SUMMARY

In one aspect, there is provided a self-preserved oil dispersion including a dispersed oil phase, an aqueous phase and at least one surfactant, wherein said oil dispersion comprises boric acid or salt thereof, in an amount ranging from 0.005% to 0.075% in weight of the total weight of the oil dispersion, wherein said amount of boric acid or salt thereof is a preservative effective amount so that the oil dispersion is self-preserved, and wherein the dispersion is free of methylchloroisothiazolinone, methylisothiazolinone, polyquaternium, benzalkonium chloride and sorbic acid~~conventional preservative agent~~. ~~The dispersion may be free of sorbic acid.~~

According to one embodiment, the oil dispersion of the disclosure has a sufficient preservative activity to comply with USP and/or Ph. Eur. preservative efficacy requirements, said pharmacopeias being herein incorporated by reference. In an embodiment, compliance with USP and/or Ph. Eur. means that the dispersion shall have sufficient preservative activity to inhibit the growth and decrease the population of Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus, Candida albicans, Aspergillus niger or Aspergillus.

According to one embodiment, the oil dispersion of the disclosure is an oil-in-water emulsion.

According to one embodiment, the amount of boric acid in the oil dispersion of the disclosure ranges from 0.008 to 0.05%, preferably from 0.01 to 0.05%, more preferably from 0.01 to 0.02% w/w.

According to one embodiment, boric acid, in the meaning of this disclosure, include any form of boric acid or salt thereof, especially sodium borate, sodium metaborate, calcium borate, borax, tricopper diborate, trioleyl borate, lithium borate, tris(trimethylsilyl) borate, ethyl borate, potassium tetrafluoroborate, disodium dihydrogen borate, manganese borate, oleyl borate, tripentyl borate, tributyl borate, trimethyl borate, tridodecyl borate, triazanium borate or a mixture thereof.

According to one embodiment, the oil phase comprises an oil selected from mineral oil such as petrolatum or liquid paraffin; medium chain triglycerides (MCT); triglycerides oils, vegetable oils such as castor oil, corn oil, olive oil, soybean oil, sesame oil, cotton seed oil, sweet almond oil or any suitable vegetable oil; fatty acid, isopropyl myristate,

cholinesterase inhibitors such as physostigmine, echothiophate; antivirals, such as idoxuridine, trifluorotymidine, acyclovir, valaciclovir, ganciclovir, cidofovir and interferon; antibiotics such as aminoglycosides, carbacephem, carbapenems, cephalosporins, glycopeptides, penicillins, polypeptides, quinolones, sulfonamides, tetracyclines, chlortetracycline, bacitracin, neomycin, polymyxin, gramicidin, cephalexin, oxytetracycline, chloramphenicol, kanamycin, rifampicin, tobramycin, gentamycin, ciprofloxacin, aminosides, erythromycin, ceftazidime, vancomycine, imipeneme; antifungals such as polyene antibiotics, azole derivatives, imidazole, triazole, allylamines, amphotericin B and miconazole; antibacterials such as sulfonamides, sulfadiazine, sulfacetamide, sulfamethizole and sulfisoxazole, nitrofurazone and sodium propionate; and/or their derivatives; and/or their prodrugs; and/or their precursors; and/or acceptable salts thereof; alone or in combination.

In another aspect, there is provided an oil dispersion as defined above for use in the treatment of an eye disease or eye condition.

In another aspect, there is provided a process of manufacturing of an oil dispersion as defined above, comprising the steps of emulsifying and mixing the aqueous phase and the oil phase with surfactant.

In another aspect, there is provided a multi-dose container including the oil dispersion as defined above. The present disclosure also relates to a mono-dose container including the oil dispersion of the disclosure.

In another aspect, there is provided use of boric acid or salt thereof in an oil dispersion, in an amount ranging from 0.005% to 0.075% in weight of the total weight of the oil dispersion as a preservation promoter.

DEFINITIONS

In the present invention, the following terms have the following meanings:

- "**a composition with a preservative activity**" or "**a preserved composition**" refers to a composition that is protected from microbial and/or fungal contamination

CLAIMS

1. An oil dispersion including a dispersed oil phase, an aqueous phase and at least one surfactant, wherein said oil dispersion comprises boric acid or salt thereof, in an amount ranging from 0.005% to 0.075% in weight of the total weight of the oil dispersion, wherein said amount of boric acid or salt thereof is a preservative effective amount so that the oil dispersion is self-preserved, and wherein the dispersion is free of methylchloroisothiazolinone, methylisothiazolinone, polyquaternium, benzalkonium chloride and sorbic acid~~conventional preservative agents~~.

2. The oil dispersion according to claim **1**, having sufficient preservative activity to comply with USP and/or Ph. Eur. preservative efficacy requirements.

3. The oil dispersion according to claim **1** or claim **2**, wherein the dispersion is an oil-in-water emulsion.

4. The oil dispersion according to anyone of claims **1** to **3**, wherein the amount of boric acid or salt thereof ranges from 0.008 to 0.05%, preferably from 0.01 to 0.05%, more preferably from 0.01 to 0.02% w/w.

5. The oil dispersion according to anyone of claims **1** to **4**, wherein boric acid or salt thereof is~~in the form of~~ boric acid~~ or salt thereof~~, ~~especially~~ sodium borate, sodium metaborate, calcium borate, borax, tricopper diborate, trioleyl borate, lithium borate, tris(trimethylsilyl) borate, ethyl borate, potassium tetrafluoroborate, disodium dihydrogen borate, manganese borate, oleyl borate, tripentyl borate, tributyl borate, trimethyl borate, tridodecyl borate, triazanium borate or a mixture thereof.

6. The oil dispersion according to anyone of claims **1** to **5**, wherein the oil phase comprises an oil selected from mineral oil such as petrolatum or liquid paraffin; medium chain triglycerides (MCT); triglycerides oils, vegetable oils such as castor oil, corn oil, olive oil, soybean oil, sesame oil, cotton seed oil, sweet almond oil or any suitable vegetable oil; fatty acid, isopropyl myristate, oily fatty alcohols, esters of sorbitol and fatty acids, oily sucrose esters or a mixture thereof.

7. The oil dispersion according to anyone of claims **1** to **6**, comprising a cationic surfactant.

acyclovir, valaciclovir, ganciclovir, cidofovir and interferon; antibiotics such as aminoglycosides, carbacephem, carbapenems, cephalosporins, glycopeptides, penicillins, polypeptides, quinolones, sulfonamides, tetracyclines, chlortetracycline, bacitracin, neomycin, polymyxin, gramicidin, cephalexin, oxytetracycline, chloramphenicol, kanamycin, rifampicin, tobramycin, gentamycin, ciprofloxacin, aminosides, erythromycin, ceftazidime, vancomycine, imipeneme; antifungals such as polyene antibiotics, azole derivatives, imidazole, triazole, allylamines, amphotericin B and miconazole; antibacterials such as sulfonamides, sulfadiazine, sulfacetamide, sulfamethizole and sulfisoxazole, nitrofurazone and sodium propionate; and/or their derivatives; and/or their prodrugs; and/or their precursors; and/or acceptable salts thereof; alone or in combination.

13. An oil dispersion according to anyone of claims **1** to **12**, for use in the treatment of an eye disease or eye condition.

14. A process of manufacturing of an oil dispersion according to anyone of claims **1** to **13**, comprising the steps of emulsifying and mixing the aqueous phase and the oil phase with surfactant.

15. A multi-dose container including the oil dispersion according to anyone of claims **1** to **12**.

16. Use of boric acid or salt thereof in an oil dispersion, in an amount ranging from 0.005% to 0.075% in weight of the total weight of the oil dispersion, as a preservation promoter.