We claim:

1. A device (100) for forming small scale nanoparticle drug complexes from different liquids that are mixed in predefined proportion using a magnetic stirrer (110), the device (100) comprising:

a micromixer (102) positioned on the magnetic stirrer (110), the micromixer (102) made of PDMS (Polydimethylsiloxane) having a cylindrical chamber (118) including at least two inlets (112) and (114) for receiving liquids in the chamber (118) at top end portion thereof and an outlet (116) for collecting mixed liquids;

at least two syringes (108) mounted on a syringe pump (106) wherein a first syringe (108) being receivable in a first inlet (112) and a second syringe (108) being receivable in a second inlet (114) for injecting respective liquids into the chamber (118); and

a microactuator (104) defined by a PDMS (Polydimethylsiloxane) film with dispersed iron oxide nanoparticles, the microactuator (104) positioning centrally in the cylindrical chamber (118), the microactuator (104) magnetically activable by the magnetic stirrer (110), wherein

the magnetic stirrer (110) has a central axis that is coaxial to a central axis of the microactuator (104), and

the microactuator (104) being axially rotatable along the central axis of the microactuator (104) for mixing the liquids in the chamber (118) upon actuation of magnetic stirrer (110).

2. The device (100) for forming nanoparticle drug complexes as claimed in claim 1, wherein the first inlet (112), the second inlet (114) and the outlet (116) have a length in the range of 3mm to 6mm.

3. The device (100) for forming nanoparticle drug complexes as claimed in claim 1, wherein the first inlet (112), the second inlet (114) and the outlet (116) have a diameter that is in the range of 200 to 500 µm.

4. The device (100) for forming nanoparticle drug complexes as claimed in claim 1, wherein the chamber (118) has a height in the range of 1mm to 3mm and a diameter in the range of 1mm to 4mm.

5. The device (100) for forming nanoparticle drug complexes as claimed in claim 1, wherein the first inlet (112) and second inlet (114) of the micromixer (102) are coupled to respective syringes (108) through tubules (120) that are further coupled to respective syringe pump (106).

6. The device for forming nanoparticle drug complexes as claimed in claim 1, wherein the micromixer (102) positioned on the magnetic stirrer (110) magnetically activates the microactuator (104) for mixing the liquids in the cylindrical chamber (118).

7. The device (100) for forming nanoparticle drug complexes of claim 1, wherein the magnetic microactuator (104) has predefined dimensions of 1mm × 0.2 mm × 0.3 mm.

8. The device (100) for forming nanoparticle drug complexes as claimed in claim 1, wherein flow rate controlled by syringe pump (106) and rotation of the microactuator (104) controlled by the magnetic stirrer (110).

9. A process for forming small scale nanoparticle drug complexes from at least two liquids that are mixed in predefined proportion using a magnetic stirrer (110) comprising:

positioning a micromixer (102) on the magnetic stirrer (110) such that a central axis of the magnetic stirrer (110) and a central axis of the a microactuator (104) are coaxial;

injecting a predefined quantity of a first liquid through a first inlet (112) in a cylindrical chamber (118) with a first syringe (108);

injecting a predefined quantity of a second liquid through a second inlet (114) in a cylindrical chamber (118) with a second syringe (108);

mixing the two liquids with the microactuator (104) that is activable by the magnetic stirrer (110); and

collecting uniformly mixed liquids through an outlet (116).

10. The process for forming small scale nanoparticle drug complexes as claimed in claim 9, wherein the quantity of the first liquid in the first syringe (108) being in a range of 10µ1 to 1 ml.

11. The process for forming small scale nanoparticle drug complexes as claimed in claim 9, wherein the quantity of the second liquid in the second syringe (108) being in a range of 10µ1 to 1 ml.

12. The process for forming small scale nanoparticle drug complexes as claimed in claim 9, wherein the first liquid in the first syringe (108) is a predefined drug dissolved in a solvent and the second liquid in the second syringe (108) is a colloidal suspension of predefined nanoparticles (NPs) in same or another solvent.

13. The process for forming small scale nanoparticle drug complexes as claimed in claim 9, wherein the quantity of the nanoparticle drug complexes being collected from the outlet (116) being in a range of 20 µ1 to 2 ml.

Dated this 12th day of June 2013.

For DEFENCE INSTITUTE OF ADVANCED TECHNOLOGY, (DEEMED UNIVERSITY)

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