~ potassium-containing solution is ~~between~~ 0.1 mmol/l, ~~and 3.0 mmol/l, preferably 0.1 mmol/l,~~ 0.5 mmol/l, 0.65 mmol/l, 1.6 mmol/l or 2.0 mmol/l~~, particularly preferably 1.0 mmol/l or 1.5 mmol/l~~.

4. The method according to claim 1 or claim 2,
wherein the concentration of the potassium cations in the potassium-containing solution is 1.0 mmol/l or 1.5mmol/l.

~~4~~5. The method according to any one of ~~the preceding~~ claims 1 to 4,
~~**characterized in that**~~ wherein the potassium exposure time in the potassium exposure step is ~~between 5 min and 30 min, preferably at~~ 10 min, 12 min, 15 min, 20 min or 25 min.

6. The method according to any one of claims 1 to 5,
wherein the temperature of the potassium-containing solution in the potassium exposure step in a polar temperature range is between 1ºC and 15ºC or between 5ºC and 12ºC, in a moderate temperature range is between 10ºC and 20ºC, or in a tropical temperature range is between 20ºC and 29ºC.

7. The method according to claim 6,
wherein the temperature of the potassium-containing solution in the potassium exposure step in the polar temperature range is 10ºC.

8. The method according to claim 6,
wherein the temperature of the potassium-containing solution in the potassium exposure step in the moderate temperature is 15ºC or 12ºC.

9. The method according to claim 6,
wherein the temperature of the potassium-containing solution in the potassium exposure step in the tropical temperature is 27ºC or 21ºC.

10. The method according to any one of claims 1 to 9,
wherein the potassium-containing solution in the potassium exposure step has a pH of between 6.8 and 8.0 or between 7.0 and 7.9.

11. The method according to any one of claims 1-9,
wherein the potassium-containing solution in the potassium exposure step has a pH of 7.2, 7.4 or 7.5.

~~5~~12. The method according to any one of ~~the preceding~~ claims 1 to 11, ~~**characterized in that** after or before the potassium exposure step, in~~ which further comprises a calcium exposure step~~,~~ in a calcium-containing solution, wherein calcium donor is dissolved in ~~another solution with~~ deionized water ~~as a cationic component in~~ to provide a concentration of calcium cations of between 0.1 mmol/l and 3mmol/l, wherein ~~not damaging to the live mature eggs, said water being deionized~~ prior to the addition of ~~a~~the calcium donor for the formation of ~~said cationic component~~the calcium cations, the deionised water is at a temperature of between 1ºC and 29ºC which is in the natural spawning temperature range for fish and crustaceans, and wherein the live, nature, ovulated eggs are treated in the calcium-containing solution for a calcium exposure time of between 9 min and 30 min, wherein the calcium exposure step is carried out either before the potassium exposure step or after the potassium exposure step but before carrying out the step of dipping of the live, mature, ovulated eggs in a 0.6 percent to 1.0 percent saline solution. ~~and having a temperature not damaging to the live mature eggs, and in that the live mature eggs are treated in said solution for a calcium exposure time until a desired structural stabilization of the egg envelope is achieved.~~

~~6~~13. The method according to claim ~~5~~12, ~~**characterized in that** wherein the calcium donor employed is at least one calcium salt, preferably~~ calcium citrate, calcium chloride, ~~and/or~~ calcium sorbate, or any combination thereof ~~is used as calcium donor~~.

~~7~~14. The method according to claim ~~5~~12 or ~~6~~13, ~~**characterized in that**~~ wherein the concentration of the calcium cations in the ~~other~~calcium-containing solution in the calcium exposure step is ~~between 0.1 mmol/l and 3.0 mmol/l, preferably 0.1 mmol/l,~~ 0.5 mmol/l, 0.8 mmol/l, 1.0 mmol/l, 1.5 mmol/l, 1.6 mmol/l or 2.0 mmol/l.

~~8~~15. The method according to any one of claims ~~5 to 7~~12 to 14, ~~**characterized in that**~~ wherein the calcium exposure time in the calcium exposure step is ~~between 9 min and 30 min, preferably at~~ 10 min, 12.5 min, 15 min, 16 min, 20 min or 25 min. ~~according to claim 5,~~

~~9~~16. The method according to any one of ~~the preceding~~ claims 12 to 15, ~~**characterized in that**~~ wherein the temperature of ~~one solution in the potassium exposure step and/or the other solution~~ the calcium-containing solution in the calcium exposure step is in a polar temperature range is between 1°C and 15°C, ~~preferably~~ or between 5°C and 12°C, ~~particularly preferably 10°C,~~ in a moderate temperate ~~temperature~~ range between 10°C and 20°C, ~~preferably 15°C, particularly preferably 12°C,~~ or a tropical temperature range between 20°C and 29°C~~, preferably 27°C, particularly preferably 21°C~~.

17. The method according to claim 16, wherein the temperature of the calcium-containing solution in the calcium exposure step in a polar temperature range is 10ºC, in a moderate temperature range is between 15ºC or 12ºC, or in a tropical temperature range is 27ºC or 21ºC.

18. The method according to any one of claims 12 to 17, wherein the calcium-containing solution in the calcium exposure step has a pH of between 6.8 and 8.0, between 7.0 and 7.9, or has a pH of 7.2, 7.4, or 7.5.

~~10~~19. The method according to any one of the ~~preceding~~ claims 1-18,

~~characterized in that~~ wherein the deionized water has an electrical conductivity at 25°C between 1 µS/cm and 15 µS/cm~~, preferably 10 µS/cm or below, particularly preferably 1 µS/cm~~.

20. The method according to claim 19,
wherein the deionized water has an electrical conductivity of 1 µS/cm.

~~11~~21. The method according to any one of ~~the preceding~~ claims 12 to 20, ~~characterized in that~~ wherein the ~~one and/or the other solution~~ calcium-containing solution has a pH ~~between 6.8 and 8.0, preferably~~ between 7.0 and 7.9~~,~~.

22. The method according to claim 21, wherein the calcium-containing solution has a pH ~~particularly preferably~~ of 7.2 or 7.4 or 7.5.

~~12~~23. The method according to any one of ~~the preceding~~ claims 1 to 22, ~~characterized in that~~ wherein subsequent~~ly~~ to the last exposure step and ~~performed ex-positioning step~~ for the purposes of preservation and flavor intensification, a mild salting is carried out with~~, based on a quantity of caviar or caviar substitute product,~~ 2.0% to 3.8% ~~, preferably 3.5%,~~ sodium chloride ~~is performed~~ with respect to the quantity of caviar or caviar-like product, wherein the sodium chloride is free of potassium and calcium donors.

24. The method according to claim 23,
wherein the mild salting is carried out with 3.5% sodium chloride with respect to the quantity of caviar or caviar-like product, wherein the sodium chloride is free from potassium and calcium donors.

25. The method according to claim 23 or 24,
wherein subsequent to the preservation and flavor intensification, the caviar or the caviar-like product is frozen at a temperature in the range between -20ºC and -15ºC.

26. The method according to claim 25,

wherein the caviar or the caviar-like product is frozen at -18ºC.

~~13~~27. The method according to claim ~~12~~23 or 24, ~~**characterized in that**~~ wherein subsequent~~ly~~ to the preservation and flavor intensification, storage of the caviar or caviar-like product is carried out in hermetically sealed glass containers ~~for several months, preferably~~ one to three months, at a temperature between -2°C and -4°C.

~~14. The method according to claim 12 or 13, **characterized in that** subsequently to the preservation and flavor intensification or storage, freezing of the caviar or caviar-like product is carried out in a temperature range between -20°C and -15°C, preferably at -18°C.~~

~~15~~28. The method according to any one of ~~the preceding~~ claims 1-27, ~~**characterized in that**~~ wherein ~~after achieving the desired elastic stabilization or after achieving the desired elastic and structural stability, dipping of~~ the live, mature, ovulated eggs from fish or crustaceans with a polarization index “PI” of 0.05 ≤PI ≤ 0.05 ~~in a saline solution which does not damage them is carried out~~, are treated.

~~16~~29. The method according to ~~one of the preceding claims~~ claim 28, ~~**characterized in that**~~ wherein ~~live, mature eggs of fish or crustaceans are treated with a~~ the polarization index “PI” ~~with 0.05 ≤ PI ≤ 0.15, preferably~~ is 0.05 ≤ PI ≤ 0.12.

~~17~~30. The method according to any one of ~~the preceding~~ claims 1 to 29, ~~**characterized in that**~~ wherein the live, mature, ovulated eggs ~~of~~from fish or crustaceans from the wild ~~catches~~ or from aquaculture farming, which ~~have been~~ are harvested in an ovulated state by spawning or stripping, are treated.

~~18~~31. The method according to claim ~~17~~30,

characterized in that wherein the live, mature eggs are harvested from~~of~~ recent and primitive bony fishes or from crustaceans.

32. The method according to claim 31, wherein the live, mature, ovulated eggs are harvested from~~, preferably~~ sturgeons species.

33. The method according to claim 31, wherein the~~, or~~ live, mature, ovulated eggs are harvested from ~~of crustaceans, preferably~~ lobsters~~, are treated~~.

~~19~~34. The method according to any one of claims ~~6 to 18~~1-33, **characterized in that** wherein very large live, mature, ovulated eggs with a grain size equal to or greater than 3.2 mm in diameter ~~or soft, unstable live mature eggs with a load capacity until bursting less than or equal to 0.3 N~~ are ~~handled~~ treated.

35. The method according to any one of claims 1 to 34.
wherein soft, unstable, live, mature, ovulated eggs with a load before bursting of less than or equal to 0.3N are treated.

~~20. The method according to one of claims 1 to 19,~~
~~**characterized in that** the saline solution is a physiological saline solution.~~

~~21~~36. The method according to any one of claims 1 to ~~20~~35, **characterized in that** wherein the saline solution is ~~a 0.6 percent to 1.0 percent saline solution, preferably~~ a 0.9 percent saline solution.

~~22~~37. A caviar or caviar-like product from live, mature, ovulated eggs ~~of~~from fish or crustaceans which have three or more layers in egg envelope, said three or more layers comprising a zona radiate interna (ZRI), a zone radiata externa (ZRE), and an alveolar layer (AL), wherein the live, mature, ovulated eggs ~~being~~ are in a fertile but unfertilized state and have a natural potassium content in the egg plasma,

~~**characterized in that**~~ wherein an elastic stabilizing layer (SS) is formed in the egg envelope ~~,~~ between the zona radiata interna (ZRI) and the alveolar layer (AL), ~~preferably~~ or between the zona radiata externa (ZRE) and the alveolar layer (AL), wherein the elastic SS ~~which has~~ is an eosinophilic and hyaline ~~properties and~~ layer ~~in which~~ incorporated glucosaminoglycans ~~are incorporated~~.

~~23~~38. ~~A~~The caviar or caviar-like product according to claim ~~22~~37, ~~**characterized in that**~~ wherein in addition, an irreversible cross-linking of protein strands by incorporated tyrosine molecules ~~is additionally formed~~ forms in the egg envelope in the Zona Radiata Interna (ZRI) and in the Zona Radiata Externa (ZRE).