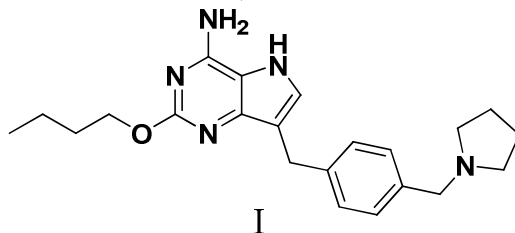


Claims

1. A maleate of the compound of formula I,

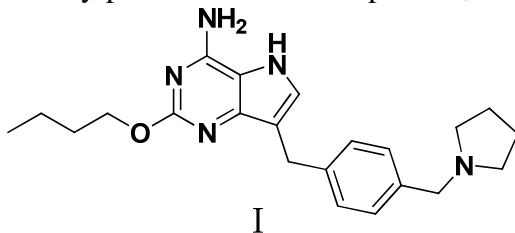


characterized in that,

the molar ratio of the compound of formula I to maleic acid is 1:1 - 1:3.

2. The maleate of the compound of formula I according to claim 1, characterized in that, the molar ratio of the compound of formula I to maleic acid 1:2.

3. A crystal form C of the maleate of the compound of formula I, characterized in that the crystal form C has diffraction peaks at $2\theta=7.6^{\circ}\pm0.2^{\circ}$, $9.9^{\circ}\pm0.2^{\circ}$, $17.8^{\circ}\pm0.2^{\circ}$, $22.8^{\circ}\pm0.2^{\circ}$, $24.2^{\circ}\pm0.2^{\circ}$, $26.3^{\circ}\pm0.2^{\circ}$ in X-ray powder diffraction pattern,



4. The crystal form C according to claim 3, characterized in that, the crystal form C has diffraction peaks at $2\theta=5.6^{\circ}\pm0.2^{\circ}$, $7.6^{\circ}\pm0.2^{\circ}$, $9.9^{\circ}\pm0.2^{\circ}$, $17.8^{\circ}\pm0.2^{\circ}$, $19.8^{\circ}\pm0.2^{\circ}$, $22.8^{\circ}\pm0.2^{\circ}$, $24.2^{\circ}\pm0.2^{\circ}$, $25.0^{\circ}\pm0.2^{\circ}$, $26.3^{\circ}\pm0.2^{\circ}$ in X-ray diffraction pattern.

5. The crystal form C according to claim 3, characterized in that, the crystal form C has diffraction peaks at $2\theta=5.6^{\circ}\pm0.2^{\circ}$, $6.0^{\circ}\pm0.2^{\circ}$, $7.6^{\circ}\pm0.2^{\circ}$, $9.9^{\circ}\pm0.2^{\circ}$, $12.0^{\circ}\pm0.2^{\circ}$, $15.3^{\circ}\pm0.2^{\circ}$, $17.8^{\circ}\pm0.2^{\circ}$, $18.5^{\circ}\pm0.2^{\circ}$, $19.8^{\circ}\pm0.2^{\circ}$, $20.4^{\circ}\pm0.2^{\circ}$, $22.8^{\circ}\pm0.2^{\circ}$, $23.1^{\circ}\pm0.2^{\circ}$, $24.2^{\circ}\pm0.2^{\circ}$, $24.7^{\circ}\pm0.2^{\circ}$, $25.0^{\circ}\pm0.2^{\circ}$, $26.3^{\circ}\pm0.2^{\circ}$ in X-ray diffraction pattern.

6. The crystal form C according to any one of claims 3-5, characterized in that, the crystal form C has X-ray powder diffraction pattern substantially shown in Figure 1.

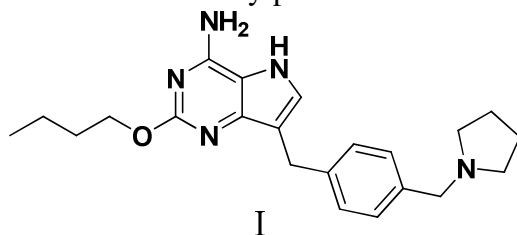
7. A process for preparing the crystal form C according to any one of claims 3-6, comprising the following steps:

- 1) dissolving the compound of formula I in a solvent;
- 2) adding maleic acid; and

3) cooling for crystallization, filtering, washing and drying to obtain the crystal form C, wherein the solvent is selected from the group consisting of methanol, ethanol, propanol, isopropanol, n-butanol, isobutanol, tertiary butanol, acetone, ethyl acetate and mixed solvent thereof.

8. The process according to claim 7, characterized in that, the solvent is ethanol.

9. A crystal form D of the maleate of the compound of formula I, characterized in that the crystal form D has diffraction peaks at $2\theta=5.1^{\circ}\pm0.2^{\circ}$, $9.5^{\circ}\pm0.2^{\circ}$, $11.2^{\circ}\pm0.2^{\circ}$, $17.6^{\circ}\pm0.2^{\circ}$, $20.2^{\circ}\pm0.2^{\circ}$, $23.0^{\circ}\pm0.2^{\circ}$ in X-ray powder diffraction pattern,



10. The crystal form D according to claim 9, characterized in that, the crystal form D has diffraction peaks at $2\theta=5.1^{\circ}\pm0.2^{\circ}$, $9.5^{\circ}\pm0.2^{\circ}$, $11.2^{\circ}\pm0.2^{\circ}$, $17.6^{\circ}\pm0.2^{\circ}$, $20.2^{\circ}\pm0.2^{\circ}$, $20.7^{\circ}\pm0.2^{\circ}$, $23.0^{\circ}\pm0.2^{\circ}$, $23.7^{\circ}\pm0.2^{\circ}$ in X-ray diffraction pattern.

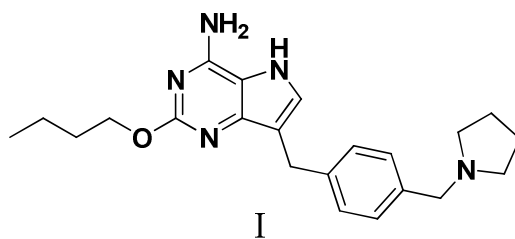
11. The crystal form D according to claim 9, characterized in that, the crystal form D has diffraction peaks at $2\theta=5.1^{\circ}\pm0.2^{\circ}$, $5.6^{\circ}\pm0.2^{\circ}$, $9.5^{\circ}\pm0.2^{\circ}$, $11.2^{\circ}\pm0.2^{\circ}$, $16.9^{\circ}\pm0.2^{\circ}$, $17.6^{\circ}\pm0.2^{\circ}$, $20.2^{\circ}\pm0.2^{\circ}$, $20.7^{\circ}\pm0.2^{\circ}$, $22.6^{\circ}\pm0.2^{\circ}$, $23.0^{\circ}\pm0.2^{\circ}$, $23.7^{\circ}\pm0.2^{\circ}$, $24.5^{\circ}\pm0.2^{\circ}$ in X-ray diffraction pattern.

12. The crystal form D according to any one of claims 9-11, characterized in that, the crystal form D has X-ray powder diffraction pattern substantially shown in Figure 2.

13. A process for preparing the crystal form D according to any one of claims 9-12, comprising the following steps:

- 1) placing the crystal form C of the maleate of the compound of formula I according to any one of claims 3-6 in acetone solvent to form a suspension;
- 2) shaking at constant temperature; and
- 3) centrifugating, washing and drying to obtain the crystal form D.

14. A crystal form E of the maleate of the compound of formula I, characterized in that the crystal form E has diffraction peaks at $2\theta=4.9^{\circ}\pm0.2^{\circ}$, $5.3^{\circ}\pm0.2^{\circ}$, $9.0^{\circ}\pm0.2^{\circ}$, $16.5^{\circ}\pm0.2^{\circ}$, $19.3^{\circ}\pm0.2^{\circ}$ in X-ray powder diffraction pattern,



15. The crystal form E according to claim 14, characterized in that, the crystal form E has diffraction peaks at $2\theta=4.9^{\circ}\pm0.2^{\circ}$, $5.3^{\circ}\pm0.2^{\circ}$, $6.7^{\circ}\pm0.2^{\circ}$, $9.0^{\circ}\pm0.2^{\circ}$, $10.8^{\circ}\pm0.2^{\circ}$, $16.5^{\circ}\pm0.2^{\circ}$, $19.3^{\circ}\pm0.2^{\circ}$ in X-ray powder diffraction pattern.

16. The crystal form E according to claim 14, characterized in that, the crystal form E has diffraction peaks at $2\theta=4.9^{\circ}\pm0.2^{\circ}$, $5.3^{\circ}\pm0.2^{\circ}$, $6.7^{\circ}\pm0.2^{\circ}$, $9.0^{\circ}\pm0.2^{\circ}$, $10.8^{\circ}\pm0.2^{\circ}$, $16.2^{\circ}\pm0.2^{\circ}$, $16.5^{\circ}\pm0.2^{\circ}$, $19.3^{\circ}\pm0.2^{\circ}$, $22.0^{\circ}\pm0.2^{\circ}$, $22.6^{\circ}\pm0.2^{\circ}$, $25.9^{\circ}\pm0.2^{\circ}$ in X-ray powder diffraction pattern.

17. The crystal form E according to any one of claims 14-16, characterized in that, the crystal form E has X-ray powder diffraction pattern substantially shown in Figure 3.

18. A process for preparing the crystal form E according to any one of claims 14-17, comprising the following steps:

- 1) placing the crystal form C of the maleate of the compound of formula I according to any one of claims 3-6 in isopropanol solvent to form a suspension;
- 2) shaking at constant temperature; and
- 3) centrifugating, washing and drying to obtain the crystal form E.

19. A crystalline composition, characterized in that, based on the weight of the crystalline composition, the crystal form C according to any one of claims 3-6 is 50% or more; or based on the weight of the crystalline composition, the crystal form D according to any one of claims 9-12 is 50% or more; or based on the weight of the crystalline composition, the crystal form E according to any one of claims 14-17 is 50% or more.

20. The crystalline composition according to claim 19, characterized in that, based on the weight of the crystalline composition, the crystal form C according to any one of claims 3-6 is 80% or more; or based on the weight of the crystalline composition, the crystal form D according to any one of claims 9-12 is 80% or more; or based on the weight of the crystalline composition, the crystal form E according to any one of claims 14-17 is 80% or more.

21. The crystalline composition according to claim 19, characterized in that,
based on the weight of the crystalline composition, the crystal form C according to any
one of claims 3-6 is 90% or more; or
based on the weight of the crystalline composition, the crystal form D according to any
one of claims 9-12 is 90% or more; or
based on the weight of the crystalline composition, the crystal form E according to any
one of claims 14-17 is 90% or more.

22. The crystalline composition according to claim 19, characterized in that,
based on the weight of the crystalline composition, the crystal form C according to any
one of claims 3-6 is 95% or more; or
based on the weight of the crystalline composition, the crystal form D according to any
one of claims 9-12 is 95% or more; or
based on the weight of the crystalline composition, the crystal form E according to any
one of claims 14-17 is 95% or more.

23. A pharmaceutical composition, characterized in that, it comprises the maleate of the
compound of formula I according claim 1 or 2, the crystal form C according to any one
of claims 3-6, the crystal form D according to any one of claims 9-12, the crystal form E
according to any one of claims 14-17, or the crystalline composition according to any
one of claims 19-22 or any combination thereof in an effective amount.

24. Use of the maleate of the compound of formula I according to claim 1 or 2, the
crystal form C according to any one of claims 3-6, the crystal form D according to any
one of claims 9-12, the crystal form E according to any one of claims 14-17, the
crystalline composition according to any one of claims 19-22 or the pharmaceutical
composition according to claim 23 for the manufacture of a medicament for treating
Toll-like receptor 7 associated disease, wherein the Toll-like receptor 7 associated
disease is a virus infection.

25. The use according to claim 24, characterized in that, the virus infection is hepatitis B
or hepatitis C virus infection.