CLAIMS

1. A method of preparing a cultivated mycelium material, the method comprising:

    a. generating the cultivated mycelium material;

    b. contacting the cultivated mycelium material with a solution comprising one or more proteins in the presence of a crosslinker to produce a composition comprising the cultivated mycelium material and one or more crosslinked proteins, wherein the one or more crosslinked proteins are from a species other than a fungal species from which the cultivated mycelium material is generated; and

    c. pressing the cultivated mycelium material.

2. The method of claim 1, wherein the contacting comprises submerging the cultivated mycelium material in the solution.

3. The method of claim 1, wherein the contacting comprises contacting the cultivated mycelium material with the solution in a single step.

4. The method of claim 1, wherein the contacting comprises contacting the cultivated mycelium material with the solution in one or more steps.

5. The method of claim 1, wherein the one or more crosslinked proteins are from a plant source.

6. The method of claim 5, wherein the plant source is a pea plant.

7. The method of claim 5, wherein the plant source is a soybean plant.

8. The method of claim 1, the solution comprises a dye.

9. The method of claim 8, wherein the composition is colored with the dye to produce a color, and the color of the cultivated mycelium material is substantially uniform on one or more surfaces of the cultivated mycelium material.

10. The method of claim 8, wherein the dye is penetrated throughout the interior of the composition.

11. The method of claim 8, wherein the dye is selected from the group consisting of: an acid dye, a direct dye, a synthetic dye, a natural dye, and a reactive dye.

12. The method of claim 1, wherein the solution comprises a plasticizer.

13. The method of claim 12, wherein the plasticizer is selected from the group consisting of oil, glycerin, and fat liquor.

14. The method of claim 12, wherein the composition is flexible.

15. The method of claim 1, wherein the crosslinker is transglutaminase.

16. The method of claim 1, wherein the crosslinker comprises an enzyme.

17. The method of claim 16, wherein the enzyme comprises transglutaminase.

18. The method of claim 1, wherein the pressing comprises pressing the cultivated mycelium material to a thickness of 0.1 inch to 0.5 inch.

19. The method of claim 18, wherein the pressing comprises pressing the cultivated mycelium material to a thickness of 0.25 inch.

20. The method of claim 1, wherein the pressing is repeated one or more times.

21. The method of claim 1, wherein the pressing comprises pressing the cultivated mycelium material to a thickness of 0.25 inch.

22. The method of claim 1, wherein the pressing comprises pressing the cultivated mycelium material with a roller.

23. The method of claim 1, wherein the solution comprises tannins.

24. The method of claim 1, further comprising incubating the composition.

25. The method of claim 24, wherein the incubating comprises incubating the composition at a set temperature for a set amount of time.

26. The method of claim 25, wherein the set temperature is 40°C.

27. The method of claim 1, further comprising drying the composition.

28. The method of claim 1, further comprising applying a finishing agent to one or more surfaces of the composition.

29. The method of claim 28, wherein the finishing agent is selected from the group consisting of: urethane, wax, nitrocellulose, or a plasticizer.

30. A composition comprising a cultivated mycelium material prepared by the method of claim 1, and wherein the composition comprises one or more crosslinked proteins, wherein the one or more crosslinked proteins are from a species other than a fungal species from which the cultivated mycelium material is generated.

31. A composition comprising a cultivated mycelium material prepared by the method of claim 1 and colored with a dye to produce a color, and wherein the color of the cultivated mycelium material is substantially uniform on one or more surfaces of the cultivated mycelium material, and wherein the composition comprises one or more crosslinked proteins, wherein the one or more crosslinked proteins are from a species other than a fungal species from which the cultivated mycelium material is generated.

32. An article of footwear, comprising:

a. an upper;

b. a lasting board affixed with the upper to define an interior foot-receiving cavity therewith;

c. an outsole coupled with the upper opposite the lasting board;

d. wherein the upper includes at least a portion of a cultivated mycelium material prepared by the method of claim 1.

33. An athletic sneaker, comprising:

a. an upper including at least a portion of a cultivated mycelium material prepared by the method of claim 1;

b. a lasting board affixed with the upper to define an interior foot-receiving cavity therewith;

c. a midsole of a foam material and affixed with the lasting board; and

d. an outsole of a rubber material and affixed with the midsole opposite the lasting board;

e. wherein the cultivated mycelium material is at least one of tanned and dyed to resemble leather, and the upper is configured and assembled to resemble athletic footwear of leather.

34. An athletic sneaker, comprising:

a. an upper including at least a portion of a cultivated mycelium material prepared by the method of claim 1;

b. a lasting board affixed with the upper to define an interior foot-receiving cavity therewith;

c. a midsole of a foam material and affixed with the lasting board; and

d. an outsole of a rubber material and affixed with the midsole opposite the lasting board;

e. wherein the upper includes at least one portion molded in a three dimensional shape.