Claims

1. A process for treating organic waste, the process comprising the step of contacting an organic waste with one or more microorganisms from at least three of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms, said contacting being undertaken under conditions to at least partly convert said organic waste to organic fertilizer.

2. A process as claimed in claim 1, comprising the step of contacting an organic waste with one or more microorganisms from each of the following species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms.

3. A process as claimed in claim 1 or 2, further comprising the step of contacting said organic waste with one or more microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms, and *Corynebacterium* sp. microorganisms.

4. A process as claimed in any one of claims 1 to 3, wherein the initial moisture content of said organic waste is 25% (wt) to 70% (wt).

5. A process as claimed in any one of claims 1 to 4, wherein said contacting comprises the step of

adding a composition comprising one or more microorganisms from at least three of said *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms, and *Lactobacillus* sp. microorganisms to said organic waste.

6. A process as claimed in any one of claims 1 to 5, wherein said contacting comprises the step of adding a composition comprising one or more microorganisms from each of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms.

7. A process as claimed in claim 5 or 6, wherein said composition further comprises one or more microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms and *Corynebacterium* sp. microorganisms.

8. A process as claimed in claim 7, wherein said composition comprises one or more microorganisms selected from the group consisting of *Streptomyces pactum* and *Corynebacterium striatum*.

9. A process as claimed in any one of claims 1 to 8, wherein said *Bacillus* sp. is selected from the group consisting of *Bacillus pumilus*, *Bacillus stearothermophilus*, *Bacillus brevis*, *Bacillus cereus*, *Bacillus subtilis*, *Bacillus sphearieus*, and *Bacillus licheniformis*.

10. A process as claimed in any one of claims 1 to 9, wherein said Pseudomonas sp. is selected from the group consisting of *Pseudomonas alcaligenes* and *Pseudomonas marinoglutinosa*.

11. A process as claimed in any one of claims 1 to 10, wherein said *Bifidobacterium* sp. is *Bifidobacterium thermophilus*.

12. A process as claimed in any one of claims 1 to 11, wherein said *Lactobacillus* sp. is selected from the group consisting of *Lactobacillus casei*, *Lactobacillus planatarum*, and *Lactobacillus fermentus*.

13. A process as claimed in any one of claims 1 to 12, comprising during said contacting step, the step of aerating said organic waste.

14. A process as claimed in any one of claims 1 to 13, comprising during said contacting step, the step of controlling the temperature of said organic waste at 35°C to 75°C to convert said organic waste to organic fertilizer.

15. A process as claimed in claim 14, comprising prior to said contacting step of contacting said organic waste with one or more microorganisms from at least three of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms, the step of controlling the temperature of said organic waste at 80°C to 175°C to remove unwanted microorganisms from said organic waste.

16. A process as claimed in any one of claims 5 to 15, wherein said composition is a solution.

17. A process as claimed in any one of claims 5 to 15, wherein said composition is a powder.

18. A process as claimed in claim 16, wherein the microorganism content of said solution comprises 5 % (vol) to 50 % (vol) microorganisms in a microorganism culture.

19. A process as claimed in claim 17, wherein the microorganism content of said powder comprises 1×10^{10} viable microorganisms per gram of powder to 15×10^{10} viable microorganisms per gram of powder.

20. A process as claimed in any one of claims 7 to 19, wherein the microorganisms of said microorganism composition are one or more microorganisms selected from the group consisting of *Streptomyces pactum*, *Corynebacterium striatum*, *Bacillus pumilus*, *Bacillus stearothermophilus*, *Bacillus brevis*, *Bacillus cereus*, *Bacillus subtilis*, *Bacillus sphearieus*, *Bacillus licheniformis*, *Pseudomonas alcaligenes*, *Pseudomonas marinoglutinosa*, *Bifidobacterium thermophilus*, *Lactobacillus casei*, *Lactobacillus planatarum* and *Lactobacillus fermentus*.

21. A process as claimed in any one of claims 1 to 20, wherein said organic waste is selected from the group consisting of agricultural waste, food waste,

organic refuse, mill effluent, municipal waste, sewage, sludge, animal waste, and industrial waste.

22. A process as claimed in claim 21, wherein said agricultural waste is selected from the group consisting of oil palm empty fruit bunch, olive husk, corn cob, coffee bean husk, rice husk, rice straw, spent mushroom compost, palm foliage, palm trunk, palm kernel shells, palm fiber, farm effluent, slaughterhouse waste, flower cuttings, spent flower compost, wheat straw, fruit waste, and vegetable waste.

23. A process as claimed in claim 21, wherein said animal waste is selected from the group consisting of poultry manure, cow manure, goat manure, horse manure, sheep manure, and swine manure.

24. A process as claimed in any one of claims 1 to 23, wherein said organic waste has a particle size of 1 mm to 20 mm.

25. A process as claimed in any one of claims 1 to 24, wherein said step of contacting said organic waste with at least one of said microorganisms is for at least 18 hours.

26. A process as claimed in any one of claims 1 to 25, further comprising adding one or more additives or nutrients to said organic waste to enhance conversion of said organic waste by said microorganisms.

27. Use of one or more microorganisms from at least three of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms, for treating an organic waste to produce organic fertilizer, increase the NPK value of an organic fertilizer, increase the potassium value of an organic fertilizer, reduce odour of an organic waste, prevent leaching of nutrients from organic waste, or reduce waste accumulation.

28. The use as claimed in claim 27 wherein said use comprises the use of one or more microorganisms from each of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms

29. The use as claimed in claim 27 or 28, further comprising microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms and *Corynebacterium* sp. microorganisms.

30. The use as claimed in any one of claims 27 to 29, wherein said *Bacillus* sp. microorganisms are selected from the group consisting of *Bacillus pumilus*, *Bacillus stearothermophilus*, *Bacillus brevis*, *Bacillus cereus*, *Bacillus subtilis*, *Bacillus sphearieus*, and *Bacillus licheniformis*.

31. The use as claimed in any one of claims 27 to 30, wherein said *Pseudomonas* sp. is selected from the

group consisting of *Pseudomonas alcaligenes* and *Pseudomonas marinoglutinosa*.

32. The use as claimed in any one of claims 27 to 31, wherein said *Bifidobacterium* sp. is *Bifidobacterium thermophilus*.

33. The use as claimed in any one of claims 27 to 32, wherein said *Lactobacillus* sp. is selected from the group consisting of *Lactobacillus casei*, *Lactobacillus planatarum*, and *Lactobacillus fermentus*.

34. The use as claimed in claim 29, wherein said microorganism is selected from the group consisting of *Streptomyces pactum* and *Corynebacterium striatum*.

35. A composition for treating an organic waste, the composition comprising one or more microorganisms from at least three of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms.

36. A composition as claimed in claim 35, the composition comprising one or more microorganisms from each of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms

37. A composition as claimed in claim 35 or 36, further comprising one or more microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms and *Corynebacterium* sp. microorganisms.

38. A composition as claimed in any one of claims 35 to 37, wherein said *Bacillus* sp. is selected from the group consisting of *Bacillus pumilus*, *Bacillus stearothermophilus*, *Bacillus brevis*, *Bacillus cereus*, *Bacillus subtilis*, *Bacillus sphearieus*, and *Bacillus licheniformis*.

39. A composition as claimed in any one of claims 35 to 38, wherein said *Pseudomonas* sp. is selected from the group consisting of *Pseudomonas alcaligenes* and *Pseudomonas marinoglutinosa*.

40. A composition as claimed in any one of claims 35 to 39, wherein said *Bifidobacterium* sp. is *Bifidobacterium thermophilus*.

41. A composition as claimed in any one of claims 35 to 40, wherein said *Lactobacillus* sp. is selected from the group consisting of *Lactobacillus casei*, *Lactobacillus planatarum*, and *Lactobacillus fermentus*.

42. A composition as claimed in claim 37, wherein said microorganisms are selected from the group consisting of *Streptomyces pactum* and *Corynebacterium striatum*.

43. A composition of any one of claims 35 to 42, wherein said composition is a solution.

44. A composition of any one of claims 35 to 42, wherein said composition is a powder.

45. An organic fertilizer comprising an organic waste and a composition of any one of claims 35 to 44.

46. A kit for use in treating an organic waste, the kit comprising:

(i) a composition comprising one or more microorganisms from at least three of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms, and *Lactobacillus* sp. microorganisms, and

(ii) instructions for contacting said composition with an organic waste under conditions to at least partly convert said organic waste to organic fertilizer.

47. A kit as claimed in claim 46, wherein said composition comprises one or more microorganisms from each of the following microorganism species: *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms and *Lactobacillus* sp. microorganisms.

48. A kit as claimed in claim 46 or 47, further comprising a composition containing microorganisms selected from the group consisting of *Streptomyces*

sp. microorganisms and *Corynebacterium* sp. microorganisms.

49. A kit as claimed in any one of claims 46 to 48, further comprising one or more additives or nutrients, wherein said one or more additives or nutrients are capable of enhancing the growth of said microorganisms in said composition.

CLAIMS

1. A process for treating organic waste, the process comprising the step of contacting an organic waste with one or more microorganisms from each of at least three of the following microorganism species:

   (i) *Bacillus* sp. microorganisms, selected from the group consisting of *Bacillus pumilus*, *Bacillus stearothermophilus*, *Bacillus brevis*, *Bacillus cereus*, *Bacillus subtilis*, *Bacillus sphearieus* and *Bacillus licheniformis;*

   (ii) *Pseudomonas* sp. microorganisms, selected from the group consisting of *Pseudomonas alcaligenes* and *Pseudomonas marinoglutinosa;*

   (iii) *Bifidobacterium* sp. microorganisms, which is *Bifidobacterium thermophilus;* and

   (iv) *Lactobacillus* sp. microorganisms, selected from the group consisting of *Lactobacillus casei, Lactobacillus planatarum* and *Lactobacillus fermentus;* and

   wherein said contacting being undertaken under conditions to at least partly convert said organic waste to organic fertilizer.

2. The process as claimed in claim 1, further comprising the step of contacting said organic waste with one or more microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms, and *Corynebacterium* sp. microorganisms.

3. The process as claimed in any one of claims 1 to 2, wherein the initial moisture content of said organic waste is 25% (wt) to 70% (wt).

4. The process as claimed in any one of claims 1 to 3, wherein said contacting comprises the step of adding a composition comprising one or more microorganisms from at least three of said *Bacillus* sp. microorganisms, *Pseudomonas* sp. microorganisms, *Bifidobacterium* sp. microorganisms, and *Lactobacillus* sp. microorganisms to said organic waste.

5. The process as claimed in claim 4, wherein said composition further comprises one or more microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms and *Corynebacterium* sp. microorganisms.

6. The process as claimed in claim 5, wherein said composition comprises one or more microorganisms selected from the group consisting of *Streptomyces pactum* and *Corynebacterium striatum*.

7. The process as claimed in any one of claims 1 to 6, comprising during said contacting step, the step of aerating said organic waste.

8. The process as claimed in claim 1 or 7, further comprising heating said organic waste to a temperature of 80°C to 175°C prior to said contacting step, to remove unwanted microorganisms from said organic waste.

9. The process as claimed in claim 8, further comprising the step of cooling said organic waste to a temperature of 35°C to 75°C prior to said contacting step.

10. The process as claimed in any one of claims 4 to 9, wherein said composition is a solution.

11. The process as claimed in any one of claims 4 to 9, wherein said composition is a powder.

12. The process as claimed in claim 10, wherein the microorganism content of said solution comprises 5 % (vol) to 50 % (vol) microorganisms in a microorganism culture.

13. The process as claimed in claim 11, wherein the microorganism content of said powder comprises 1×10^{10} viable microorganisms per gram of powder to 15×10^{10} viable microorganisms per gram of powder.

14. The process as claimed in any one of claims 4 to 13, wherein the microorganisms of said microorganism composition are one or more microorganisms selected from the group consisting of *Streptomyces pactum, Corynebacterium striatum, Bacillus pumilus, Bacillus stearothermophilus, Bacillus brevis, Bacillus cereus, Bacillus subtilis, Bacillus sphearieus, Bacillus licheniformis, Pseudomonas alcaligenes, Pseudomonas marinoglutinosa, Bifidobacterium thermophilus, Lactobacillus casei, Lactobacillus planatarum and Lactobacillus fermentus*.

15. The process as claimed in any one of claims 1 to 14, wherein said organic waste is selected from the group consisting of agricultural waste, food waste, organic refuse, mill effluent, municipal waste, sewage, sludge, animal waste, and industrial waste.

16. The process as claimed in claim 15, wherein said agricultural waste is selected from the group consisting of oil palm empty fruit bunch, olive husk, corn cob, coffee bean husk, rice husk, rice straw, spent mushroom compost, palm foliage, palm trunk, palm kernel shells, palm fiber, farm effluent, slaughterhouse waste, flower cuttings, spent flower compost, wheat straw, fruit waste, and vegetable waste.

17. The process as claimed in claim 15, wherein said animal waste is selected from the group consisting of poultry manure, cow manure, goat manure, horse manure, sheep manure, and swine manure.

18. The process as claimed in any one of claims 1 to 17, wherein said organic waste has a particle size of 1 mm to 20 mm.

19. The process as claimed in any one of claims 1 to 18, wherein said step of contacting said organic waste with said microorganisms is for at least 18 hours.

20. The process as claimed in any one of claims 1 to 19, further comprising adding one or more additives or nutrients to said organic waste to enhance conversion of said organic waste by said microorganisms.

21. Use of one or more microorganisms from each of at least three of the following microorganism species:

(i) *Bacillus* sp. microorganisms, selected from the group consisting of *Bacillus pumilus*, *Bacillus stearothermophilus, Bacillus brevis, Bacillus cereus, Bacillus subtilis, Bacillus sphearieus* and *Bacillus licheniformis;*

(ii) *Pseudomonas* sp. microorganisms, selected from the group consisting of *Pseudomonas alcaligenes* and *Pseudomonas marinoglutinosa;*

(iii) *Bifidobacterium* sp. microorganisms, which is *Bifidobacterium thermophilus;* and

(iv) *Lactobacillus* sp. microorganisms, selected from the group consisting of *Lactobacillus casei, Lactobacillus* planatarum and *Lactobacillus fermentus;*

for treating an organic waste to produce organic fertilizer, increase the NPK value of an organic fertilizer, increase the potassium value of an organic fertilizer, reduce odour of an organic waste, prevent leaching of nutrients from organic waste, or reduce waste accumulation.

22. The use as claimed in claim 21, further comprising microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms and *Corynebacterium* sp. microorganisms.

23. The use as claimed in claim 22, wherein said microorganism is selected from the group consisting of *Streptomyces pactum* and *Corynebacterium striatum.*

24. A composition for treating an organic waste, the composition comprising one or more microorganisms from each of at least three of the following microorganism species:

(i) *Bacillus* sp. microorganisms, selected from the group consisting of *Bacillus pumilus, Bacillus stearothermophilus, Bacillus brevis, Bacillus cereus, Bacillus subtilis, Bacillus sphearieus* and *Bacillus licheniformis;*

(ii) *Pseudomonas* sp. microorganisms, selected from the group consisting of *Pseudomonas alcaligenes* and *Pseudomonas marinoglutinosa;*

(iii) *Bifidobacterium sp.* microorganisms, which is *Bifidobacterium thermophilus;* and

(iv) *Lactobacillus* sp. microorganisms, selected from the group consisting of *Lactobacillus casei, Lactobacillus planatarum* and *Lactobacillus fermentus.*

25. The composition as claimed in claim 24, further comprising one or more microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms and *Corynebacterium* sp. microorganisms.

26. The composition as claimed in claim 25, wherein said microorganisms are selected from the group consisting of *Streptomyces pactum* and *Corynebacterium striatum.*

27. The composition of any one of claims 24 to 26, wherein said composition is a solution.

28. The composition of any one of claims 24 to 26, wherein said composition is a powder.

29. An organic fertilizer comprising an organic waste and a composition of any one of claims 24 to 28.

30. A kit for use in treating an organic waste, the kit comprising:

(a) a composition comprising one or more microorganisms from each of at least three of the following microorganism species:

(i) *Bacillus* sp. microorganisms, selected from the group consisting of *Bacillus pumilus*, *Bacillus stearothermophilus*, *Bacillus brevis*, *Bacillus cereus*, *Bacillus subtilis*, *Bacillus sphearieus* and *Bacillus licheniformis*;

(ii) *Pseudomonas* sp. microorganisms, selected from the group consisting of *Pseudomonas alcaligenes* and *Pseudomonas marinoglutinosa*;

(iii) Bifidobacterium sp. microorganisms, which is *Bifidobacterium thermophilus*; and

(iv) *Lactobacillus* sp. microorganisms, selected from the group consisting of *Lactobacillus casei*, *Lactobacillus planatarum* and *Lactobacillus fermentus*.

31. The kit as claimed in claim 30, further comprising a composition containing microorganisms selected from the group consisting of *Streptomyces* sp. microorganisms and *Corynebacterium* sp. microorganisms.

32. The kit as claimed in any one of claims 30 to 31, further comprising one or more additives or nutrients, wherein said one or more additives or nutrients are capable of enhancing the growth of said microorganisms in said composition.