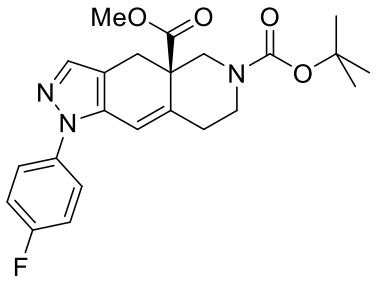
WHAT IS CLAIMED IS:

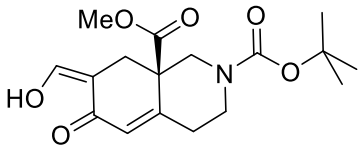
1. A method of preparing a compound of Formula I:



(I)

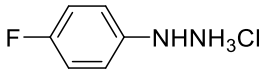
comprising:

(a) forming a first reaction mixture comprising a compound of Formula II:



(II) ,

$Mg(OAc)_2$, and 4-fluorophenylhydrazine HCl:



,

under conditions suitable to prepare the compound of Formula I in a yield of at least 80% and a purity of at least 98%.

2. The method of claim 1, wherein the $Mg(OAc)_2$ is present in an amount of from 0.5 to 1.0 molar eq. to the compound of Formula II.

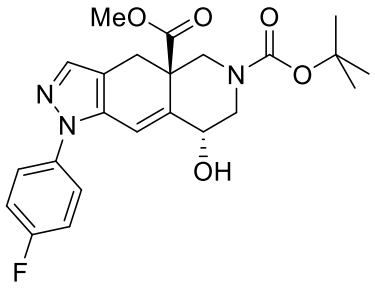
3. The method of claim 1 or 2, further comprising

(a1) heating a first crystallization mixture comprising isopropanol, heptane, and the compound of Formula I, such that the compound of Formula I dissolves in the first crystallization mixture; and

(a2) cooling the first crystallization mixture to form a first crystalline compound of Formula I.

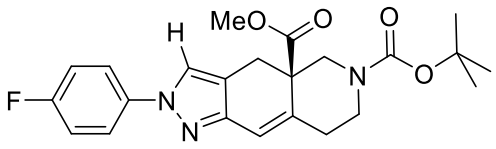
4. The method of claim 3, wherein the compound of Formula I, following step (a2), contains

less than 0.05% of Impurity A:



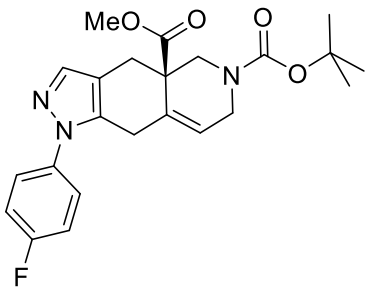
;

less than 0.5% of Impurity C:



; and

less than 0.25% of Impurity D:



.

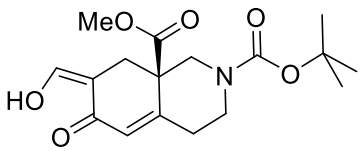
5. The method of claim 3 or 4, further comprising

(a3) heating a second crystallization mixture comprising toluene, heptane, and the first crystalline compound of Formula I, such that the first crystalline compound of Formula I dissolves in the second crystallization mixture; and

(a4) cooling the second crystallization mixture to form a second crystalline compound of Formula I.

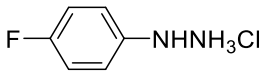
6. The method of any one of claims 1 to 5, comprising:

(a) forming the first reaction mixture comprising the compound of Formula II:



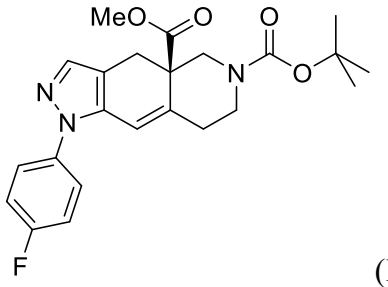
(II) ,

$Mg(OAc)_2 \cdot 4H_2O$ in an amount of about 0.6 molar eq. to the compound of Formula II, acetic acid, water, toluene, and 4-fluorophenylhydrazine HCl:



,

to prepare the compound of Formula I:



(I)

in a yield of at least 80% and a purity of at least 98%;

(a1) heating the first crystallization mixture comprising isopropanol, heptane, and the compound of Formula I, such that the compound of Formula I dissolves in the first crystallization mixture;

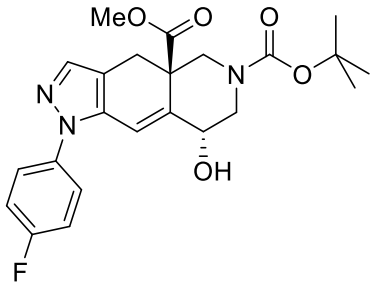
(a2) cooling the first crystallization mixture to form the first crystalline compound of Formula I;

(a3) heating the second crystallization mixture comprising toluene, heptane, and the first crystalline compound of Formula I, such that the first crystalline compound of Formula I dissolves in the second crystallization mixture; and

(a4) cooling the second crystallization mixture to form the second crystalline compound of Formula I,

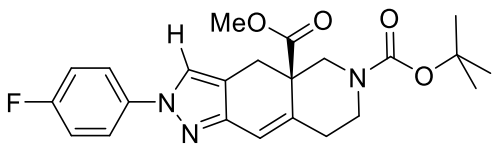
wherein the second crystalline compound of Formula I contains

less than 0.05% of Impurity A:



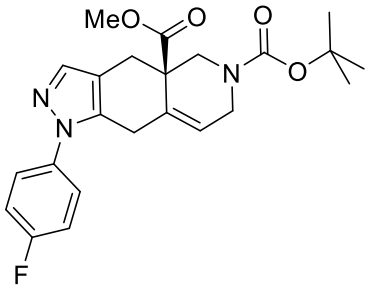
;

less than 0.05% of Impurity C:



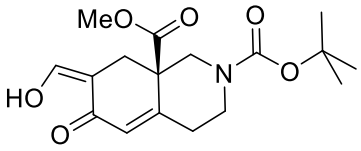
; and

less than 0.20% of Impurity D:



.

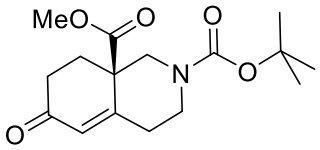
7. A method of preparing a compound of Formula II:



(II)

the method comprising:

(c) forming a third reaction mixture comprising an alkylformate, a non-nucleophilic base, and a compound of Formula III:



(III) ,

thereby preparing the compound of Formula II.

8. The method of claim 7, wherein the alkylformate is methylformate or ethylformate.

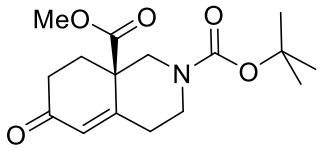
9. The method of claim 7 or 8, wherein the methylformate is present in an amount of from 1 to 10 molar eq. to the compound of Formula III.

10. The method of any one of claims 7 to 9, wherein the non-nucleophilic base is an alkoxide, hexamethylsilazane (HMDS), lithium hexamethyldisilazane, sodium hexamethyldisilazine, potassium hexamethyldisilazane, lithium diisopropylamine (LDA), lithium hydride, sodium hydride, potassium hydride, or n-butyl lithium.

11. The method of any one of claims 7 to 10, wherein the non-nucleophilic base is sodium tert-butoxide (NaOtBu), sodium tert-pentoxide (NaOtPent), or potassium tert-pentoxide (KOtPent).

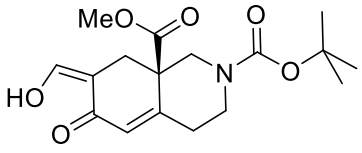
12. The method of any one of claims 7 to 11, wherein

(c) forming the third reaction mixture comprising methylformate in an amount of about 3.0 molar eq. to the compound of Formula III, sodium tert-pentoxide, lithium chloride, 2-methyltetrahydrofuran, and the compound of Formula III:



(III) ,

wherein the third reaction mixture is at a temperature of about -40 °C, thereby preparing the compound of Formula II:

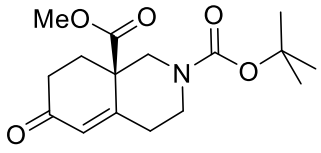


(II) .

13. The method of any one of claims 1 to 6, wherein the compound of Formula II is prepared by the method of any one of claims 7 to 12.

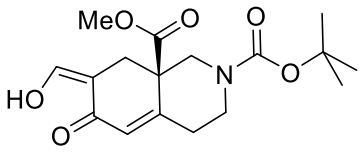
14. The method of claim 13, comprising:

(c) forming the third reaction mixture comprising methylformate in an amount of about 3.0 molar eq. to the compound of Formula III, sodium tert-pentoxide, lithium chloride, 2-methyltetrahydrofuran, and the compound of Formula III:



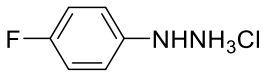
(III) ,

wherein the third reaction mixture is at a temperature of about -40 °C, thereby preparing the compound of Formula II:



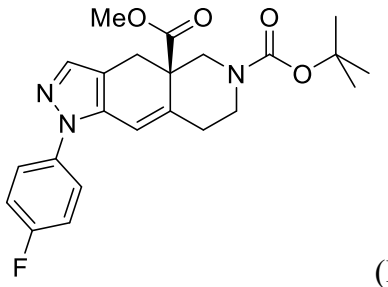
(II) ; and

(a) forming the first reaction mixture comprising the compound of Formula II, $Mg(OAc)_2 \cdot 4H_2O$ in an amount of about 0.6 molar eq. to the compound of Formula II, acetic acid, water, toluene, and 4-fluorophenylhydrazine HCl:



,

to prepare the compound of Formula I:



(I)

in a yield of at least 80% and a purity of at least 98%.

15. The method of 14, further comprising:

(a1) heating the first crystallization mixture comprising isopropanol, heptane, and the compound of Formula I, such that the compound of Formula I dissolves in the first crystallization mixture;

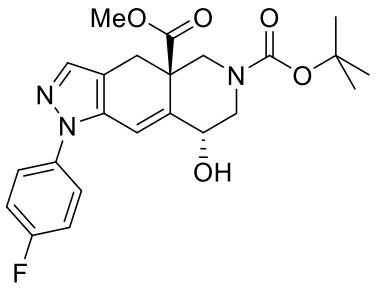
(a2) cooling the first crystallization mixture to form the first crystalline compound of Formula I;

(a3) heating the third crystallization mixture comprising toluene, heptane, and the first crystalline compound of Formula I, such that the first crystalline compound of Formula I dissolves in the third crystallization mixture; and

(a4) cooling the third crystallization mixture to form the third crystalline compound of Formula I,

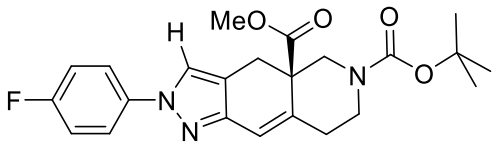
wherein the third crystalline compound of Formula I contains

less than 0.05% of Impurity A:



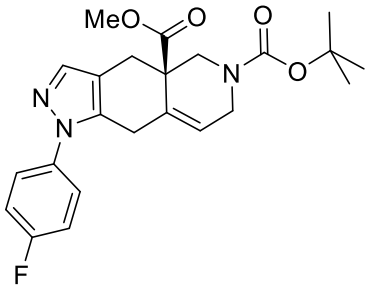
;

less than 0.05% of Impurity C:



; and

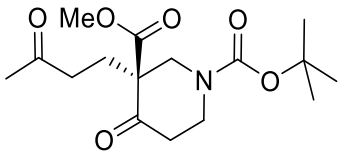
less than 0.20% of Impurity D:



.

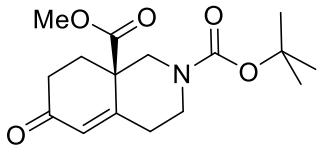
16. The method of any one of claims 7 to 15, wherein the compound of Formula III is prepared by the method comprising:

(d) forming a fourth reaction mixture comprising pyrrolidine, acetic acid, and the compound of Formula IV:



(IV) ,

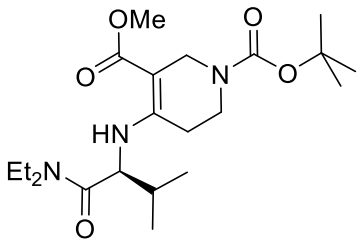
thereby preparing the compound of Formula III:



(III) .

17. The method of claim 16, wherein the compound of Formula IV is prepared by the method comprising:

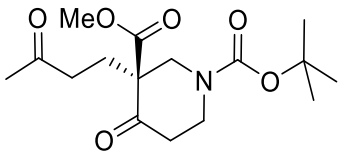
(e) forming a fifth reaction mixture comprising a compound of Formula V:



(V) ,

methyl vinyl ketone (MVK) in an amount of about 1.6 molar eq. to the compound of Formula V, Cu(OAc)2 (anhydrous), and dimethylformamide, at a temperature of from 10 to 25° C, thereby preparing the compound of

Formula IV:



(IV) .

18. The method of claim 17, wherein the fifth reaction mixture has a temperature of from 20 to 23° C.

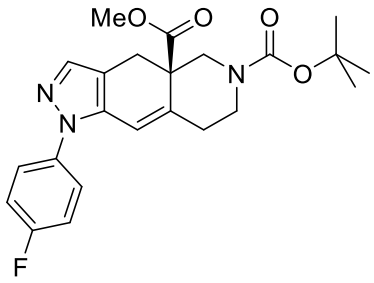
19. The method of claim 17 or 18, further comprising:

(e1) adding to the fifth reaction mixture an aqueous mixture comprising HCl and LiCl, under conditions suitable to prepare the compound of Formula IV.

20. The method of any one of claims 17 to 19, wherein the compound of Formula IV contains less than 0.1% (w/w) of MVK polymer.

21. A composition comprising:

a compound of Formula I in an amount of at least 99%:

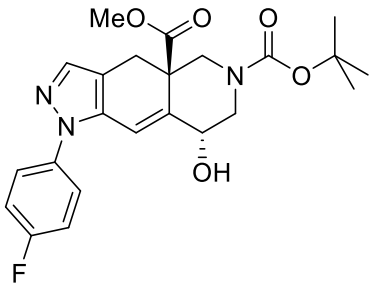


(I) ; and

one or more impurity in an amount of from 0.01 to 1%.

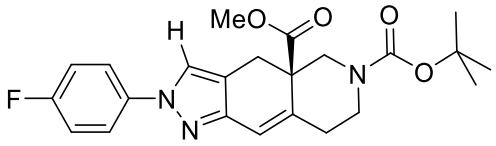
22. The composition of claim 21, wherein the composition comprises:

less than 0.05% of Impurity A:



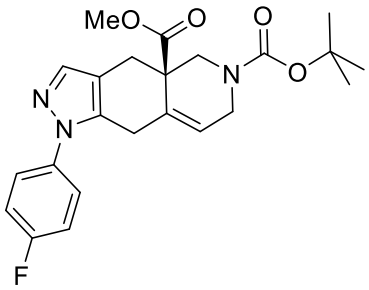
;

less than 0.05% of Impurity C:



; and

less than 0.20% of Impurity D:



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23. The composition of claim 21 or 22, wherein the compound of Formula I is prepared by the method of any one of claims 1 to 20.