CLAIMS

1. A drug delivery composition, wherein said composition comprises a drug and a polymer-degrading enzyme embedded into a polymer-based matrix, wherein said polymer-based matrix comprises at least one polymer with a molecular mass in weight (Mw) greater than 100,000 g/mol and wherein the polymer-degrading enzyme is able to degrade at least one polymer of the polymer-based matrix, wherein said composition is obtained by incorporation of said drug and said enzyme in said polymer-based matrix during heat treatment at a temperature T at which the polymer is in a partially or totally molten state.

2. A drug delivery composition of claim 1, wherein said composition comprises a drug and a polymer-degrading enzyme embedded into a polymer-based matrix, and wherein said composition comprises:

. from 50 to 99,98% by weight of polymer-based matrix,

. from 0.01 to 49.99% by weight of a drug, and

. from 0.01 to 30% by weight of the polymer-degrading enzyme.

3. The composition of claims 1 or 2, wherein the polymer-degrading enzyme is selected from proteases, esterases, cutinases, or lipases.

4. The composition of anyone of claims 1 to 3, wherein the polymer-based matrix contains at least one polymer selected from polylactic acid (PLA), polybutylene adipate terephthalate (PBAT), polyhydroxyalkanoate (PHA), polyglycolic acid (PGA), polybutylene succinate (PBS), polycaprolactone (PCL), poly(ethylene adipate) (PEA), dextrane, gelatin, poly butylene succinate adipate (PBSA), polydioxanone (PDS), polyethylene glycol (PEG), polyethylene oxide (PEO) or copolymers, and blends/mixtures thereof, preferably PLA, more preferably PLLA and/or PDLA.

5. The composition of anyone of claims 1 to 4, wherein the polymer-based matrix comprises lactic acid copolymers, preferably selected from PLA-based heteropolymers, more preferably selected from poly(lactic-co-glycolic acid) copolymers (PLA-co-PGA), poly(lactic-co-caprolactone) copolymers (PLA-co-PCL), poly(lactic-co-ethyleneglycol) copolymers (PLA-co-PEG), poly(lactic-co-ethylene oxide) copolymers (PLA-co-PEO) or grafted PLA (PLA-g-gelatine).

6. The composition according to anyone of claims 1 to 5, wherein the polymer-based matrix comprises PLA with a Mw greater than 100 000 g/mol, or a Mw greater than 150 000 g/mol, or a Mw of 180 000 g/mol.

7. The composition according to anyone of claims 1 to 6, wherein the polymer-based matrix comprises PLA, the degrading enzyme is a PLA-degrading enzyme and the drug is selected from compounds useful to manage alcohol or opioid dependence, nonsteroidal anti-inflammatory drugs, hormones and proteins.

8. The composition of anyone of claims 1 to 5, wherein the polymer-based matrix contains PCL and/or wherein the polymer-based matrix contains PGA.

9. The composition according to claim 8, wherein the polymer-based matrix consists on PCL, the polymer-degrading enzyme is a lipase PS, and the drug is selected from bone regenerative enzymes, anti-inflammatory agents, analgesic, anti-diabetics, hormone, cytokine, monoclonal antibody, antigen, contraceptive agent, anti-tumor agent, and anti-infectious agent.

10. The composition according to claim 8, wherein the polymer-based matrix consists on PGA, the polymer-degrading enzyme is an esterase, and the drug is selected from bone regenerative enzymes, anti-inflammatory agents, analgesic, anti-diabetics, hormone, cytokine, monoclonal antibody, antigen, contraceptive agent, anti-tumor agent, and anti-infectious agent.

11. The composition of anyone of claims 1 to 10, wherein the composition is a pharmaceutical composition, preferably selected from a tablet, gel, coating, particles, and microbeads.

12. Drug delivery device obtained from the drug delivery composition of anyone of claims 1 to 11.

13. The drug delivery device according to claim 12, wherein the device is a medical device, preferably selected from implant, film, stent, leaflet, valve, coil, scaffold, dressing, rod, patch, fibers, suture fibers, screw, bone plate or implant, bone cement and prostheses.

14. A process for preparing a drug delivery composition according to any one of claims 1 to 11, wherein said process comprises incorporating said drug and said enzyme into said polymer-based matrix during heat treatment of the polymer at a temperature T at which the polymer is in a partially or totally molten state.

15. The process of claim 14, wherein the drug and enzyme are incorporated at a temperature T between 50°C and 200°C, preferably between 60°C and 180°C, more preferably between 70°C and 160°C.

16. The process of claim 14 or 15, wherein the heat treatment is selected from extrusion, internal mixing, co-kneading, injection-molding, thermoforming, rotary molding, compression, calendering, ironing, coating, stratification, expansion, pultrusion, extrusion blow-molding, extrusion-swelling, compression-granulation and 3D printing, preferably an extrusion and 3D printing.

17. A medical drug delivery device obtainable by the process of anyone of claims 14 to 16.