has a desired viscosity suitable for storage under refrigerated conditions and/or delivery (*e.g.*, delivered via a pump) at room temperature (*e.g.*, ~20°C to ~25°C).

[0009] In another aspect, the present disclosure relates to methods of manufacturing a pharmaceutical composition of the invention, in particular a high concentration pharmaceutical composition as disclosed, for example, in Example 1 and Figure 1 below.

[0009a] In another aspect, the present disclosure relates to a pharmaceutical composition comprising a levodopa active agent and a carbidopa active agent for intraduodenal administration wherein the levodopa active agent and the carbidopa active agent are suspended in an aqueous carrier, characterized in that the levodopa active agent and the carbidopa active agent in the carrier has a high shear viscosity of no more than about 4500 cps at room temperature and a low shear viscosity of no less than about 45000 cps under refrigerated conditions and a ratio of low shear viscosity to high shear viscosity of not less than 10.

[0009b] In another aspect, the present disclosure relates to a pharmaceutical dosage form comprising the pharmaceutical composition of any one of the previous claims in a disposable drug reservoir having an oxygen impermeable enclosure disposed therein, wherein the oxygen impermeable enclosure is purged with an inert gas and an oxygen scavenger is added.

[0009c] In another aspect, the present disclosure relates to a method of preparing the pharmaceutical composition as described herein, wherein the method comprises:

adding a levodopa active agent and a carbidopa active agent to water to form a slurry;

adding the slurry to one or more suspending agents to form a suspension; and

subjecting the suspension to N_2 sparging.

[0009d] In another aspect, the present disclosure relates to use of a pharmaceutical composition comprising a levodopa active agent and a carbidopa active agent for intraduodenal administration in the manufacture of a medicament for treating Parkinson's disease, wherein the levodopa active agent and carbidopa active agent are suspended in an aqueous carrier, characterized in that the levodopa active agent and the carbidopa active agent in the carrier has a high shear viscosity of no more than about 4500 cps at room temperature and a low shear viscosity of no less than about 45000 cps under refrigerated conditions and a ratio of low shear viscosity to high shear viscosity of not less than 10.

[0009e] In another aspect, the present disclosure relates to a kit comprising the pharmaceutical composition as described herein.

[0009f] In another aspect, the present disclosure relates to a kit comprising the pharmaceutical dosage form as described herein.

[0010] These and additional embodiments of the invention are further described herein.

[0011] Further benefits of the present disclosure will be apparent to one skilled in the art from reading this patent application. The embodiments of the disclosure described in the following paragraphs are intended to illustrate the invention and should not be deemed to narrow the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Figure 1 is a manufacturing process flowchart for producing an exemplary pharmaceutical formulation of the invention.

[0013] Figure 2 shows the L-Dopa blood level time-concentration profile in mini-pigs of an exemplary pharmaceutical composition of the invention as against two comparators, all given in a six-hour continuous infusion.

[0014] Figure 3 shows the carbidopa blood level time-concentration profile in mini-pigs of an exemplary pharmaceutical composition of the invention as against two comparators, all given in a six-hour continuous infusion.

[0015] Figure 4 shows average levodopa plasma concentrations in 12 human subjects at various time points post administration.

[0016] Figure 5 shows average carbidopa plasma concentrations in 12 human subjects at various time points post administration.

21. The pharmaceutical composition according to any one of claims 1–13 prepared by:

adding a levodopa active agent and a carbidopa active agent to water to form a slurry;

adding the slurry to one or more suspending agents to form a suspension; and

subjecting the suspension to N_2 sparging.

22. The pharmaceutical composition according to claim 21 further comprising loading the suspension into a lower oxygen permeability container.

23. The pharmaceutical composition according to claim 21 or 22, wherein, prior to forming the suspension, the levodopa active agent has a particle size distribution of:

(i) D50 less than or equal to about 5 μm;

(ii) D90 less than or equal to about 11 μm; and

(iii) D100 less than or equal to about 22 μm; and

the carbidopa active agent has a particle size distribution of:

(i) D50 less than or equal to about 3 μm;

(ii) D90 less than or equal to about 7 μm; and

(iii) D100 less than or equal to about 21 μm.

24. The pharmaceutical composition according to any one of claims 21–23, wherein the suspending agent is selected from the group consisting of hydroxypropylcellulose, hydroxymethylcellulose, and sodium carboxymethyl cellulose.

25. The pharmaceutical composition according to any one of claims 21–24, wherein the suspending agent is an acrylic acid-based polymer.

26. Use of a pharmaceutical composition comprising a levodopa active agent and a carbidopa active agent for

intraduodenal administration in the manufacture of a medicament for treating Parkinson's disease, wherein the levodopa active agent and carbidopa active agent are suspended in an aqueous carrier, characterized in that the levodopa active agent and the carbidopa active agent in the carrier has a high shear viscosity of no more than about 4500 cps at room temperature and a low shear viscosity of no less than about 45000 cps under refrigerated conditions and a ratio of low shear viscosity to high shear viscosity of not less than 10.

27. The use according to claim 26, wherein the medicament is to be substantially continuously administered for a period of at least about 16 hours.

28. The use according to claim 27, wherein the medicament is to be substantially continuously administered for a period of at least about 24 hours.

29. The use according to any one of claims 26–28, wherein the pharmaceutical composition comprises:

a levodopa active agent in an amount of about 4.0 weight /weight percent of the total composition; and

a carbidopa monohydrate active agent in an amount of about 1.0 weight/weight percent of the total composition.

30. The use according to any one of claims 26–29, wherein the pharmaceutical composition is to be administered in a pharmaceutical dosage form according to claim 14.

31. The use according to any one of claims 26–30, wherein the aqueous carrier comprises one or more polymer-based suspending agent.

32. The use according to claim 31, wherein the one or more polymer-based suspending agent is selected from the group consisting of hydroxypropylcellulose, hydroxymethylcellulose, and sodium carboxymethyl cellulose.

33. The use according to claim 32, wherein the one or more polymer-based suspending agent is sodium carboxymethyl cellulose.

34. The use according to claim 31, wherein the one or more polymer-based suspending agent is an acrylic acid-based polymer

35. A kit comprising the pharmaceutical composition of any one of claims 1–13.

36. A kit comprising the pharmaceutical dosage form of any one of claims 14 or 15.