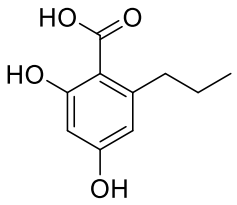
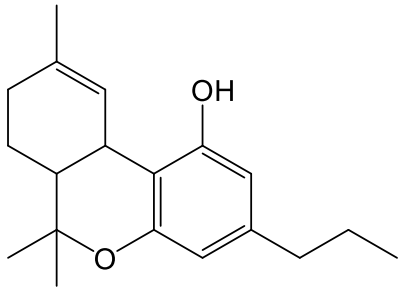
## CLAIMS

WHAT IS CLAIMED IS:

1. A transgenic plant that comprises at least one genetic modification, wherein said genetic modification results in an increased level of the following compounds



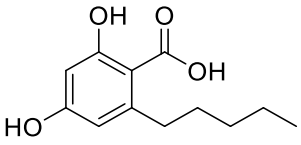
(Divarinic acid (DA), Formula I) or a derivative or analog thereof; and



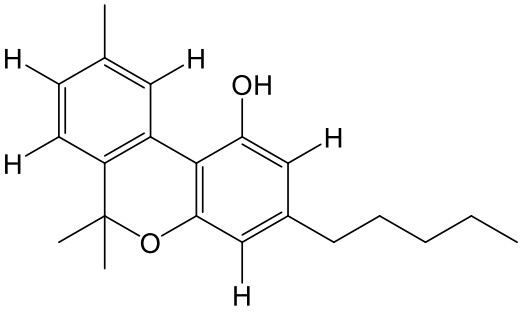
-(Tetrahydrocannabivarin (THCV), Formula VI) or a derivative or analog thereof;

compared to a level of said compounds in a comparable plant lacking said genetic modification.

2. The transgenic plant of claim 1, wherein said at least one genetic modification further results in an increased level of a compound of:



(Olivetolic acid (OA), Formula II);



(Cannabinol (CBN), Formula V);

or a derivative or analog thereof, compared to a level of said compound in a comparable plant lacking said genetic modification.

3. The transgenic plant of claim 2, wherein said at least one genetic modification results in an increased level of a compound of Formula V, or a derivative or analog thereof, compared to a level of said compound in a comparable plant lacking said genetic modification.

4. The transgenic plant of claim 2, wherein said at least one genetic modification results in an increased level of a compound of Formula II, or a derivative or analog thereof, compared to a level of said compound in a comparable plant lacking said genetic modification.

5. The transgenic plant of claim 1, wherein said at least one genetic modification is in a gene sequence that encodes a protein.

6. The transgenic plant of claim 5, wherein said at least one genetic modification disrupts expression of said protein.

7. The transgenic plant of claim 5, wherein said at least one genetic modification decreases expression of said protein compared to a comparable plant lacking said genetic modification.

8. The transgenic plant of claim 7, wherein said at least one genetic modification decreases expression of said protein by at least 30%, 40%, 50%, 60%, 70%, 80%, 90%, or 100%, compared to a comparable plant lacking said genetic modification.

9. The transgenic plant of claim 5, wherein said at least one genetic modification is in a gene sequence that encodes a tetrahydrocannabinolic acid synthase, a cannabidiolic acid synthase, or a cannabichromenic acid synthase.

10. The transgenic plant of claim 5, wherein said transgenic plant comprises at least two genetic modifications each in a gene sequence that encodes a protein.

11. The transgenic plant of claim 5, wherein said transgenic plant comprises at least two genetic modifications each in a different gene sequence that encode different proteins.

12. The transgenic plant of claim 5, wherein said at least two genetic modifications disrupts expression of said proteins.

13. The transgenic plant of claim 6, wherein said at least one genetic modification is in a gene sequence that encodes a cannabidiolic acid synthase or a cannabichromenic acid synthase.

14. The transgenic plant of claim 13, wherein said at least one genetic modification disrupts expression of said protein.

15. The transgenic plant of claim 14, wherein said at least one genetic modification decreases expression of said protein compared to a comparable plant lacking said genetic modification.

16. The transgenic plant of claim 1, wherein said transgenic plant further comprises an increased amount of cannabigerol (CBG), derivative or analog thereof, compared to an amount of the same compound in a comparable control plant without said genetic modification.

17. The transgenic plant of claim 16, wherein said at least said at least one genetic modification comprises modification of a first group of genes that comprise olivetolic acid cyclase (OAC) and olivetolic acid synthase (OLS).

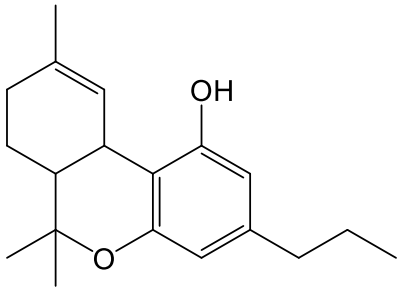
18. The transgenic plant of claim 1, wherein said genetic modification comprises a disruption of a group of genes encoding CBCA synthase, CBDA synthase, and THCA synthase.

19. A pharmaceutical composition comprising an extract of said transgenic plant of claim 2.

20. The pharmaceutical composition of claim 19, further comprising a pharmaceutically acceptable excipient, diluent, or carrier.

21. The pharmaceutical composition of claim 20, comprising said pharmaceutically acceptable excipient, wherein said pharmaceutically acceptable excipient is a lipid.

22. A transgenic plant that comprises at least one genetic modification, wherein said genetic modification results in at least about 50% more of a compound that is




(Tetrahydrocannabivarin (THCV), Formula VI) or a derivative or analog thereof compared to a level of said compound in a comparable plant lacking said genetic modification.

23. A method of suppressing appetite in a subject, the method comprising administering an effective amount of the transgenic plant of claim 22 to the subject, thereby suppressing appetite in the subject.

24. The pharmaceutical composition of claim 20 in an oral form, a transdermal form, an oil formulation, an edible food, a food substrate, an aqueous dispersion, an emulsion, a solution, a suspension, an elixir, a gel, a syrup, an aerosol, a mist, a powder, a tablet, a lozenge, a gel, a lotion, a paste, a formulated stick, a balm, a cream, or an ointment.

25. The pharmaceutical composition of claim 20 for use in therapy.

26. Use of the pharmaceutical composition of claim 20 in the manufacture of a medicament for treating a disease or condition in a subject, wherein the medicament is to be administered to the subject, thereby treating the disease or condition, wherein said disease or condition is selected from the group consisting of anorexia, emesis, pain, inflammation, multiple sclerosis, Parkinson's disease, Huntington's disease, Tourette's syndrome, Alzheimer's disease, epilepsy, glaucoma, osteoporosis, schizophrenia, cardiovascular disorders, cancer, and obesity.