Claims

1. Pharmaceutical dosage form comprising an active ingredient combination of nifedipine or nisoldipine and at least one angiotensin II antagonist and/or at least one diuretic, characterized in that nifedipine or nisoldipine is located in the core and the angiotensin II antagonist and/or the diuretic is located in a mantle coating around the core.

2. Pharmaceutical dosage form comprising an active ingredient combination of nifedipine or nisoldipine and at least one angiotensin II antagonist and/or at least one diuretic and at least one film-forming polymer, characterized in that nifedipine or nisoldipine is located in the core and the angiotensin II antagonist and/or the diuretic is located in a mantle coating around the core.

3. Pharmaceutical dosage form according to Claim 1 or 2, characterized in that nifedipine or nisoldipine is released in a controlled (modified) manner and the angiotensin II antagonist and/or the diuretic is released rapidly in the body.

4. Pharmaceutical dosage form according to any of Claims 1, 2 or 3, where the angiotensin II antagonist is selected from the group consisting of candesartan, losartan, telmisartan, irbesartan, embursartan, eprosartan, valsartan or olmesartan or one of the prodrugs of these angiotensin II antagonists.

5. Pharmaceutical dosage form according to Claim 4, where candesartan is employed in the form of candesartan cilexetil and olmesartan is employed in the form of olmesartan medoxomil.

6. Pharmaceutical dosage form according to one or more of Claims 1 to 5, where the diuretic is selected from the group consisting of acetazolamide, dichlorphenamide, methazolamide, furosemide, torasemide, bumetanide, etacrynic acid, piretanide, amiloride, triamterene, spironolactone, potassium canrenoate, eplerenone, hydrochlorothiazide, chlorthalidone, xipamide, metolazone, mefruside and indapamide.

7. Pharmaceutical dosage form according to one or more of Claims 1 to 6, characterized in that at least 85% of the nifedipine or nisoldipine (based on the declared total amount of the active ingredient in question) are released over a period of at least 4 and at most 24 hours and at least 70% of the angiotensin II antagonist and/or the diuretic (based on the declared total amount of the active ingredient in question) are released over a period of 30 minutes according to the USP release method using apparatus 2 (paddle)

8. Pharmaceutical dosage form according to one or more of Claims 1 to 7, characterized in that nifedipine or nisoldipine is employed in a minimum dose of 5 mg and a maximum dose of 90 mg and the angiotensin II antagonist is employed in a minimum dose of 2 mg and a maximum dose of 500 mg and/or the diuretic is employed in a minimum dose of 0.5 mg and a maximum dose of 500 mg.

9. Pharmaceutical dosage form according to one or more of Claims 1 to 8, characterized in that the core is an osmotic release system.

10. Pharmaceutical dosage form according to Claim 9, characterized in that the coat of the osmotic release systems consists of cellulose acetate or a mixture of cellulose acetate and polyethylene glycol.

11. Pharmaceutical dosage form according to one or more of Claims 1 to 10, characterized in that the mantle coating comprises at least one film-forming polymer suitable for the rapid release of active ingredients.

12. Pharmaceutical dosage form according to Claim 11, characterized in that the film-forming polymer is selected from the group of the cellulose derivatives comprising methylcellulose (MC), hydroxymethylpropylcellulose (HPMC), hydroxypropylcellulose (HPC), carboxymethylcellulose-sodium (Na-CMC), hydroxyethylcellulose (HEC) and mixtures thereof, or from the group of the synthetic polymers comprising polyvinylpyrrolidone (povidone, PVP), vinylpyrrolidone-vinyl acetate copolymer (copovidone), polyvinyl alcohol (PVA), polyvinyl acetate (PVAc), partially hydrolyzed polyvinyl alcohol, polyvinyl alcohol-polyethylene glycol copolymers (PVA-co-PEG) and mixtures thereof.

13. Pharmaceutical dosage form according to Claim 12, characterized in that the film-forming polymer is selected from the group comprising polyvinyl alcohol (PVA), polyvinyl acetate (PVAc), partially hydrolyzed polyvinyl alcohol, polyvinyl alcohol-polyethylene glycol copolymers (PVA-PEG copolymer) and mixtures thereof.

14. Pharmaceutical dosage form according to one or more of Claims 1 to 13, characterized in that in the mantle coating the proportion of angiotensin II antagonist and/or diuretic is from 10 to 50%, based on the dry weight of the mantle coating.

15. Pharmaceutical dosage form according to one or more of Claims 1 to 14, characterized in that the weight of the mantle coating in the dosage form according to the invention is from 20 to 300 mg.

16. Pharmaceutical dosage form according to one or more of Claims 1 to 15, characterized in that the thickness of the mantle coating is from 50 to 1500 µm.

17. Process for preparing a pharmaceutical dosage form according to one or more of Claims 1 to 16, characterized in that an aqueous coating suspension comprising at least one angiotensin II antagonist and/or at least one diuretic, at least one film-forming polymer and, if appropriate, further excipients, is sprayed onto the cores at an incoming air temperature of from 40 to 70°C.

The claims defining the invention are as follows:

1. A pharmaceutical dosage form comprising an active ingredient combination of nifedipine or nisoldipine and at least one angiotensin II antagonist and/or at least one diuretic, wherein the nifedipine or nisoldipine is located in the core of the dosage form, and the angiotensin II antagonist and/or the diuretic is located in a mantle coating surrounding the core, and wherein (i) the nifedipine or nisoldipine is released in a controlled manner and the angiotensin II antagonist and/or the diuretic is released rapidly; (ii) the core is an osmotic release system, and (iii) the mantle coating comprises at least one film-forming polymer suitable for the rapid release of an active ingredient.

2. The pharmaceutical dosage form according to Claim 1, where the angiotensin II antagonist is selected from the group consisting of: candesartan, losartan, telmisartan, irbesartan, embursartan, eprosartan, valsartan, olmesartan, and prodrugs thereof.

3. The pharmaceutical dosage form according to Claim 2, wherein candesartan is present in the form of candesartan cilexetil, and olmesartan is present in the form of olmesartan medoxomil.

4. The pharmaceutical dosage form according to any one of Claims 1 to 3, wherein the diuretic is selected from the group consisting of: acetazolamide, dichlorphenamide, methazolamide, furosemide, torasemide, bumetanide, etacrynic acid, piretanide, amiloride, triamterene, spironolactone, potassium canrenoate, eplerenone, hydrochlorothiazide, chlorthalidone, xipamide, metolazone, mefruside and indapamide.

5. The pharmaceutical dosage form according to any one of Claims 1 to 4, wherein at least 85% of the nifedipine or nisoldipine (based on the total amount of the active ingredient) is released over a period of at least 4 and at most 24 hours, and at least 70% of the angiotensin II antagonist and/or the diuretic (based on the total amount of the active ingredient) are released over a period of 30 minutes, according to the USP release method using apparatus 2 (paddle)

6. The pharmaceutical dosage form according to any one of Claims 1 to 5, wherein nifedipine or nisoldipine is present in a minimum dose of 5 mg and a maximum dose of 90 mg, and the angiotensin II antagonist is present in a minimum dose of 2 mg and a maximum dose of 500 mg, and/or the diuretic is present in a minimum dose of 0.5 mg and a maximum dose of 500 mg.

7. The pharmaceutical dosage form according to any one of Claims 1 to 6, wherein the mantle coating consists of cellulose acetate or a mixture of cellulose acetate and polyethylene glycol.

8. The pharmaceutical dosage form according to any one of Claims 1 to 7, wherein the film-forming polymer is selected from the group consisting of: cellulose derivatives comprising methylcellulose (MC), hydroxymethylpropylcellulose (HPMC), hydroxypropylcellulose (HPC), carboxymethylcellulose-sodium (Na-CMC), hydroxyethylcellulose (HEC) and mixtures thereof, synthetic polymers comprising polyvinylpyrrolidone (povidone, PVP), vinylpyrrolidone-vinyl acetate copolymer (copovidone), polyvinyl alcohol (PVA), polyvinyl acetate (PVAc), partially hydrolyzed polyvinyl alcohol, polyvinyl alcohol-polyethylene glycol copolymers (PVA-co-PEG) and mixtures thereof.

9. The pharmaceutical dosage form according to Claim 8, wherein the film-forming polymer is selected from the group consisting of: polyvinyl alcohol, polyvinyl acetate, partially hydrolyzed polyvinyl alcohol, polyvinyl alcohol-polyethylene glycol copolymers (PVA-PEG copolymer) and mixtures thereof.

10. The pharmaceutical dosage form according to Claim 9, wherein the film-forming polymer is partially hydrolyzed polyvinyl alcohol.

11. The pharmaceutical dosage form according to any one of Claims 1 to 10, wherein in the mantle coating, the proportion of angiotensin II antagonist and/or diuretic is from 10 to 50% based on the dry weight of the coating.

12. The pharmaceutical dosage form according to any one of Claims 1 to 11, wherein the weight of the mantle coating in the dosage form is from 20 to 300 mg.

13. The pharmaceutical dosage form according to any one of Claims 1 to 12, wherein the thickness of the mantle coating is from 50 to 1500 µm.

14. The pharmaceutical dosage form according to any one of claims 1 to 13, wherein the angiotensin II antagonist is candesartan.

15. The pharmaceutical dosage form according to claim 14, wherein the candesartan is in the form of candesartan cilexetil.

16. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 20 mg, and candesartan in an amount of 4 mg.

17. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 20 mg, and candesartan in an amount of 8 mg.

18. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 20 mg, and candesartan in an amount of 16 mg.

19. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 20 mg, and candesartan in an amount of 32 mg.

20. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 30 mg and candesartan in an amount of 4 mg.

21. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 30 mg and candesartan in an amount of 8 mg.

22. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 30 mg and candesartan in an amount of 16 mg.

23. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 30 mg, and candesartan in an amount of 32 mg.

24. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 60 mg, and candesartan in an amount of 4 mg.

25. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 60 mg and candesartan in an amount of 8 mg.

26. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 60 mg, and candesartan in an amount of 16 mg.

27. The pharmaceutical dosage form according to claim 14, comprising nifedipine in an amount of 60 mg, and candesartan in an amount of 32 mg.

28. A pharmaceutical dosage form according to any one of claims 1 to 27, wherein the osmotic release system is an osmotic single-chamber system.

29. A pharmaceutical dosage form according to any one of claims 1 to 27, wherein the osmotic release system is an osmotic double-chamber system.

30. A pharmaceutical dosage form according to claim 29, wherein the osmotic release system is an osmotic two-chamber system comprising:

a core having an active ingredient layer, comprising

- 5 to 50% of nifedipine or nisoldipine,
- 40 to 95% of one or more osmotically active polymers,

and an osmosis layer, comprising

- 40 to 95% of one or more osmotically active polymers,
- 5 to 40% of an osmotically active additive,

and a coat consisting of a water-permeable material which is impermeable for the components of the core, the coat having at least one orifice.

31. A process for preparing a pharmaceutical dosage form as defined in any one of Claims 1 to 30, the process comprising: spraying onto the core at an incoming air temperature of 40°C to 70°C an aqueous coating suspension comprising at least one angiotensin II antagonist and/or at least one diuretic, at least one film-forming polymer and, optionally, further excipients.

32. Use of the pharmaceutical dosage form according to any one of claims 1 to 30 , for the preparation of a medicament for prophylaxis, secondary prophylaxis or treatment of cardiovascular disorders.

33. Use of the pharmaceutical dosage form according to any one of claims 1 to 30 , for the preparation of a medicament for prophylaxis, secondary prophylaxis or treatment of hypertension.