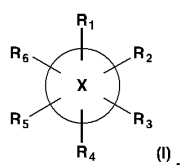


CLAIMS

What Is Claimed Is:

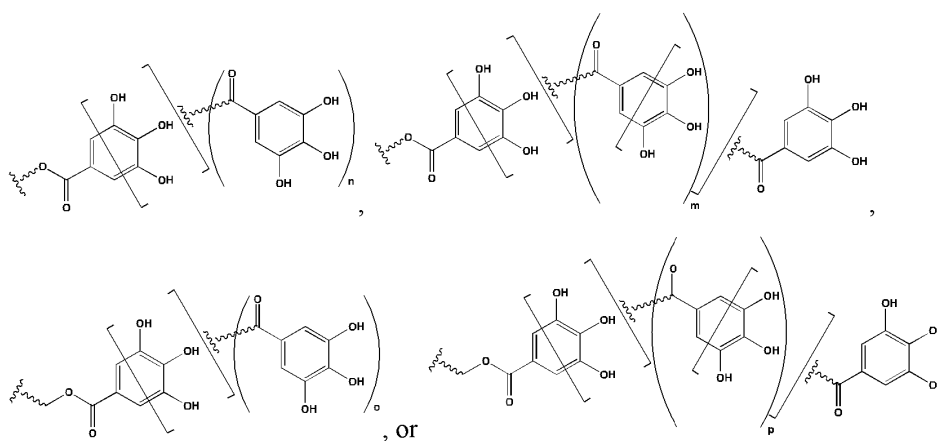
1. A method of treating coronavirus infection, comprising administering to a subject in need thereof an effective amount of a composition, wherein the composition comprises one or more compounds of Formula (I):



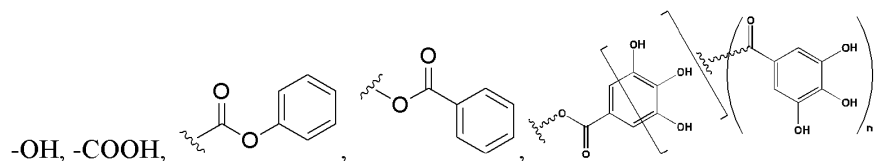
or a pharmaceutically acceptable salt thereof,

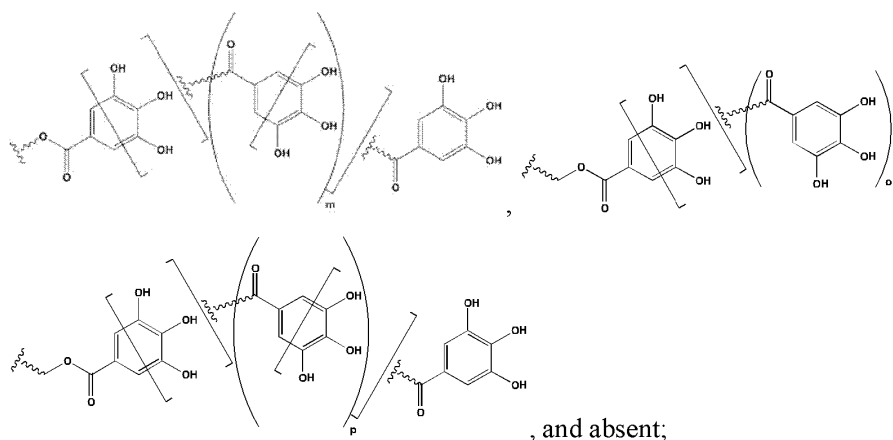
wherein Ring X is a 5 or 6 membered monocyclic ring, which optionally has one or two heteroatoms selected from the group consisting of N, O, P, and S;

wherein at least one of R₁, R₂, R₃, R₄, R₅, and R₆, independently is of the formula:



remaining R₁, R₂, R₃, R₄, R₅, and R₆ each, independently, is selected from the group consisting of





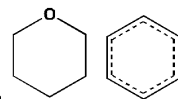
wherein n and o are, independently, 0 or 1;

wherein m and p are, independently, 1, 2, 3, 4, or 5; and

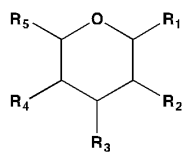
wherein the compound of Formula (I) has 2 to 35 galloyl moieties, inclusive.

2. The method of claim 1, wherein R_1 , R_2 , R_3 , R_4 , R_5 , or R_6 is unsubstituted or optionally substituted with 1, 2, 3, 4, or 5 substituents selected from the group consisting of C_{1-3} alkyl, halogen, $-CF_3$, $-CN$, $-NO_2$, $-SH$, $-OH$, $-S(C_{1-3} \text{ alkyl})$, $-NH_2$, $NH(C_{1-3} \text{ alkyl})$, $N(C_{1-3} \text{ alkyl})_2$, and $-O(C_{1-3} \text{ alkyl})$.

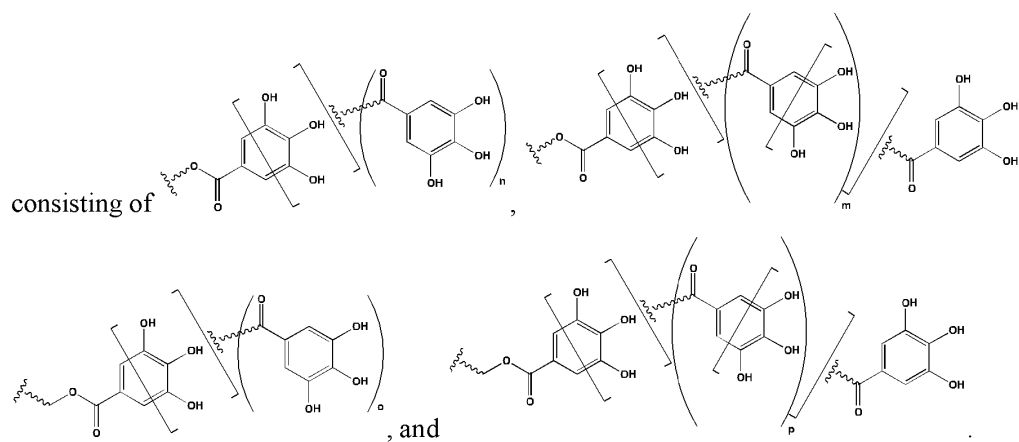
3. The method of claim 1 or claim 2, wherein the Ring X is



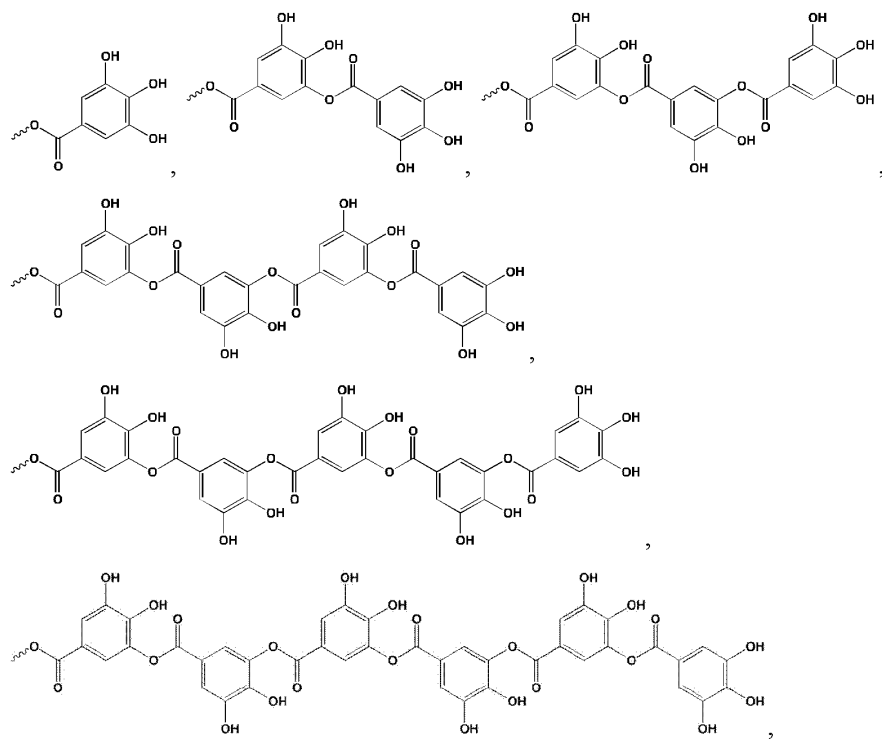
4. The method of claim 1 or claim 2, wherein when the Formula (I) is

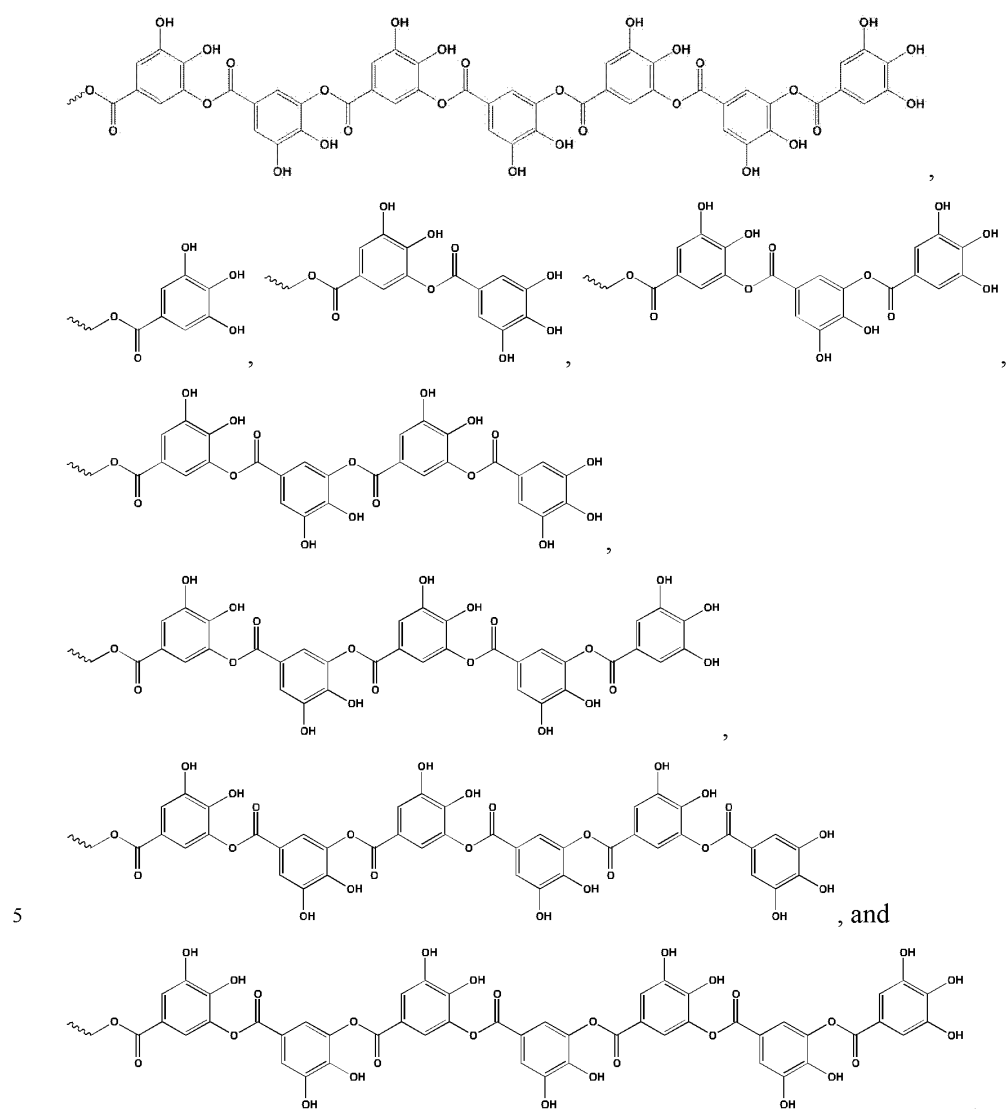


(Ia), and each of R_1 , R_2 , R_3 , R_4 , and R_5 , independently, is selected from the group

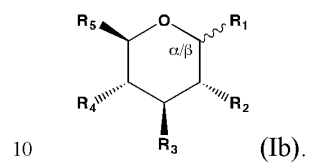


5. The method of claim 4, wherein each of R₁, R₂, R₃, R₄, and R₅, independently, is
5 of the formula:



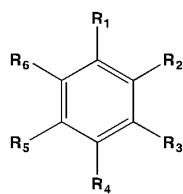


6. The method of claim 4 or claim 5, wherein the compound of Formula (I) is of formula (Ib):

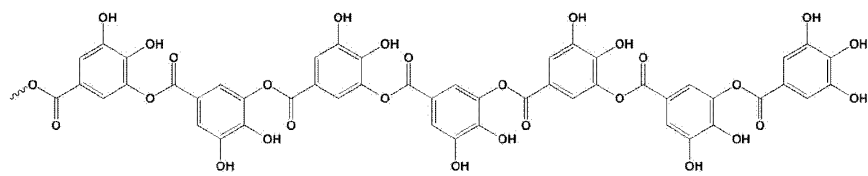
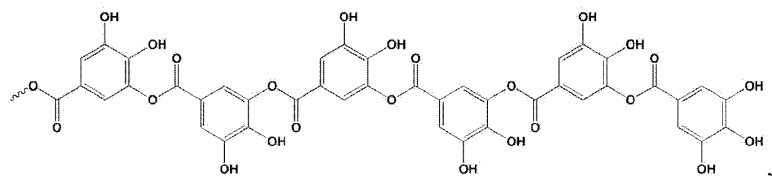
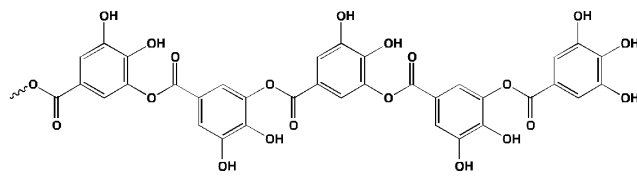
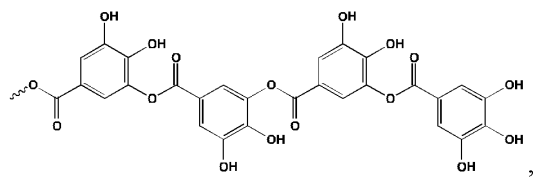
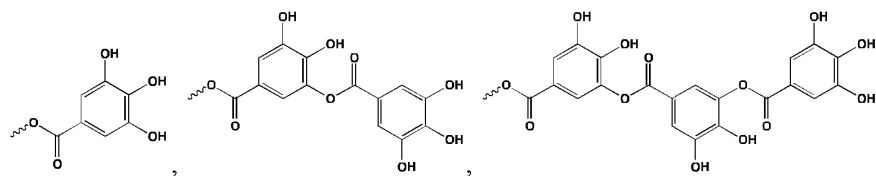


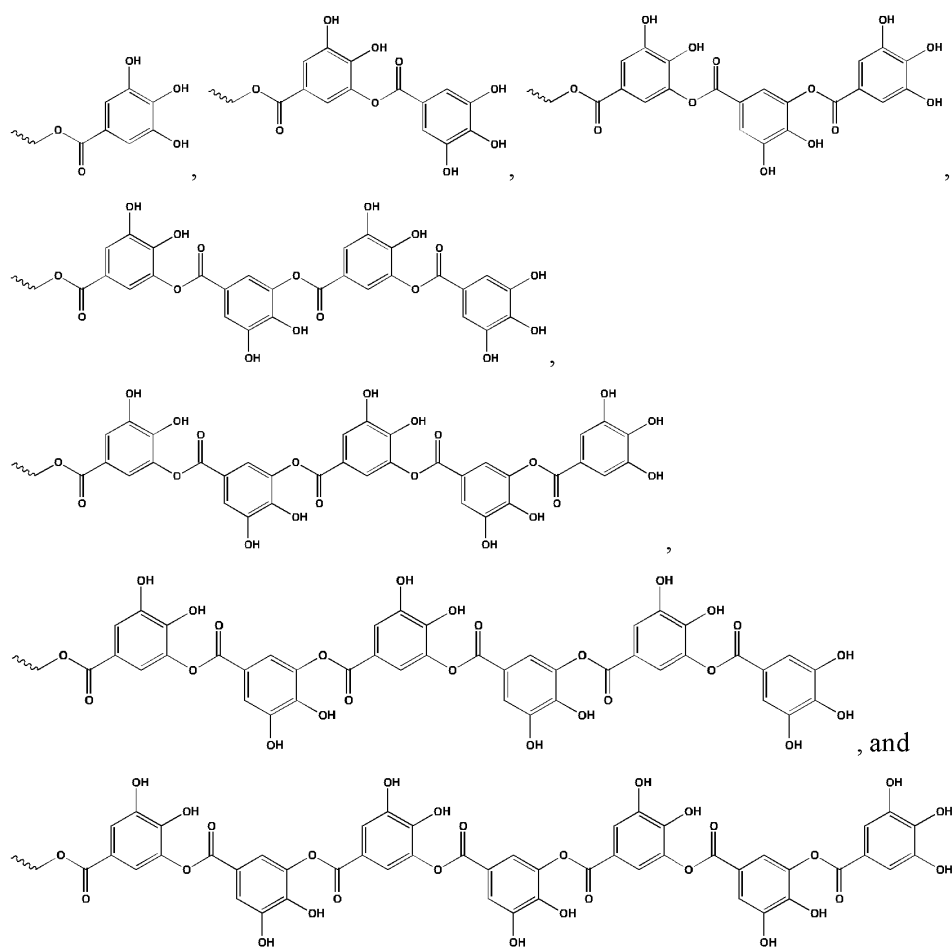
7. The method of claim 6, wherein the compound of Formula (I) is α 5G, β 5G, α 10G, β 10G, α 15G, β 15G, α 20G, β 20G, α 25G, or β 25G.

8. The method of claim 1 or claim 2, wherein the compound of Formula (I) is of the
5 formula (Ic):



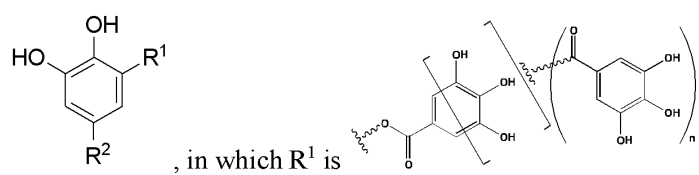
, and R_1 , R_2 , R_3 , R_4 , R_5 , and R_6 are each, independently, selected from the group consisting of:

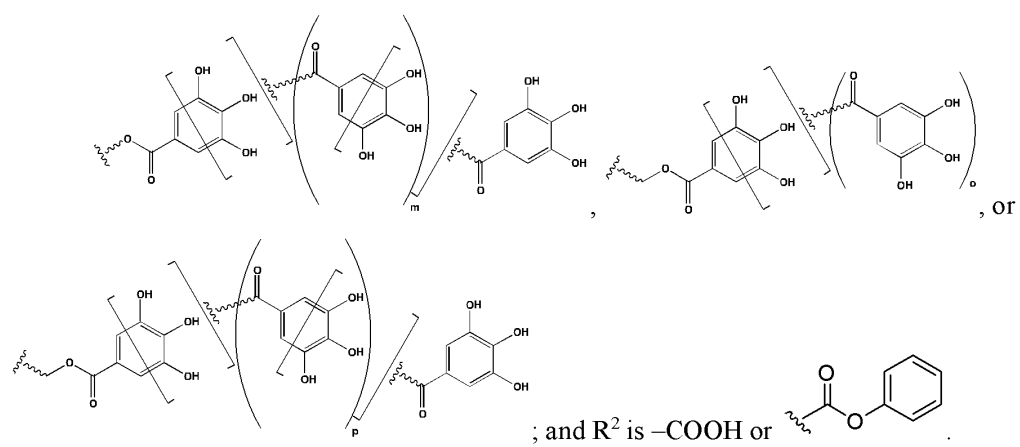




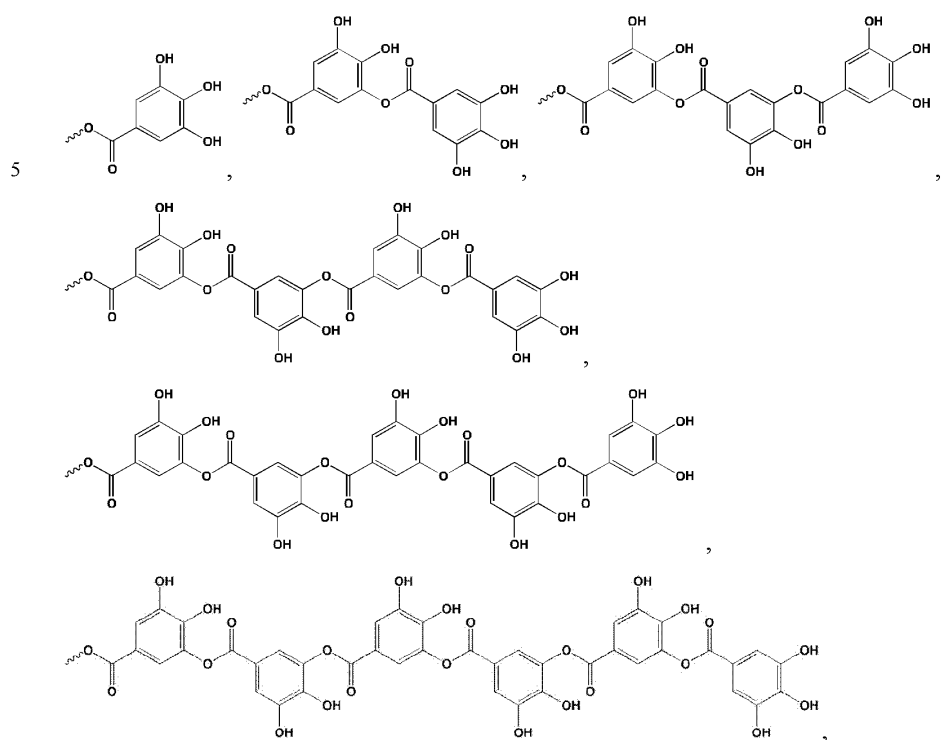
5

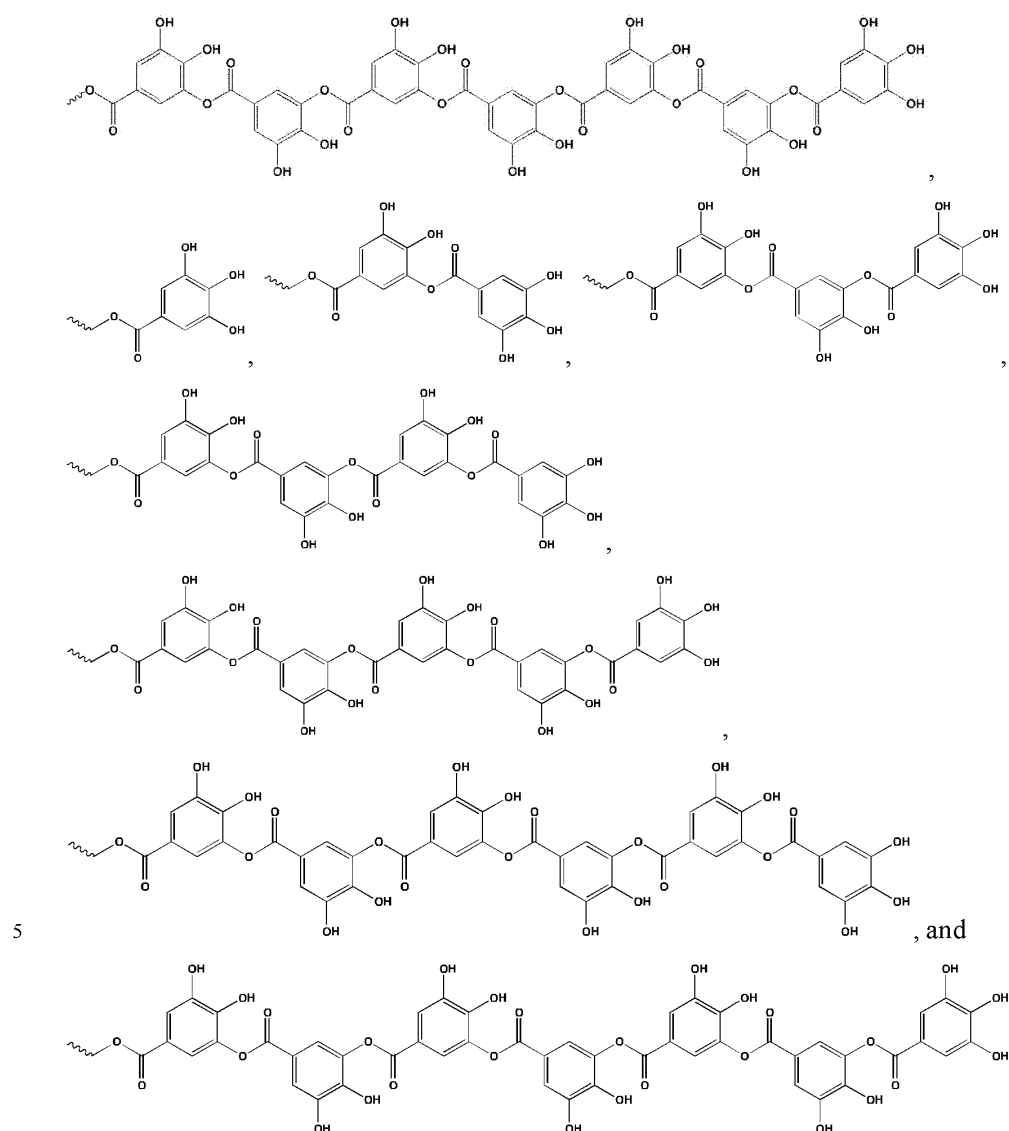
9. The method of claim 1 or claim 2, wherein the compound of Formula (I) is of the formula (Id):





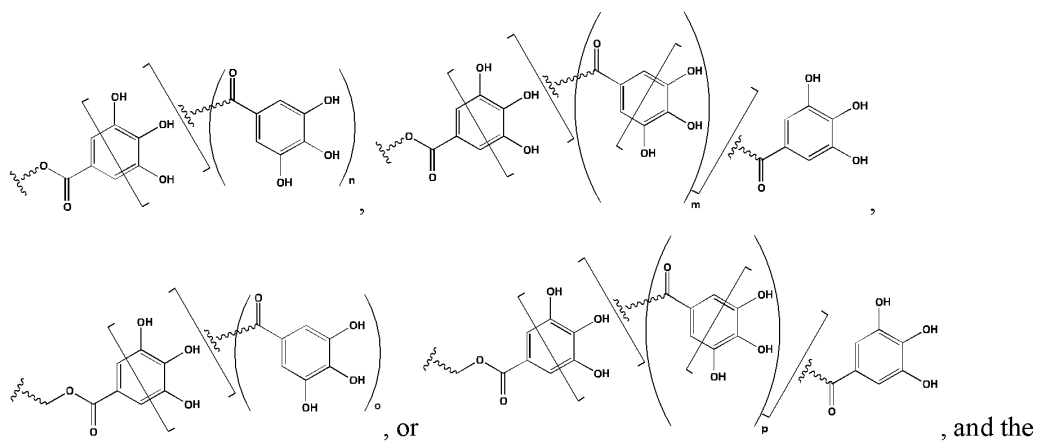
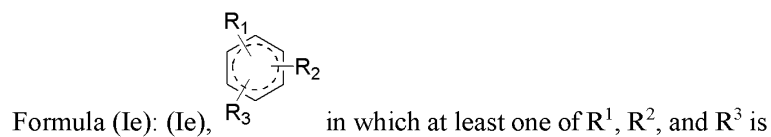
10. The method of claim 9, wherein R¹ is selected from the group consisting of:



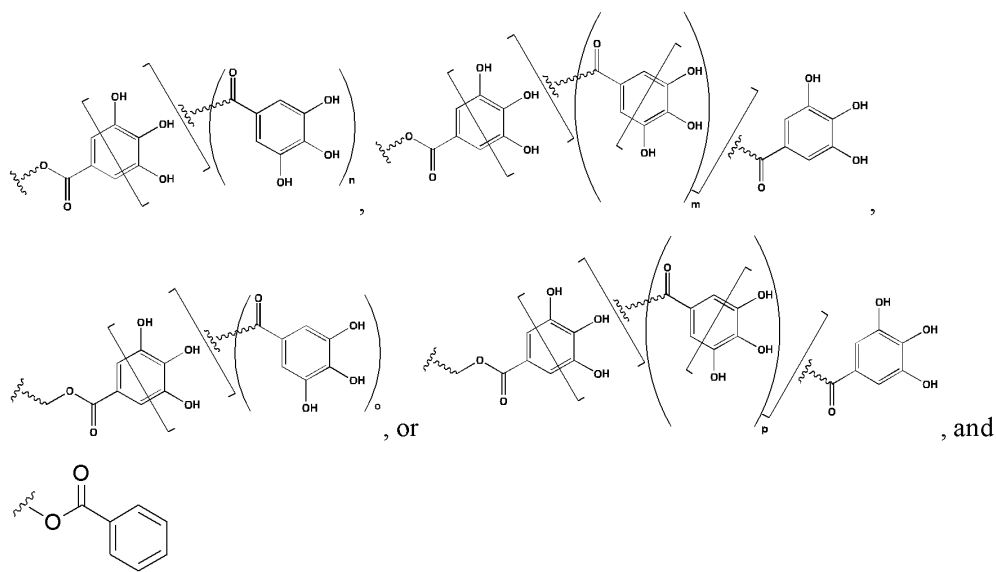


11. The method of claim 10, wherein the compound of Formula (Id) is phenol 3G, phenol 5G, phenol 7G, Compound 14, Compound 18, or Compound 149.

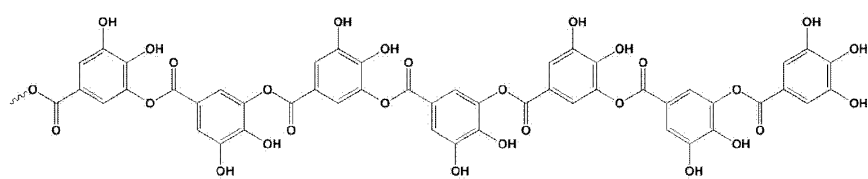
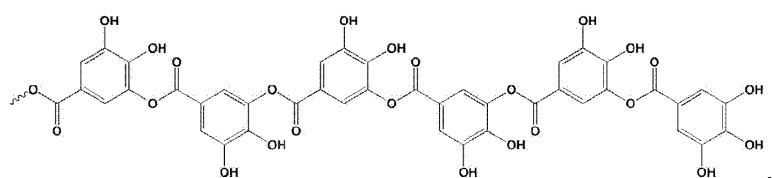
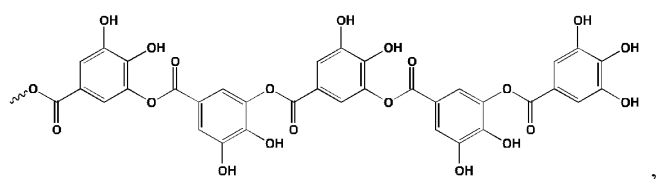
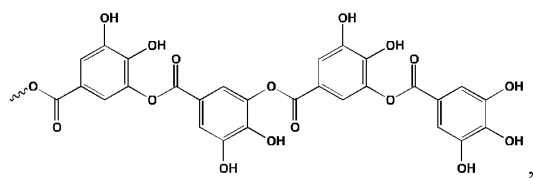
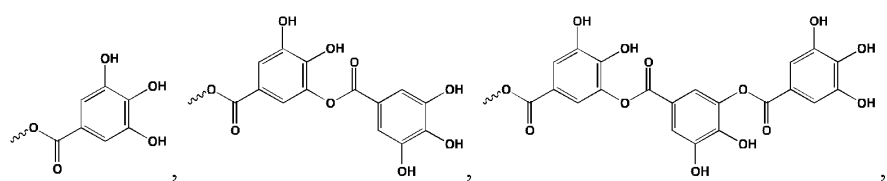
12. The method of claim 1 or claim 2, wherein the compound of Formula (I) is of the



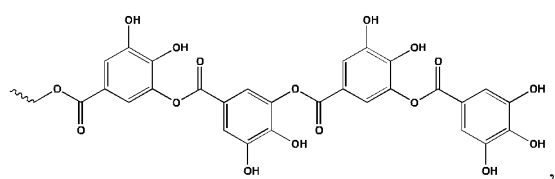
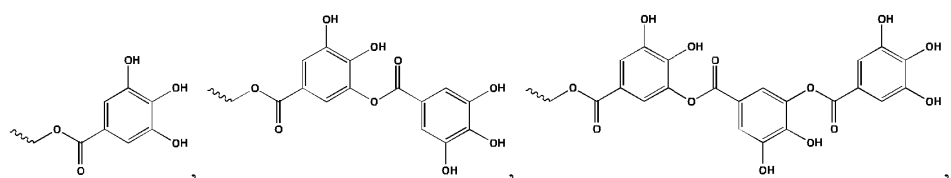
5 remaining of R¹, R², and R³ each independently are selected from the group consisting of

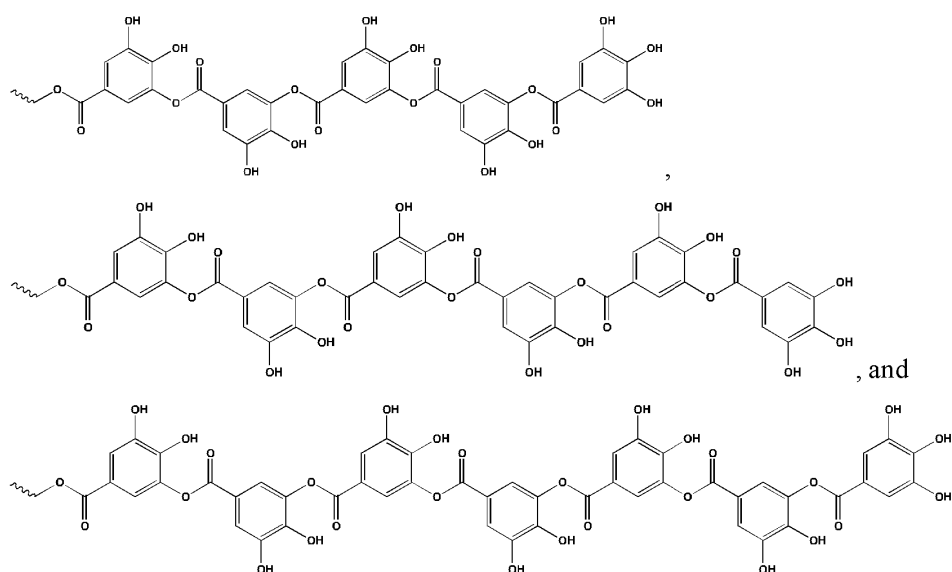


10 13. The method of claim 12, wherein each of R¹, R², and R³, independently, is selected from the group consisting of:



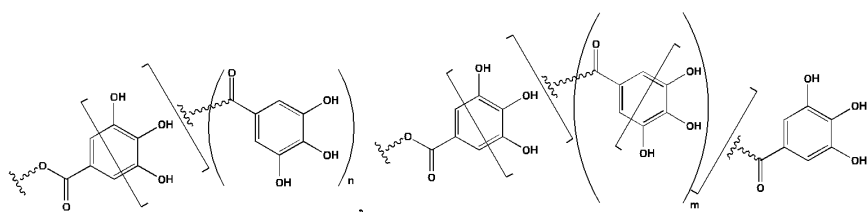
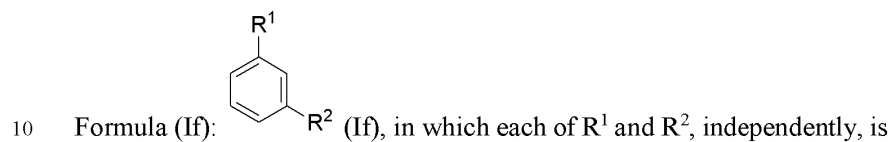
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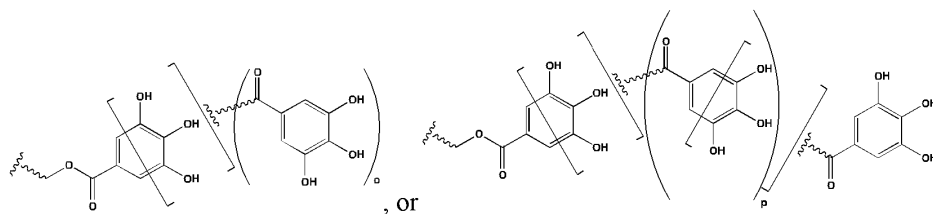




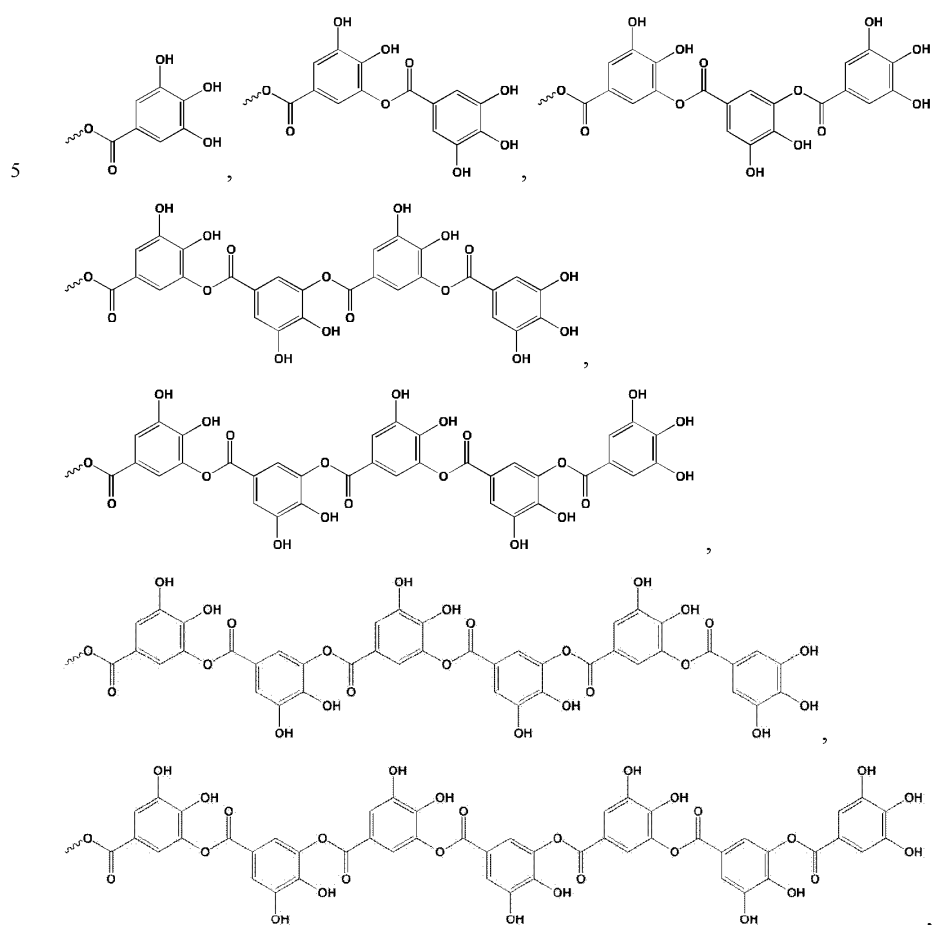
14. The method of claim 12, wherein the compound of Formula (Ie) is phloroglucinol 6G, phloroglucinol 9G, phloroglucinol 12G, phloroglucinol 15G, phloroglucinol 21G, or Compound 103.

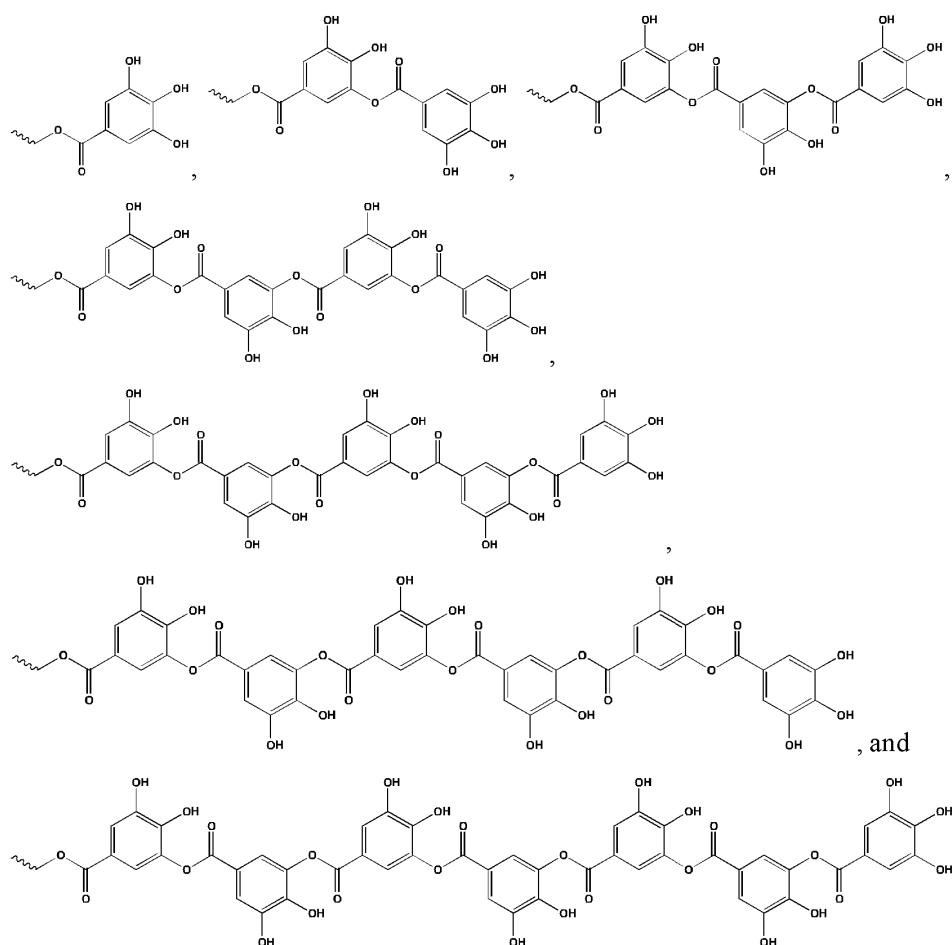
15. The method of claim 1 or claim 2, wherein the compound of Formula (I) is of the





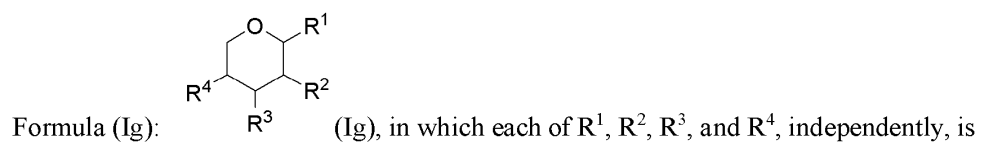
16. The method of claim 15, wherein each of R^1 and R^2 , independently, is selected from the group consisting of:

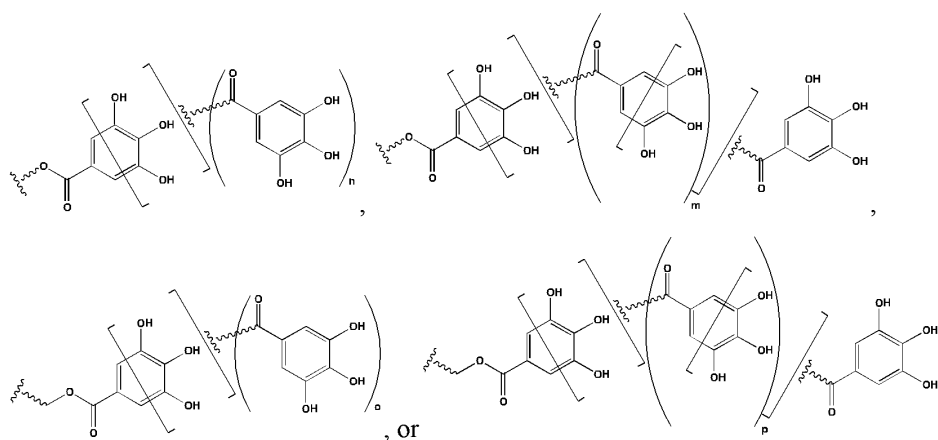




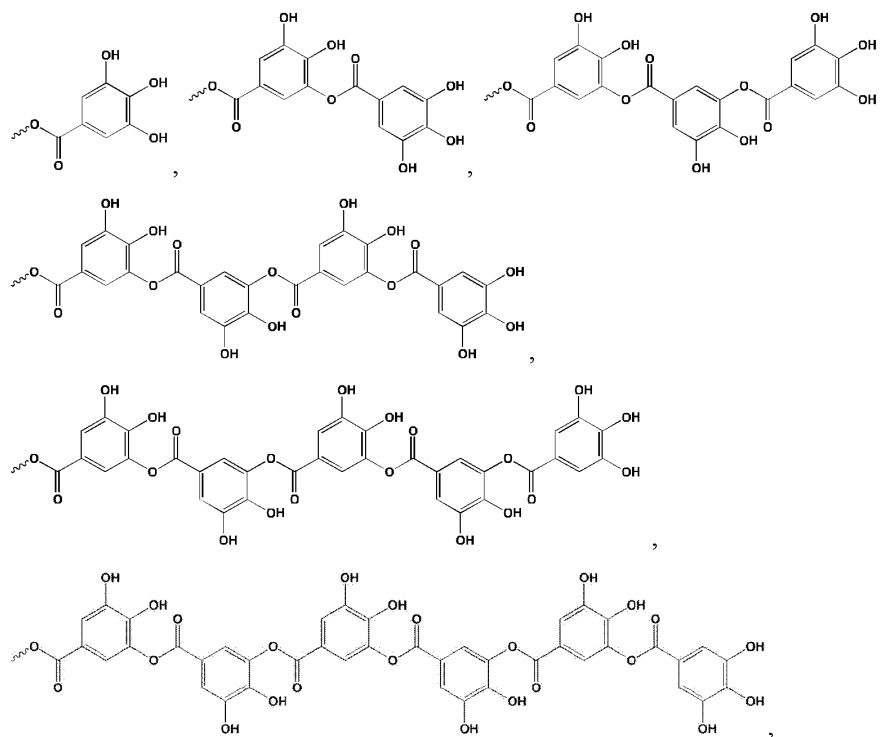
17. The method of claim 16, wherein the compound of Formula (If) is Resorcin 10G or Resorcin 14G.

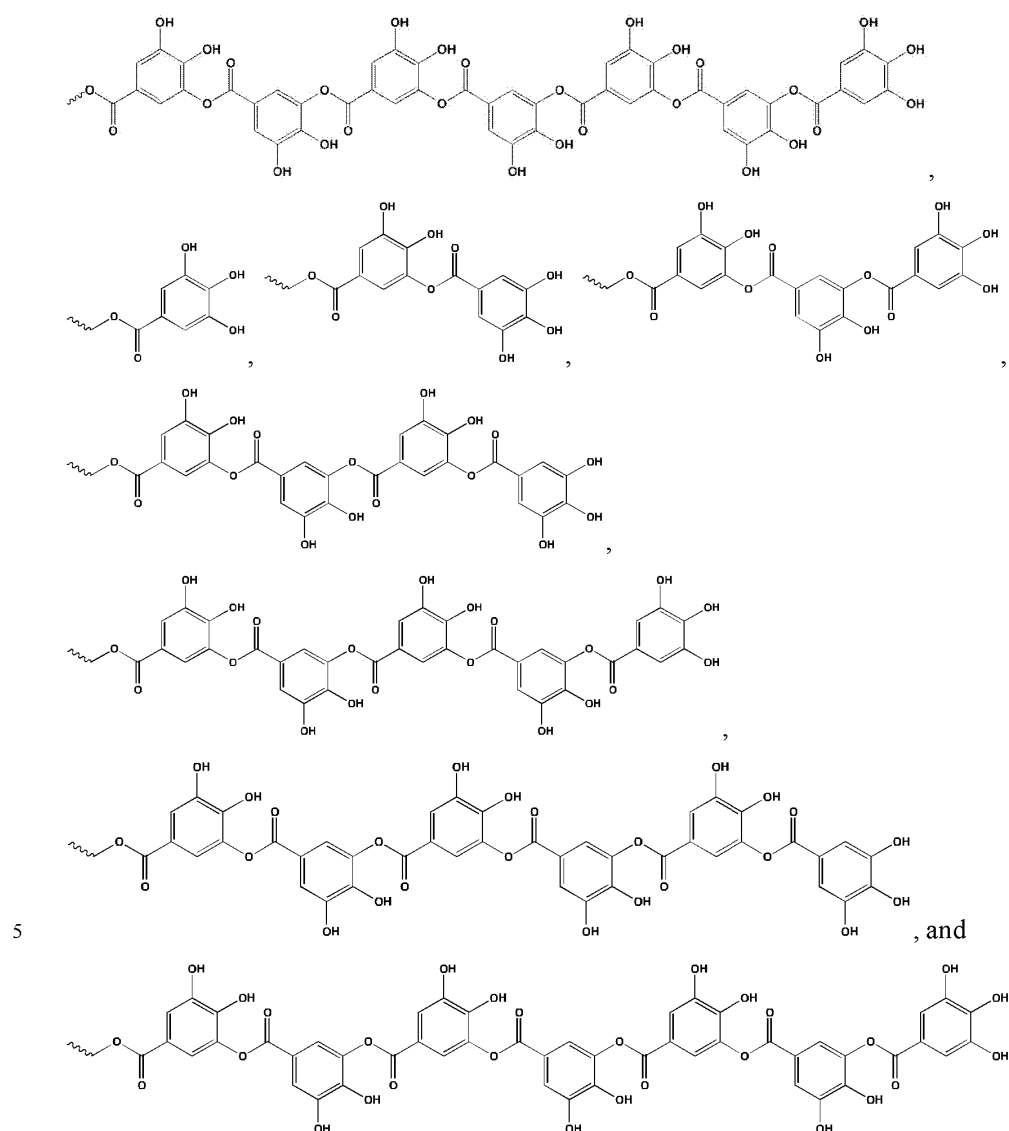
18. The method of claim 1 or claim 2, wherein the compound of Formula (I) is of the





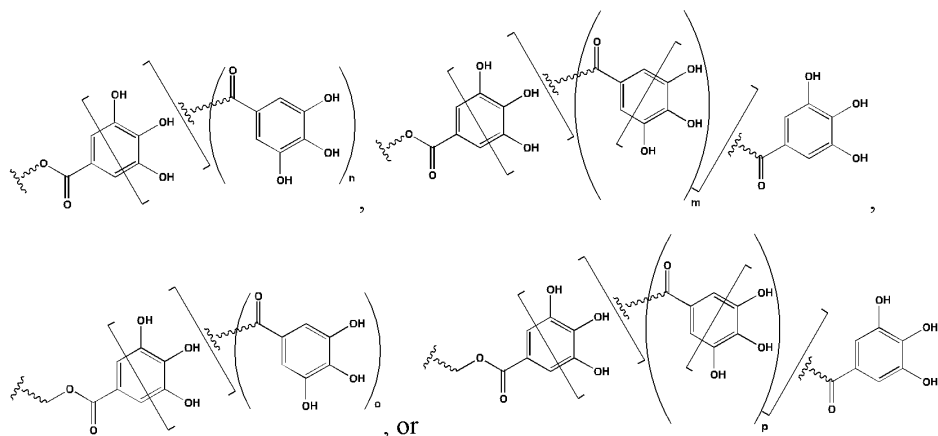
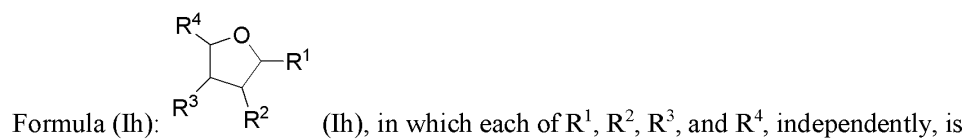
19. The method of claim 18, wherein each of R^1 , R^2 , R^3 , and R^4 , independently, is
 5 selected from the group consisting of:





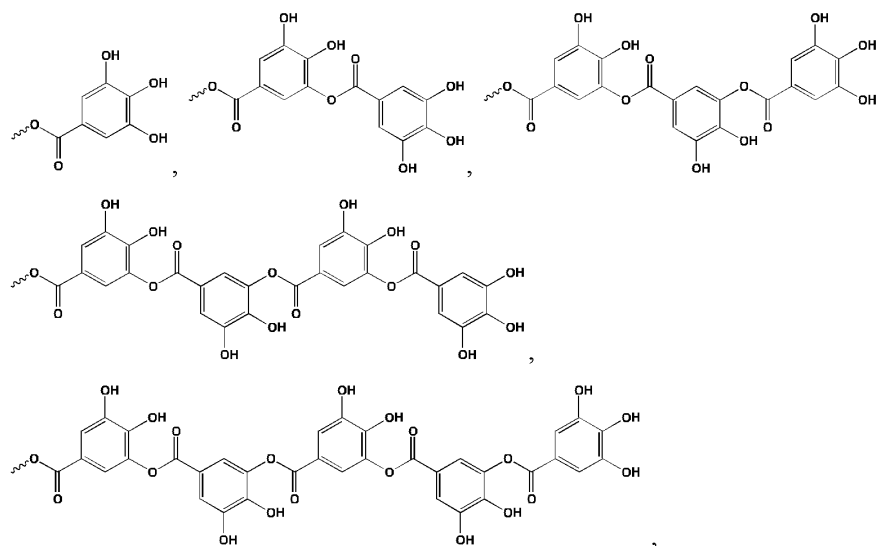
20. The method of claim 19, wherein the compound of Formula (Ig) is Compound 117, 119, 121, 123, 126, or 128.

21. The method of claim 1 or claim 2, wherein the compound of Formula (I) is of the

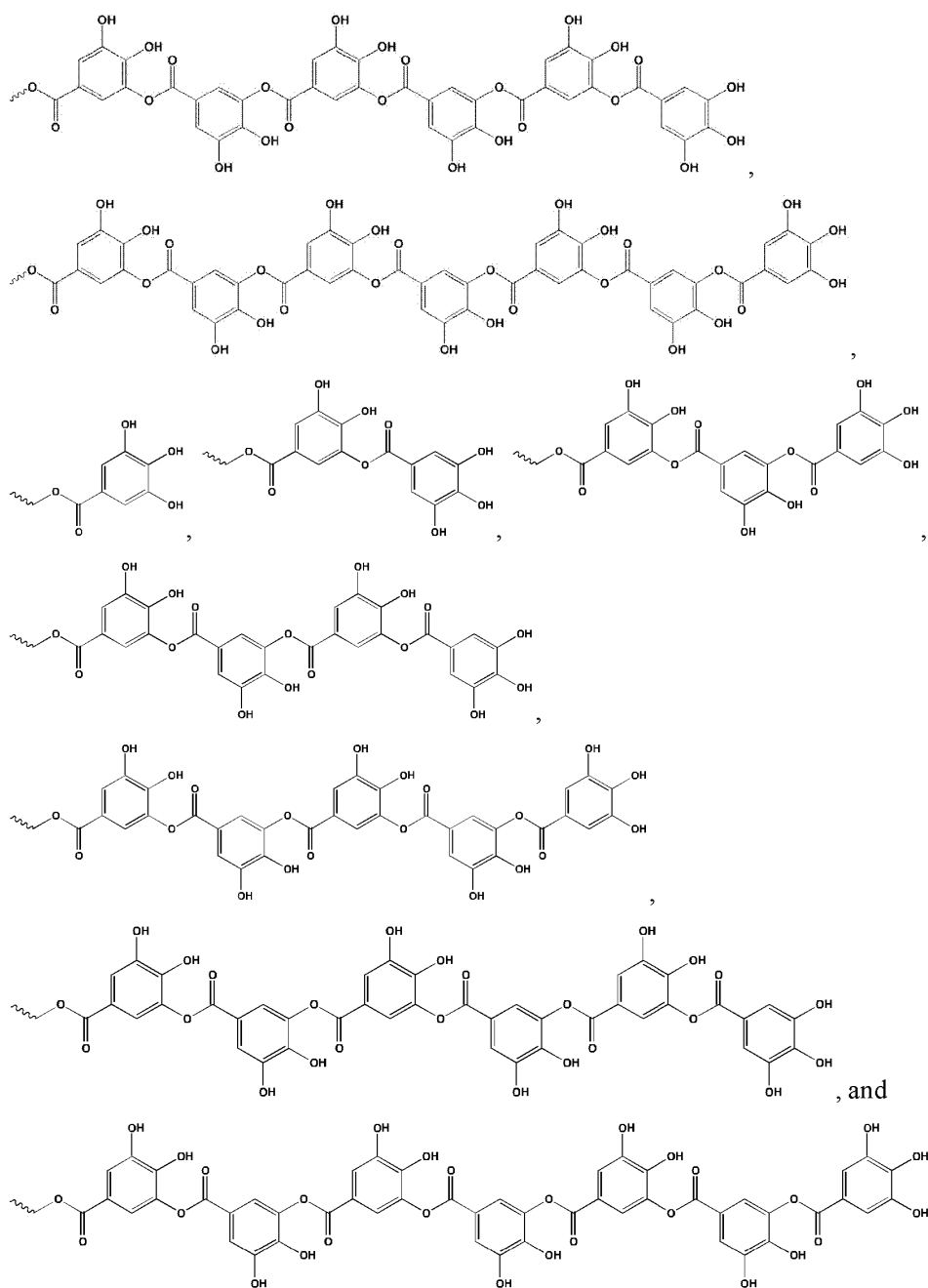


5

22. The method of claim 21, wherein each of R¹, R², R³, and R⁴, independently, is selected from the group consisting of:



10



23. The method of claim 22, wherein the compound of Formula (Ij) is Compound 134, 136, 138, 140, 142, 144, 146, or 148.

24. The method of any one of claims 1-23, wherein the composition comprises a heterogenous population of compounds of Formula (I), and wherein the Formula (I) compounds in the population have different numbers of galloyl moieties ranging from 2 to 35 inclusive.

25. The method of claim 24, wherein about 1-26% of the Formula (I) compounds in the population have 5 galloyl moieties.

10

26. The method of claim 24 or claim 25, wherein about 10-40% of the Formula (I) compounds in the pupolation have 6-7 galloyl moieties.

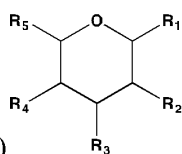
27. The method of any one of claims 24-26, wherein about 20-85% of the Formula (I) compounds in the pupolation have 8-12 galloyl moieties.

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28. The method of any one of claims 1-23, wherein the composition comprises a substantially homogenous population of compounds of Formula (I), each of which has the same number of galloyl moieties ranging from 2-35.

20

29. The method of any one of claims 24-28, wherein the compounds of Formula (I) in



the population is of Formula (Ia), in which each of R₁, R₂, R₃, R₄, and R₅ is defined herein, and wherein about 1-25% of the Formula (I) compounds in the population have 5 galloyl moieties, about 10-40% of the Formula (I) compounds in the population have 6-7 galloyl moieties, and about 20-85% of the Formula (I) compounds in the population have 8-12 galloyl moieties; optionally wherein the compounds of Formula (I) is of the Formula (Ib).

25

30. The method of claim 29, wherein about 1-8% of the Formula (I) compounds in the population have 5 galloyl moieties, about 15-35% of the Formula (I) compounds in the population have 6-7 galloyl moieties, and about 60-80% of the Formula (I) compounds in the population have 8-12 galloyl moieties.

5

31. The method of any one of claims claim 1-30, wherein the composition is a nutraceutical composition, a health food, or a medical food.

32. The method of any one of claims 1-31, wherein the coronavirus infection is an infection caused by a coronavirus selected from the group consisting of SARS-CoV-2, severe acute respiratory syndrome coronavirus (SARS-CoV), middle east respiratory syndrome coronavirus (MERS-CoV), 229E alpha coronavirus, NL63 alpha coronavirus, OC43 beta coronavirus, and HKU1 beta coronavirus.

33. The method of any one of claims 1-32, wherein the composition is administered to the subject by oral administration, by injection, by topical administration, or by inhalation.

34. The method of any one of claims 1-33, wherein the composition is placed in a medical device selected from the group consisting of an inhaler, a nebulizer, a nasal spray, and a vaporization aerosol device for administration to the subject.

35. The method of any one of claims 1-34, wherein the subject is a human subject.

36. The method of any one of claims 1-35, wherein the subject is administered the composition continuously or at a frequency of every five minutes to one time every three months.

37. The method of any one of claims 1-36, wherein the human subject is treated concurrently with, prior to, or subsequent to, one or more additional anti-viral agents.

30

38. The method of claim 37, wherein the one or more additional anti-viral agents comprise a viral entry inhibitor, a viral uncoating inhibitor, a viral reverse transcriptase inhibitor, a viral protein synthesis inhibitor, a viral protease inhibitor, a viral polymerase inhibitor, a viral integrase inhibitor, an interferon, or the combination thereof.

5

39. The method of claim 38, wherein the viral entry inhibitor is selected from the group consisting of maraviroc, enfuvirtide, ibalizumab, fostemsavir, plerixafor, epigallocatechin gallate, vicriviroc, aplaviroc, maraviroc, tromantadine, nitazoxanide, umifenovir, and podofilox.

10

40. The method of claim 39, wherein the viral uncoating inhibitor is selected from the group consisting of amantadine, rimantadine, and pleconaril.

15

41. The method of claim 40, wherein the viral reverse transcriptase inhibitor is selected from the group consisting of zidovudine, didanosine, zalcitabine, stavudine, lamivudine, abacavir, emtricitabine, entecavir, truvada, nevirapine, raltegravir, and tenofovir disoproxil.

20

42. The method of claim 40, wherein the viral protease inhibitor is selected from the group consisting of fosamprenavir, ritonavir, atazanavir, nelfinavir, indinavir, saquinavir, saquinavir, famciclovir, fomivirsen, lopinavir, ribavirin, darunavir, oseltamivir, and tipranavir.

25

43. The method of claim 40, wherein the viral polymerase inhibitor is selected from the group consisting of amatoxins, rifamycin, cytarabine, fidaxomicin, tagetitoxin, foscarnet sodium, idoxuridine, penciclovir, sofosbuvir, trifluridine, valacyclovir, valganciclovir, vidarabine, and remdesivir.

30

44. The method of claim 40, wherein the viral integrase inhibitor is selected from the group consisting of raltegravir, elvitegravir, dolutegravir, bictegravir, and cabotegravir.

45. The method of claim 40, wherein the interferon is selected from the group consisting of type I interferon, type II interferon, type III interferon, and peginterferon alfa-2a.

46. An aerosol dispenser for treating coronavirus infection, comprising a container, in which a composition comprising one or more of the Formula (I) compounds set forth in any one of claims 1-24 are placed, wherein the Formula (I) compounds are suspended in a liquid
5 propellant.

47. The aerosol dispenser of claim 46, which is an inhaler, a nebulizer, a nasal spray, or a vaporization aerosol device.

10 48. The aerosol dispenser of claim 46 or claim 47, wherein the composition comprises microparticles that comprise the one or more Formula (I) compounds, and optionally wherein the microparticles have a mass median diameter (D_{50}) of about 1 μ M to about 5 μ M.

49. A compound of Formula (I), which is set forth in any one of claims 9-23.
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