CLAIMS

1. A method for producing a product, the method comprising:

maintaining a combination comprising a liquid medium, a microorganism, a structure or carrier comprising a bag, and a cellulosic or lignocellulosic biomass disposed within the structure or carrier, under conditions that allow the passage of molecules of the cellulosic or lignocellulosic biomass out of and/or into the structure or carrier and that allow the microorganism to convert the molecules to one or more enzymes, and

storing the one or more enzymes and then using the enzyme(s) in saccharification reactions of the same or a similar biomass material at a later date and/or in a different location.

2. The method of claim 1, wherein the microorganism comprises a strain of *Trichoderma reesei*.

3. The method of claim 2, wherein the strain is a high-yielding cellulase-producing mutant of *Trichoderma reesei*.

4. The method of claim 3, wherein the strain comprises RUT-C30.

5. The method of claim 1, further comprising:

disposing the microorganism within a second structure or carrier;

wherein the structure or carrier containing the cellulosic or lignocellulosic biomass is disposed within the second structure or carrier.

6. The method of claim 1, wherein the structure or carrier is formed of a mesh material having a maximum opening size of less than 1 mm.

7. The method of claim 6, wherein the mesh material has an average pore size of from about 10 mm to 1 nm.

8. The method of claim 1, where the structure or carrier is made of a bioerodible polymer.

9. The method of claim 8, where the bioerodible polymer is selected from the group consisting of: polylactic acid, polyhydroxybutyrate, polyhydroxyalkanoate, polyhydroxybutyrate-valerate, polycaprolactone, polyhydroxybutyrate-hexanoate, polybutylene succinate, polybutyrate succinate adipate, polyesteramide, polybutylene adipate-co-terephthalate, mixtures thereof, and laminates thereof.

10. The method of claim 9, wherein the structure or carrier is made of a starch film.

11. The method of claim 1, wherein the cellulosic or lignocellulosic biomass is selected from the group consisting of: paper, paper products, paper waste, paper pulp, pigmented papers, loaded papers, coated papers, filled papers, magazines, printed matter, printer paper, polycoated paper, card stock, cardboard, paperboard, cotton, wood, particle board, forestry wastes, sawdust, aspen wood, wood chips, grasses, switchgrass, miscanthus, cord grass, reed canary grass, grain residues, rice hulls, oat hulls, wheat chaff, barley hulls, agricultural waste, silage, canola straw, wheat straw, barley straw, oat straw, rice straw, jute, hemp, flax, bamboo, sisal, abaca, corn cobs, corn stover, soybean stover, corn fiber, alfalfa, hay, coconut hair, sugar processing residues, bagasse, beet pulp, agave bagasse, algae, seaweed, manure, sewage, offal, agricultural or industrial waste, arracacha, buckwheat, banana, barley, cassava, kudzu, oca, sago, sorghum, potato, sweet potato, taro, yams, beans, favas, lentils, peas, and mixtures of any of these.

12. The method of claim 11, wherein the cellulosic or lignocellulosic material comprises corn cobs.

CLAIMS

What is claimed is:

1. A method comprising:
maintaining a combination comprising a liquid medium, a structure or carrier, and a reduced-recalcitrance cellulosic or lignocellulosic biomass disposed within the structure or carrier, under conditions that allow the passage of molecules out of and/or into the structure or carrier.

2. The method of claim 1, wherein the structure or carrier is porous.

3. The method of claim 1, further comprising disposing an additive in the structure or carrier.

4. The method of claim 3 further comprising maintaining the combination under conditions that allow the additive to convert the molecules to one or more products.

5. The method of any one of the above claims, wherein the additive is selected from the group consisting of a microorganism, an enzyme, an acid, a base, a chemical solution, a nutrient, a mineral, and combinations thereof.

6. The method of claim 5 wherein the additive comprises a microorganism.

7. The method of any one of claims 4-6, wherein the product is selected from the group consisting of: a molecule, a protein, a sugar, a fuel and combinations thereof.

8. The method of claim 7, wherein the protein comprises an enzyme.

9. The method of any one of the above claims, wherein the structure or carrier is selected from the group consisting of a bag, a shell, a net, a membrane, a mesh and combinations thereof.

10. The method of claim 2, wherein the structure or carrier comprises a bag, and is formed of a mesh material having a maximum opening size of less than 1 mm.

~~11. The method of claim 8, where the structure or carrier is a bag, and the bag is made of a~~ bioerodible polymer, e.g., a polymer selected from the group consisting of: polylactic acid, polyhydroxybutyrate, polyhydroxyalkanoate, polyhydroxybutyrate-valerate, polycaprolactone, polyhydroxybutyrate-hexanoate, polybutylene succinate, polybutyrate succinate adipate, polyesteramide, polybutylene adipate-co-terephthalate, mixtures thereof, and laminates thereof.

12. The method of claim 11, wherein the bag is made of a starch film.

13. The method of any one of the above claims, further comprising utilizing further processing to tear or rupture the structure or carrier.

14. The method of claim 6, wherein the microorganism comprises a strain of *Trichoderma reesei*.

15. The method of claim 14, wherein the strain is a high-yielding cellulase-producing mutant of *Trichoderma reesei*.

16. The method of claim 15, wherein the strain comprises RUT-C30.

17. The method of any one of the above claims, wherein the recalcitrance of the cellulosic or lignocellulosic biomass has been reduced by exposure to an electron beam.

18. The method of any one of claims 4-17, wherein the conversion comprises saccharification.

19. The method of any of the above claims, wherein the cellulosic or lignocellulosic biomass is selected from the group consisting of: paper, paper products, paper waste, paper pulp, pigmented papers, loaded papers, coated papers, filled papers, magazines, printed matter, printer paper, polycoated paper, card stock, cardboard, paperboard, cotton, wood, particle board, forestry wastes, sawdust, aspen wood, wood chips, grasses, switchgrass, miscanthus, cord grass, reed canary grass, grain residues, rice hulls, oat hulls, wheat chaff, barley hulls, agricultural waste, silage, canola straw, wheat straw, barley straw, oat straw, rice straw, jute, hemp, flax, bamboo, sisal, abaca, corn cobs, corn stover, soybean stover, corn fiber, alfalfa, hay, coconut hair, sugar processing residues, bagasse, beet pulp, agave bagasse, algae, seaweed, manure, sewage, offal, agricultural or industrial

~~waste, arracacha, buckwheat, banana, barley, cassava, kudzu, oca, sago, sorghum, potato,~~ sweet potato, taro, yams, beans, favas, lentils, peas, and mixtures of any of these.

20. The method of any of the above claims, wherein the cellulosic or lignocellulosic material has an average particle size of less than about 1 mm, e.g., about 0.25 mm to 2.5 mm.