sonic energy source has a frequency between about 18 kHx and about 22 kHz, or about 20 kHz.

The methods may further comprise:

(e) receiving the plurality of particles through the outlet of the pressurizable chamber; and

(f) collecting the plurality of particles in a collection device.

In one embodiment, the compound is a taxane. The method of any one of claims 30-35 wherein the compound is a taxane. Exemplary taxanes may include paclitaxel, docetaxel, cabazitaxel, taxadiene, baccatin III, taxchinin A, brevifoliol, and taxuspine D, or a pharmaceutically acceptable salt thereof. In a specific embodiment, the taxane is selected from the group consisting of paclitaxel, docetaxel, and cabazitaxel, or a pharmaceutically acceptable salt thereof. In one embodiment, the solvent is selected from the group consisting of acetone, ethanol, methanol, dichloromethane, ethyl acetate, chloroform, acetonitrile, and suitable combinations thereof. In various embodiments, the compressed fluid and/or the anti-solvent may be super critical carbon dioxide. In one embodiment, the compound is paclitaxel and the solvent comprises acetone. In another embodiment, the compound is docetaxel and the solvent comprises ethanol. In a further embodiment, the method is carried out between 3 1.1°C to about 60°C, and at between about 1071 psi and about 1800 psi.

The invention also provides compound particles prepared by the method of any embodiment or combination of embodiments of the invention.

In another aspect, there is provided a composition,

comprising particles including at least 95% by weight of a taxane selected from the group consisting of paclitaxel or docetaxel, or a pharmaceutically acceptable salt thereof, wherein the paclitaxel particles have a bulk density of between 0.060 g/cm^3 and 0.11 g/cm^3 and a specific surface area (SSA) of between 22 m^2/g and 40 m^2/g, and the docetaxel particles have a bulk density of between 0.06 g/cm^3 and 0.1 g/cm^3 and a SSA of between 40 m^2/g and 50 m^2/g,

wherein the bulk density is the mass of the totality of particles in the composition divided by the total volume they occupy when poured into a graduated cylinder; and

wherein the SSA is the total surface area of the taxane particle per unit of taxane mass as measured by the Brunauer–Emmett–Teller ("BET") isotherm.

In another aspect, there is provided a use of the composition as described herein in the manufacture of a medicament for treating a tumor.

Brief Description of the Figures

Figure 1 is an electron micrograph of exemplary paclitaxel particles of the invention.

Figure 2 is an electron micrograph of raw paclitaxel particles.

Figure 3 illustrates a cross-section view of an example nozzle assembly, according to an example embodiment.

Figure 4 illustrates a cross-section view of another example nozzle assembly, according to an example embodiment.

Figure 5 illustrates a perspective view of a particle collection device, according to an example embodiment.

Figure 6 illustrates a top view of the particle collection device, according to an example embodiment.

Figure 7 illustrates a cross-section view of the particle collection device, according to an example embodiment.

We claim

1. A composition, comprising particles including at least 95% by weight of a taxane selected from the group consisting of paclitaxel or docetaxel, or a pharmaceutically acceptable salt thereof, wherein the paclitaxel particles have a bulk density of between 0.060 g/cm^3 and 0.11 g/cm^3 and a specific surface area (SSA) of between 22 m^2/g and 40 m^2/g, and the docetaxel particles have a bulk density of between 0.06 g/cm^3 and 0.1 g/cm^3 and a SSA of between 40 m^2/g and 50 m^2/g,

wherein the bulk density is the mass of the totality of particles in the composition divided by the total volume they occupy when poured into a graduated cylinder; and

wherein the SSA is the total surface area of the taxane particle per unit of taxane mass as measured by the Brunauer–Emmett–Teller ("BET") isotherm .

2. The composition of claim 1, wherein the taxane is paclitaxel or a pharmaceutically acceptable salt thereof.

3. The composition of claim 2, wherein the paclitaxel particles have a SSA of between 25 m^2/g and 40 m^2/g, 30 m^2/g and 40 m^2/g, or between 35 m^2/g and 40 m^2/g.

4. The composition of any one of claims 2-3, wherein at least 40% (w/w) of the paclitaxel is dissolved in 30 minutes or less in a solution of 50% methanol /50% water (v/v) at 37°C and pH 7.0 in a USP II paddle apparatus operating at 75 RPM.

5. The composition of claim 1, wherein the taxane is docetaxel or a pharmaceutically acceptable salt thereof.

6. The composition of claim 5, wherein the docetaxel particles have a SSA of between 43 m^2/g and 46 m^2/g.

7. The composition of any one of claims 5-6, wherein at least 20% (w/w) of the docetaxel is dissolved in 30 minutes or less in a solution of 15% methanol /85% water (v/v) at 37°C and pH 7.0 in a USP II paddle apparatus operating at 75 RPM.

8. The composition of any one of claims 1-7, wherein the particles have a mean particle size of between 0.4 μm and 1.2 μm, or between 0.6 μm and 1.0 μm.

9. The composition of any one of claims 1-8, wherein the particles are uncoated and exclude polymer, protein, polyethoxylated castor oil and polyethylene glycol glycerides composed of mono-, di- and triglycerides and mono- and diesters of polyethylene glycol.

10. The composition of any one of claims 1-9, wherein the composition comprises a suspension further comprising a pharmaceutically acceptable aqueous carrier.

11. The composition of any one of claims 1-10, further comprising one or more components selected from the group consisting of polysorbate, methylcellulose, polyvinylpyrrolidone, mannitol, and hydroxypropyl methylcellulose.

12. The composition of any one of claims 1-11, wherein the particles comprise at least 98% of the taxane.

13. Use of the composition of any one of claims 1-12 in the manufacture of a medicament for treating a tumor.

14. The use of claim 13, wherein the tumor is selected from the group consisting of a breast tumor, an ovarian tumor, a lung tumor, a bladder tumor, a prostate tumor, a bone tumor, a stomach tumor and a pancreatic tumor.

15. The use of claim 13 or 14, wherein the medicament is to be administered intraperitoneally.

16. The use of claim 15, wherein the medicament is to be administered by perfusion or as a bolus into the peritoneal cavity.