

CLAIMS

1. A method of obtaining melanin from an invertebrate biomass, the method comprising:
rupturing the invertebrate biomass to form a raw material;
demineralizing the raw material to form a first solid fraction;
deproteinating the first solid fraction to form a second solid fraction;
liberating the melanin from the second solid fraction resulting in a supernatant comprising the melanin;
extracting the supernatant; and
precipitating the melanin.
2. The method of claim 1 wherein the invertebrate biomass is a melanised Arthropoda phylum species.
3. The method of claim 1 wherein the invertebrate biomass is *Hermetia illucens*.
4. The method of claim 1 wherein the invertebrate biomass is an adult form of *Tenebrio molitor*.
5. The method of claim 1 wherein the invertebrate biomass comprises cuticles from prepupal stages, empty pupae shells or spent adult stage.
6. The method of claim 1 wherein the demineralizing comprises adding a first acidic solution to the raw material to obtain a first mixture.
7. The method of claim 6 further comprising treating the first mixture for a first period of time at a first temperature between 25 °C and 90 °C; and extracting the first solid fraction from the first mixture by filtration or centrifugation.
8. The method of claim 6 wherein the first acidic solution is hydrochloric acid having a concentration of between 0.1 M and 3 M.
9. The method of claim 6 wherein the first acidic solution is lactic acid having a concentration of between 1 % and 10 % w/w.
10. The method of claim 6 wherein adding the first acidic solution is performed to obtain a first solid-to-liquid ratio of between 1:10 and 1:100.
11. The method of claim 7 wherein the first period of time is between 1 hour and 24 hours.

12. The method of claim 7 further comprising washing the first solid fraction with water and receiving a first washing liquid, checking the first washing liquid for pH level, and rewashing the first solid fraction with water until the first washing liquid pH level is between 5 and 7.
13. The method of claim 1 wherein the deproteinating comprises adding a first alkaline solution having a concentration between 0.5 M and 3 M to the first solid fraction to obtain a second mixture.
14. The method of claim 13 wherein the first alkaline solution is sodium hydroxide.
15. The method of claim 13 wherein adding the first alkaline solution is performed to obtain a second solid-to-liquid ratio of between 1:10 and 1:30.
16. The method of claim 13 further comprises treating the second mixture for a second period of time at a second temperature between 25 °C and 90 °C; and extracting the second solid fraction from the second mixture by filtration or centrifugation.
17. The method of claim 16 wherein the second period of time is between 30 minutes and 5 hours.
18. The method of claim 13 further comprising the step of washing the second solid fraction with water and receiving a second washing liquid, checking the second washing liquid for pH level, and rewashing the second solid fraction with water until the second washing liquid pH level is between 7 to 9.
19. The method of claim 1 wherein the melanin liberating comprises:
adding a second alkaline solution having a concentration of between 1 M and 6 M to the second solid fraction to obtain a third mixture; and
treating the third mixture for a third period of time at a third temperature between 70 °C and 90 °C.
20. The method of claim 19 wherein the second alkaline solution is sodium hydroxide.
21. The method of claim 19 wherein adding the second alkaline solution is performed to obtain a third solid-to-liquid ratio of between 1:10 and 1:24.
22. The method of claim 19 wherein the third period of time is between 1 hour and 6 hours.
23. A composition obtainable by a method according to any one of claims 1 to 22.

24. A purified melanin obtainable by a process comprising the steps of:
providing invertebrate biomass;
rupturing the invertebrate biomass to form a raw material;
demineralizing the raw material to form a first solid fraction;
deproteinating the first solid fraction to form a second solid fraction;
liberating melanin from the second solid fraction resulting in a supernatant comprising the melanin;
extracting the supernatant; and
precipitating the melanin.
25. The purified melanin of claim 24 wherein the invertebrate biomass is a melanised Arthropoda phylum species.
26. The purified melanin of claim 24 wherein the invertebrate biomass is *Hermetia illucens*.
27. The purified melanin of claim 24 wherein the invertebrate biomass is an adult form of *Tenebrio molitor*.
28. The purified melanin of claim 24 wherein the invertebrate biomass comprises cuticles from prepupal stages, empty pupae shells or spent adult stage.