Claims

1. A crystal form of (+)-tetrabenazine having an X-ray diffraction spectrum comprising peaks at diffraction 2θ angels of 8.6±0.2°, 14.1±0.2°, 15.0±0.2°, 17.3±0.2°, 22.6±0.2°, and 23.1±0.2°.
2. The crystal form of (+)-tetrabenazine according to claim 1, being Form 1 having an X-ray diffraction spectrum comprising peaks at diffraction 2θ angels of 6.5±0.2°, 8.6±0.2°, 12.1±0.2°, 14.1±0.2°, 15.0±0.2°, 16.5±0.2°, 17.3±0.2°, 17.9±0.2°, 22.6±0.2°, and 23.1±0.2°.
3. The crystal form of (+)-tetrabenazine according to claim 1 or 2, being Form 1 having an X-ray diffraction spectrum substantially as shown in FIG. 1A or FIG. 1B.
4. The crystal form of (+)-tetrabenazine according to claim 1, being Form 2 having an X-ray diffraction spectrum comprising peaks at diffraction 2θ angels of 8.6±0.2°, 12.1±0.2°, 14.1±0.2°, 15.0±0.2°, 17.3±0.2°, 17.9±0.2°, 22.6±0.2°, and 23.1±0.2°.
5. The crystal form of (+)-tetrabenazine according to claim 1 or 4, being Form 2 having an X-ray diffraction spectrum substantially as shown in FIG. 2A or FIG. 2B.
6. The crystal form of (+)-tetrabenazine according to claim 1 or 4 or 5, being Form 2 having a differential scanning calorimetry scan spectrum comprising an endothermic peak at 115±5°C.
7. The crystal form of (+)-tetrabenazine according to any one of claims 1 and 4-6, being Form 2 having a thermogravimetric analysis profile substantially as shown in FIG. 13A or FIG. 13B or FIG. 13C.
8. The crystal form of (+)-tetrabenazine according to any one of claims 1 and 4-7, being Form 2 having a particle size of D50 ranging from 1 μm to 200 μm, more preferably ranging from 5 μm to 150 μm, and still more preferably ranging from 10 μm to 100 μm.
9. The crystal form of (+)-tetrabenazine according to any one of claims 1 and 4-8, being Form 2 having a response angle less than 46±5 degree.
10. A process of making a crystal form of (+)-tetrabenazine having an X-ray diffraction spectrum comprising peaks at diffraction 2θ angles of 8.6±0.2°, 14.1±0.2°, 15.0±0.2°, 17.3±0.2°, 22.6±0.2°, 23.1±0.2°, comprising: allowing (+)-tetrabenazine to crystallize from a solvent selected from the group consisting of isopropyl alcohol (IPA), ethanol,

acetone, ethyl acetate (EA), isopropyl acetate (IPAc), methyl tert-butyl ether (MTBE), N-methyl-2-pyrrolidone (NMP), water, a mixture or combination thereof.

11. The process according to claim 10, wherein the crystal form is Form 2 having an X-ray diffraction spectrum comprising peaks at diffraction 2θ angels of 8.6±0.2°, 12.1±0.2°, 14.1±0.2°, 15.0±0.2°, 17.3±0.2°, 17.9±0.2°, 22.6±0.2°, and 23.1±0.2°.
12. The process according to claim 10 or 11, wherein the crystal form is Form 2 having an X-ray diffraction spectrum substantially as shown in FIG. 2A or FIG. 2B.
13. The process according to any one of claims 10-12, wherein (+)-tetrabenazine is allowed to crystallize at a temperature of from -15°C to 40°C.
14. A pharmaceutical composition comprising a pharmaceutically acceptable carrier and a crystal form of (+)-tetrabenazine having an X-ray diffraction spectrum comprising peaks at diffraction 2θ angles of 8.6±0.2°, 14.1±0.2°, 15.0±0.2°, 17.3±0.2°, 22.6±0.2°, 23.1±0.2.
15. The pharmaceutical composition according to claim 14, wherein the crystal form is Form 1 having an X-ray diffraction spectrum comprising peaks at diffraction 2θ angels of 6.5±0.2°, 8.6±0.2°, 12.1±0.2°, 14.1±0.2°, 15.0±0.2°, 16.5±0.2°, 17.3±0.2°, 17.9±0.2°, 22.6±0.2°, and 23.1±0.2°.
16. The pharmaceutical composition according to any one of claims 14-15, wherein the pharmaceutically acceptable carrier comprises a biodegradable polymer selected from the group consisting of a homopolymer polylactide or polylatic acid (PLA), a copolymer poly (lactic acid-co-glycolic acid) or poly (lactide-co-glycolide) (PLGA), and a combination thereof, preferably, wherein the PLGA has a monomer ratio of lactide:glycolide (or lactic acid:glycolic acid) between 50:50 and 99:1 inclusive.
17. The pharmaceutical composition according to any one of claims 16, wherein the pharmaceutically acceptable carrier further comprises a pharmaceutically acceptable organic solvent selected from the group consisting of N-methyl-2-pyrrolidone, 2-pyrrolidone, N,N-dimethylformamide, dimethyl sulfoxide, benzyl alcohol, benzyl benzoate, triacetin, and combinations thereof.
18. The pharmaceutical composition according to any one of claims 14-17, wherein the pharmaceutically acceptable carrier comprises a biodegradable, hydrophobic, non-polymeric carrier, preferably selected from a group of biodegradable sugar derivative, and

more preferably, the biodegradable, non-polymeric, hydrophobic sugar derivative is sucrose acetate isobutyrate (SAIB).