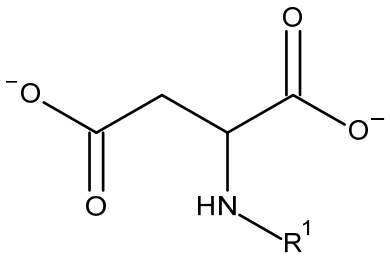
CLAIMS

1. Use of a metal-organic framework (MOF) in the manufacture of a medicament for the treatment or prevention of hyperphosphatemia, wherein the medicament is to be administered orally, and

the MOF consists essentially of a plurality of metal ions each coordinated to a plurality of organic ligands,

wherein the plurality of metal ions comprises Zr^{4+} ions, Fe^{3+} ions, or a combination of Zr^{4+} and Fe^{3+} ions, and

the plurality of organic ligands are selected from one or more members of the group consisting of a compound according to formula (I):



(I)

wherein,

R^1 is selected from the group consisting of H and -C(O)C_{1-6}alkyl, wherein said C_{1-6}alkyl is optionally substituted by 1, 2 or 3 halogens;

a C_{2-6}alkane substituted by two carboxylate groups; a C_{4-6}alkene substituted by two carboxylate groups; a benzenedicarboxylate; a benzenetricarboxylate; a 5-6 membered heteroaromatic ring comprising 1 or 2 atoms selected from the group consisting of N, S and O, wherein said heteroaromatic ring is substituted by two carboxylate groups; cyclohexane substituted by two carboxylate groups; and cystinate;

or a pharmaceutically acceptable salt or solvate thereof.

2. The use according to claim 1, wherein R^1 is selected from the group consisting of H and -C(O)C_{1-4}alkyl.

3. The use according to claim 1 or 2, wherein the plurality of organic ligands are selected from one or more members of the group consisting of a compound according to formula (I), fumarate, terephthalate, succinate, adipate, trimesate, pyridinedicarboxylate, cyclohexanedicarboxylate, and cystinate.

4. The use according to any one of claims 1 to 3, wherein the plurality of organic ligands are selected from one or more members of the group consisting of aspartate, *N*-acetyl aspartate, terephthalate, and fumarate.

5. The use according to any one of claims 1 to 4, wherein the plurality of metal ions consists of Zr^{4+}, and the plurality of organic ligands are selected from one or more members of the group consisting of aspartate and *N*-acetyl aspartate.

6. The use according to claim 5, wherein the MOF has a molecular formula according to $[Zr_6O_4(OH)_4(\text{aspartate})_6]$.

7. The use according to claim 5, wherein the MOF has a molecular formula according to $[Zr_6O_4(OH)_4(\textit{N}\text{-acetyl aspartate})_6]$.

8. The use according to claim 1, wherein the plurality of metal ions consists of Fe^{3+} ions, and the plurality of organic ligands are selected from one or more members of the group consisting of aspartate and *N*-acetyl aspartate.

9. The use according to claim 8, wherein the MOF has a structural formula according to $[Fe_3O(\textit{N}\text{-acetyl aspartate})_3(H_2O)_2(X)]$, wherein X is a counterion selected from the group consisting of Cl^-, ^-OH, and NO_3^- (e.g. X may be Cl^-).

10. The use according to claim 8, wherein the MOF has a structural formula according to $[Fe_3O(\text{aspartate})_3(H_2O)_2(X)]$, wherein X is a counterion selected from the group consisting of Cl^-, ^-OH, and NO_3^- (e.g. X may be Cl^-).

11. The use according to claim 1, wherein the plurality of metal ions consists of Fe^{3+} ions, and the plurality of organic ligands are a combination of fumarate and terephthalate, optionally wherein the MOF is formed from Fe^{3+} ions and a mixture of fumarate and terephthalate, wherein the mixture of fumarate and terephthalate contains a molar ratio of fumarate to terephthalate of from 2:1 to 1:2.

12. The use according to any one of the preceding claims, wherein the medicament is to be administered in combination with one or more further oral adsorbents selected from the group consisting of a phosphate binding agent, an activated carbon adsorbent, and a potassium binding agent, for example wherein the medicament is to be administered

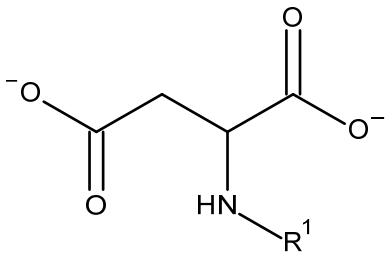
in combination with one or more further phosphate binding agents selected from the group consisting of calcium carbonate, calcium acetate, sevelamer carbamate, sevelamer hydrochloride, lathanum carbonate, iron citrate, sucroferric oxyhydroxide, and tenapanor.

13. The use according to any one of the preceding claims, wherein the medicament is to be administered to a subject suffering from chronic kidney disease (CKD) or end-stage renal disease (ESRD), or a subject suffering from or at risk of developing a cardiovascular disease.

14. A metal-organic framework (MOF) comprising a plurality of metal ions each coordinated to a plurality of organic ligands,

wherein the plurality of metal ions comprises Zr^{4+} ions, Fe^{3+} ions, or a combination of Zr^{4+} and Fe^{3+} ions, and

the plurality of organic ligands are selected from one or more compounds according to formula (I):



(I)

wherein,

R^1 is -C(O)C_{1-6}alkyl,wherein said C_{1-6}alkyl is optionally substituted by 1, 2 or 3 halogens;

or a pharmaceutically acceptable salt or solvate thereof.

15. The MOF of claim 14, wherein R^1 is -C(O)C_{1-4}alkyl.

16. The MOF of claim 14, wherein the compound of formula (I) is *N*-acetyl aspartate.

17. The MOF of claim 16, wherein the MOF has a structural formula according to $[Zr_6O_4(OH)_4(N\text{-acetyl aspartate})_6]$.

18. The MOF of claim 16, wherein the MOF has a structural formula according to [Fe_3O(*N*-acetyl aspartate)$_3$(H_2O)$_2$(X)], wherein X is a counterion selected from the group consisting of Cl^-, ^-OH, and NO_3^- (e.g. X may be Cl^-).

19. A pharmaceutical composition comprising the MOF of any one of claims 14 to 18, and one or more pharmaceutically acceptable carriers or excipients.

20. Use of a MOF according to any one of claims 14 to 18 in the manufacture of a medicament for the treatment or prevention of hyperphosphatemia.