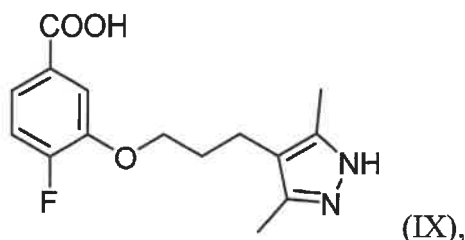


Claims:

1. Crystalline Form Type A of Formula IX as its HCl salt



characterized by an X-ray powder diffraction pattern comprising peaks at 12.0, 21.8, 25.9, 26.7, and 27.9 degrees 2θ (± 0.2 degrees 2θ).

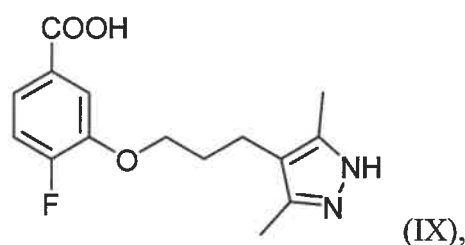
2. Crystalline Form Type A of Formula IX as its HCl salt according to claim 1, characterized by an X-ray powder diffraction pattern substantially in accordance with **FIG. 31**.
3. Crystalline Form Type A of Formula IX as its HCl salt of claim 1 or 2, which is substantially free of other Formula IX crystalline or amorphous forms.
4. Crystalline Form Type A of Formula IX as its HCl salt according to any one of claims 1 to 2, further characterized by a weight loss ranging from about 0.7% to about 1.9% upon heating to around 150 °C, as measured by thermal gravimetric analysis.
5. Crystalline Form Type A of Formula IX as its HCl salt according to claim 4, wherein the weight loss is about 1.3%.
6. Crystalline Form Type A of Formula IX as its HCl salt according to any one of claims 1 to 5, characterized by water uptake of about 1.6 % at 25 °C / 80 % relative humidity (RH) after undergoing a dynamic vapor sorption cycle which includes pre-equilibration at 0 % RH.
7. Crystalline Form Type A of Formula IX as its HCl salt according to any one of claims 1 to 6, characterized by gains of less than 2.5% weight after undergoing a dynamic vapor sorption cycle from about 0 % relative humidity (RH) to about 90% RH.

8. Crystalline Form Type A of Formula IX as its HCl salt according to any one of claims 1 to 7, having a dynamic vapor sorption profile substantially as shown in **FIG. 37**.

9. Crystalline Form Type A of Formula IX as its HCl salt according to any one of claims 1 to 5, further characterized by a differential scanning calorimetry thermogram comprising endothermic peaks at around 211-214 and 237-239 °C.

10. Crystalline Form Type A of Formula IX as its HCl salt according to claim 9, wherein, said differential scanning calorimetry thermogram comprises endothermic peaks around 11.7, 212.6, and 237.3°C.

11. A Crystalline Form of Formula IX,



wherein said Crystalline Form is selected from the group consisting of Type B, Type E, Type I, Type H, Type J, Type K, Type C, and Type G, where:

Crystalline Form Type B is characterized by an X-ray powder diffraction pattern comprising peaks at 12.1, 13.9, 19.8, 23.3, and 24.4 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 40**;

Crystalline Form Type E is characterized by an X-ray powder diffraction pattern comprising peaks at 11.9, 14.0, 15.1, and 25.8 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 46**;

Crystalline Form Type I is characterized by an X-ray powder diffraction pattern comprising peaks at 12.5, 17.3, 23.4, 25.0, and 25.4 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 55**;

Crystalline Form Type H is characterized by an X-ray powder diffraction pattern comprising peaks at 11.9, 12.3, 21.7, 23.3, and 25.8 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 51**;

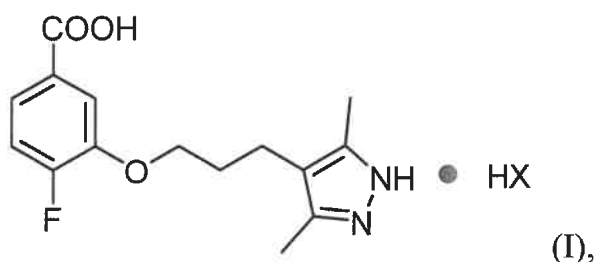
Crystalline Form Type J is characterized by an X-ray powder diffraction pattern comprising peaks at 13.8, 14.7, 22.9, 26.2, and 27.7 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 59**;

Crystalline Form Type K is characterized by an X-ray powder diffraction pattern comprising peaks at 7.2, 7.6, 9.9, 14.0, and 19.3 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 63**;

Crystalline Form Type C is characterized by an X-ray powder diffraction pattern comprising peaks at 14.6, 16.8, 19.5, 20.7, and 22.5 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 43**; and

Crystalline Form Type G is characterized by an X-ray powder diffraction pattern comprising peaks at 12.3, 13.2, 13.4, 17.8, and 26.6 degrees 2θ (± 0.2 degrees 2θ), and/or by an X-ray powder diffraction pattern substantially in accordance with **FIG. 49**.

12. A pharmaceutically acceptable salt represented by Formula I

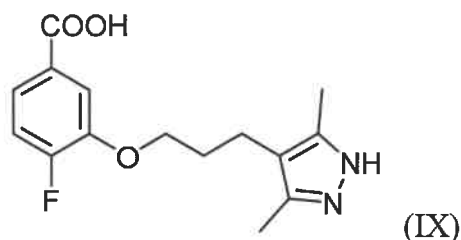


wherein X is a pharmaceutically acceptable anion of a protic acid.

13. The pharmaceutically acceptable salt of claim 12, wherein the pharmaceutically acceptable anion of a protic acid is selected from the group consisting of chloride, bromide, sulfonate, tosylate, mesylate, nitrate and acetate, and combinations thereof.

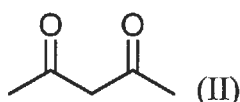
14. The pharmaceutically acceptable salt of claim 13, wherein the pharmaceutically acceptable anion of a protic acid is chloride.

15. A method for preparing a compound of Formula IX



comprising

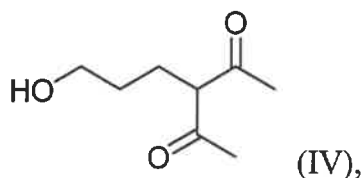
(a) contacting a compound of Formula II



with a compound of Formula III

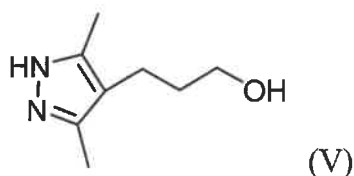


a first base, and a first organic solvent to provide a compound of Formula IV

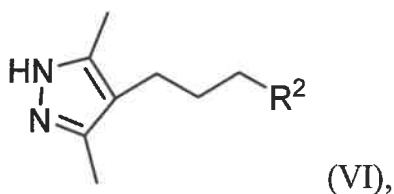


wherein each R¹ is independently a halogen or a sulfonate ester;

(b) contacting a compound of Formula IV with hydrazine and a second organic solvent to provide a compound of Formula V

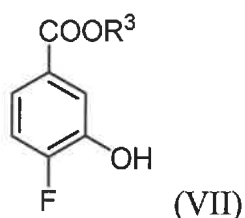


(c) contacting a compound of Formula V with a sulfonating agent or halogenating agent provide a compound of Formula VI

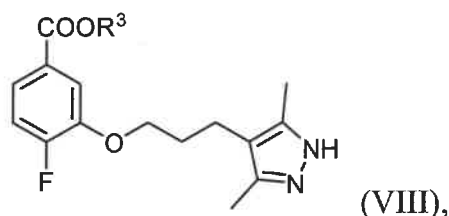


wherein R² is a halogen or a sulfonate ester;

(d) contacting a compound of Formula VI with a compound of Formula VII



a second base, and an third organic solvent to provide a compound of Formula VIII



wherein R³ is selected from the group consisting of an C₁₋₁₂ alkyl, C₂₋₁₂ alkenyl, C₁₋₁₂ alkynyl, C₃₋₈ cycloalkyl, C₃₋₁₂ heterocycloalkyl, aryl, and heteroaryl, each of which is optionally substituted.

(e) contacting a compound of Formula VIII with a third base to provide a compound of Formula IX.

16. The method of claim 15, wherein each R¹ is independently selected from the group consisting of chloride, bromide, tosylate, and mesylate.

17. The method of claim 15, wherein the first base is an alkali metal carbonate, an alkali metal bicarbonate or a combination thereof.

18. The method of any one of claims 15 to 17, wherein the first organic solvent is a polar aprotic organic solvent.

19. The method of any one of claims 15 to 18, wherein the second organic solvent is a polar protic organic solvent.

20. The method of any one of claims 15 to 19, wherein the sulfonating agent is mesyl chloride or tosyl chloride.

21. The method of any one of claims 15 to 19, wherein the halogenating agent is selected from the group consisting of PBr₃, PCl₃, PCl₅, SOBr₂, PBr₅, and SOCl₂.

22. The method of any one of claims 15 to 21, wherein R^2 is selected from the group consisting of chloride, bromide, tosylate, and mesylate.

23. The method of any one of claims 15 to 22, wherein the second base is an alkali metal carbonate, an alkali metal bicarbonate or a combination thereof.

24. The method of any one of claims 15 to 23, wherein the third organic solvent is a polar aprotic organic solvent.

25. The method of claim 24, wherein polar organic solvent is selected from the group consisting of acetone, ethyl acetate, dichloromethane, tetrahydrofuran, dimethylformamide, dimethylsulfoxide and acetonitrile.

26. The method of any one of claims 15 to 25, wherein R^3 is C_{1-8} alkyl.

27. The method of any one of claims 15 to 26, wherein the third base is a metal hydroxide.