Claims:

1. A controlled release trunk implant formulation for eradicating and/or controlling pest in a tree and/or treating the tree, comprising:

at least one water soluble polymer present in an amount of from 5 to 60 wt%, wherein the at least one water soluble polymer is selected from the group consisting of alginic acid, carrageenan, cellulose ether, chitosan, dextran, gelatin, hyaluronic acid, pectins, polyacrylamide, polyacrylic acid, polyvinyl alcohol, polyvinylpyrrolidone, polysaccaride, pullulan, starch, salts thereof, copolymers thereof and blends thereof;

at least one plant treatment agent present in an amount of from 1 to 90 wt%, wherein the at least one plant treatment agent is selected from the group consisting of pesticides, insecticides, biocides, fungicides, bacteria, enzymes and nutrients;

at least one binder present in an amount of from 4 to 60 wt%, wherein the at least one binder is selected from the group consisting of substances with OH moiety, polar solvents and mixtures thereof;

one or more excipients; and

a crosslinking agent that crosslinks the at least one water soluble polymer.

2. The controlled release trunk implant formulation according to claim 1, wherein

the at least one water soluble polymer is present in an amount of from 7.5 to 40 wt%;

the at least one plant treatment agent is present in an amount of from 30 to 85 wt%;

the at least one binder is present in an amount of from 10 to 40 wt%; and

the one or more excipients is present in the remaining amount.

3. The controlled release trunk implant formulation according to claim 1 or 2, wherein the at least one water soluble polymer comprises a first polymer and a second polymer, wherein the first polymer is present in an amount of from 50 to 99 wt% and the second polymer is present in an amount of from 1 to 50 wt% based on the total amount of water soluble polymer present in the trunk implant formulation.

4. The controlled release trunk implant formulation according to claim 1 or 2, wherein the trunk implant formulation further comprises one or more additives and/or excipients selected from the group consisting of preservative, lubricant, defoamer, surfactant, filler, and colorant.

5. A controlled release trunk implant comprising a formulation according to any one of the preceding claims, wherein the trunk implant is in the form of a tablet, pellet, block, rod, or granulated particles.

6. A controlled release trunk implant comprising:

at least one water soluble polymer present in an amount of from 5 to 60 wt%, wherein the at least one water soluble polymer is selected from the group consisting of alginic acid, carrageenan, cellulose ether, chitosan, dextran, gelatin, hyaluronic acid, pectins, polyacrylamide, polyacrylic acid, polyvinyl alcohol, polyvinylpyrrolidone, polysaccaride, pullulan, starch, salts thereof, copolymers thereof and blends thereof;

at least one plant treatment agent present in an amount of from 1 to 90 wt%, wherein the at least one plant treatment agent is selected from the group consisting of pesticides, insecticides, biocides, fungicides, bacteria, enzymes and nutrients;

at least one binder present in an amount of from 0.01 to 10 wt%, wherein the at least one binder is selected from the group consisting of substances with OH moiety, polar solvents and mixtures thereof;

one or more excipients; and

a crosslinking agent that crosslinks the at least one water soluble polymer; and

wherein the trunk implant is provided in the form of a tablet, pellet, block, rod, or granulated particles.

7. The controlled release trunk implant according to claim 5 or 6, wherein the trunk implant is prepared to release the at least one plant treatment agent over a period from 5 to 90 days.

8. The controlled release trunk implant according to claim 7, wherein the trunk implant is prepared to release the at least one plant treatment agent over 10 to 70 days.

9. The controlled release trunk implant according to claim 7, wherein the trunk implant is prepared to release the at least one plant treatment agent over 15 to 45 days.

10. The controlled release trunk implant according to claim 7, wherein the trunk implant is prepared to release the at least one plant treatment agent over 20 to 30 days.

11. The controlled release trunk implant according to claim 6, wherein the water soluble polymer comprises a first polymer and a second polymer, wherein the first polymer is present in an amount of from 50 to 99 wt% and the second polymer is present in an amount of from 1 to 50 wt% based on the total amount of water soluble polymer present in the trunk implant formulation.

12. The controlled release trunk implant according to claim 6, wherein the formulation further comprises one or more additives and/or excipients selected from the group consisting of preservative, lubricant, defoamer, surfactant, filler, and colorant.

13. A method of producing a controlled release trunk implant for eradicating and/or controlling pest in a tree and/or treating the tree, the method comprising:

(a) providing a trunk implant formulation comprising:

at least one water soluble polymer selected from the group consisting of alginic acid, carrageenan, cellulose ether, chitosan, dextran, gelatin, hyaluronic acid, pectins, polyacrylamide, polyacrylic acid, polyvinyl alcohol, polyvinylpyrrolidone, polysaccaride, pullulan, starch, salts thereof, copolymers thereof and blends thereof;

at least one plant treatment agent selected from the group consisting of pesticides, insecticides, biocides, fungicides, bacteria, enzymes and nutrients;

at least one binder selected from the group consisting of substances with OH moiety, polar solvents or mixtures thereof;

one or more excipients; and

a crosslinking agent that crosslinks the at least one water soluble polymer in the mixture; and

(b) extruding the mixture at room temperature; and

(c) shaping and/or cutting the extrudate to form a controlled release trunk implant.

14. The method according to claim 13, wherein the binder is in an amount of from 4 to 60 wt% based on the total weight of the formulation.

15. The method according to claim 13, wherein the trunk implant formulation further comprises one or more additives and/or excipients selected from the group consisting of preservative, lubricant, defoamer, surfactant, filler, and colorant.

16. The method according to claim 13, wherein the trunk implant formulation comprises:
the at least one water soluble polymer in an amount of from 5 to 60 wt%;
the at least one plant treatment agent in an amount of from 1 to 90 wt%;
the at least one binder in an amount of from 4 to 60 wt%; and
one or more excipients.

17. The method according to claim 13, wherein the trunk implant formulation comprises:
the at least one water soluble polymer in an amount of from 7.5 to 40 wt%;
the at least one plant treatment agent in an amount of from 30 to 85 wt%;
the at least one binder in an amount of from 10 to 40 wt%; and
the one or more excipients present in the remaining amount.

18. The method according to any one of claims 13 to 17, further comprising:

drying the controlled release trunk implant to remove the binder from the controlled release trunk implant.

19. The method according to claim 18, wherein the controlled release trunk implant comprises:

at least one water soluble polymer in an amount of from 5 to 60 wt%;

at least one plant treatment agent in an amount of from 1 to 90 wt%;

at least one binder in an amount of from 0.01 to 10 wt%; and

one or more excipients.

20. The method according to claim 13 or 19, wherein the controlled release trunk implant is in the form of a tablet, pellet, block, rod, or granulated particles.

21. A method of eradicating and/or controlling pest in a tree and/or treating the tree, the method comprising:

inserting a controlled release trunk implant as claimed in any one of claims 5 to 12 into a hole drilled into a trunk of a tree to provide a continuous release of the plant treatment agent to the tree; and

optionally sealing the hole;

wherein the hole is moist on the inner region of the hole.

22. The method according to claim 21, wherein the controlled release trunk implant is configured to provide a continuous release of the plant treatment agent for 30 to 90 days.

23. The method according to claim 21 or 22, wherein the controlled release trunk implant completely dissolves at the end of treatment period of the tree.