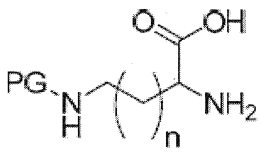
CLAIMS

What is clamed is:

Claim 1. A method for the synthesis of 3,6-bis-[N-protected aminoalkyl]-2,5-diketopiperazine comprising:



Formula I

heating a mixture of an amino acid of general formula I in the presence of a catalyst in an organic solvent;

wherein PG is trifluoroacetyl;

wherein the catalyst is phosphorous pentoxide, wherein the concentration of phosphorous pentoxide to the amino acid is between 20% and 35%; and

wherein the solvent is selected from the group consisting of: dimethylacetamide, N-methyl-2-pyrrolidone, diglyme, ethyl glyme, proglyme, ethyldiglyme, m-cresol, p-cresol, o-cresol, xylenes, ethylene glycol and phenol.

Claim 2. The method of claim 1 wherein n is preferably from 1 to 7.

Claim 3. The method of claim 1 wherein n is equal to 3.

Claim 4. The method of claim 1 wherein n is equal to 2.

Claim 5. The method of claim 1 wherein the solvent is substantially water miscible.

Claim 6. The method of claim 1 wherein the solvent is N-methyl-2-pyrrolidone.

Claim 7. The method of claim 1 wherein the amino acid is ε-trifluoroacetyl-L-lysine.

Claim 8. The method of claim 1 wherein the amino acid is ɣ-trifluoroacetyl-ornithine.

Claim 9. The method of claim 1 further comprising the step of quenching the mixture with water.

Claim 10. A method for the synthesis of 3,6-bis-4-(N-trifluoroacetyl)aminobutyl-2,5-diketopiperazine comprising:

heating a mixture of ε-trifluoroacetyl-L-lysine in the presence of phosphorous pentoxide in N-methyl-2-pyrrolidone, to a temperature of between 150° and 175°C for between 0.25 and 5 hours, the concentration of phosphorous pentoxide is between 20% and 35% that of the lysine; and

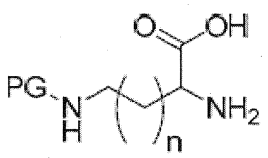
quenching the mixture with a second solvent.

Claim 11. The method of claim 10 wherein the mixture is quenched with water.

CLAIMS

What is clamed is:

Claim 1. A method for the synthesis of 3,6-bis-[N-protected aminoalkyl]-2,5-diketopiperazine comprising:



Formula I

heating a mixture of an amino acid of general formula I in the presence of a catalyst in an organic solvent;

wherein the catalyst is phosphorous pentoxide, wherein the concentration of phosphorous pentoxide to the amino acid is between 20% and 35%; and

wherein the solvent is selected from the group consisting of: dimethylacetamide, N-methyl-2-pyrrolidone, diglyme, ethyl glyme, proglyme, ethyldiglyme, m-cresol, p-cresol, o-cresol, xylenes, ethylene glycol and phenol.

Claim 2. The method of claim 1 wherein n is preferably from 1 to 7.

Claim 3. The method of claim 1 wherein n is equal to 3.

Claim 4. The method of claim 1 wherein n is equal to 2.

Claim 5. The method of claim 1 where PG is an amide forming protecting group.

Claim 6. The method of claim 1 wherein the protecting group is trifluoroacetyl.

Claim 7. The method of claim 1 wherein PG is a carbamate forming protecting group.

Claim 8. The method of claim 1 wherein the protecting group is Cbz.

Claim 9. The method of claim 1 wherein the solvent is substantially water miscible.

Claim 10. The method of claim 1 wherein the solvent is N-methyl-2-pyrrolidone.

Claim 11. The method of claim 1 wherein the amino acid is ε-trifluoroacetyl-L-lysine.

Claim 12. The method of claim 1 wherein the amino acid is ε-Cbz-L-lysine.

Claim 13. The method of claim 1 wherein the amino acid is ɣ-trifluoroacetyl-ornithine.

Claim 14. The method of claim 1 wherein the amino acid is ɣ-Cbz-ornithine.

Claim 15. The method of claim 1 further comprising the step of quenching the mixture with water.

Claim 16. A method for the synthesis of 3,6-bis-[N-protected aminobutyl]-2,5-diketopiperazine comprising:

heating a mixture of a N-protected lysine in the presence of a catalyst in an organic solvent, to a temperature of between 110° and 175°C for between 0.25 and 5 hours;

wherein the catalyst is phosphorous pentoxide,

the concentration of catalyst is between 20% and 35% that of the lysine; and

the solvent is selected from the group consisting of: dimethylacetamide, N-methyl-2-pyrrolidone, diglyme, ethyl glyme, proglyme, ethyldiglyme, m-cresol, p-cresol, o-cresol, xylenes, ethylene glycol and phenol.

Claim 17. A method for the synthesis of 3,6-bis-4-(N-trifluoroacetyl)aminobutyl-2,5-diketopiperazine comprising:

heating a mixture of ε-trifluoroacetyl-L-lysine in the presence of phosphorous pentoxide in N-methyl-2-pyrrolidone, to a temperature of between 150° and 175°C for between 0.25 and 5 hours, the

concentration of phosphorous pentoxide is between 20% and 35% that of the lysine; and

quenching the mixture with a second solvent.

Claim 18. The method of claim 17 wherein the mixture is quenched with water.