

WHAT IS CLAIMED IS:

1. A method comprising:

converting a cooled ~~biomass-cellulosic or lignocellulosic~~ material to a product utilizing a microorganism and/or enzyme, wherein at least one of cooling and converting the ~~biomass-cellulosic or lignocellulosic~~ material is performed using a mobile processing unit, and wherein cooling comprises cooling the ~~biomass-cellulosic or lignocellulosic~~ material to a temperature below the brittle point of the cellulosic or lignocellulosic material.

2. The method of claim 1 further comprising grinding or comminuting the ~~biomass~~ cellulosic or lignocellulosic material.

3. The method of claim 2 wherein grinding or comminuting is performed before the cellulosic or lignocellulosic ~~biomass~~ material has been cooled.

4. The method of claim 1, further comprising irradiating the cellulosic or lignocellulosic ~~biomass~~ material.

5. The method of claim 1 wherein the cooled cellulosic or lignocellulosic ~~biomass~~ material has a bulk density of less than 0.8 g/cm³.

6. The method of claim 2 wherein grinding or comminuting is performed in a freeze grinding or freeze milling device.

7. The method of claim 1 wherein the product comprises an alcohol.

8. The method of claim 7 wherein the product comprises ethanol and/or butanol.

9. ~~The method of claim 1 wherein the biomass material comprises a cellulosic or lignocellulosic material.~~

10. The method of claim 1 wherein the ~~step of biomass material comprises cellulose and~~ converting the cooled cellulosic or lignocellulosic material comprises utilizing an enzyme to saccharify the cellulose.

~~41~~10. The method of claim ~~40~~-9 wherein the method further comprises fermenting the product of saccharification to produce an alcohol.

~~42~~11. The method of claim 1 wherein cooling comprises cooling the cellulosic or lignocellulosic material to a temperature below the brittle point of the cellulosic or lignocellulosic material.

~~43~~12. The method of claim 1 wherein cooling and/or converting are performed while the cellulosic or lignocellulosic material is in transit.

~~44~~13. The method of claim ~~43~~-12 wherein the cellulosic or lignocellulosic material is in transit by ship, barge, train, or truck.

~~45~~14. The method of claim 1 wherein the mobile processing unit is transportable by ship, barge, train, or truck.

15. The method of claim 1 wherein the converting is performed to ~~biomass~~ cellulosic or lignocellulosic material that has been previously cooled.
16. The method of claim 2 wherein the grinding or comminuting is performed after the cellulosic or lignocellulosic ~~biomass~~ material has been cooled.
17. The method of claim 4 wherein irradiation is performed before the cellulosic or lignocellulosic ~~biomass~~ material has been cooled.
18. The method of claim 4 wherein irradiation is performed after the cellulosic or lignocellulosic ~~biomass~~ material has been cooled.
19. The method of claim 9-1 wherein the cellulosic or lignocellulosic material is selected from the group consisting of: paper, paper products, wood, wood-related materials, particle board, grasses, rice hulls, bagasse, cotton, jute, hemp, flax, bamboo, sisal, abaca, straw, corn cobs, rice hulls, coconut hair, algae, seaweed, cotton, synthetic celluloses, or mixtures of any of these.
20. The method of claim 4 wherein the cellulosic or lignocellulosic ~~biomass~~ material is irradiated with an electron beam.
21. The method of claim 21-20 wherein the irradiation delivers to the cellulosic or lignocellulosic ~~biomass~~ material a radiation dose of about 5 Mrad to about 50 Mrad.
22. The method of claim 22-21 wherein the dose is provided in one irradiation step.
23. The method of claim 22-21 wherein the dose is provided in multiple irradiation steps.
24. A composition comprising:
irradiated cellulosic or lignocellulosic material that has been microfractured by cooling below the brittle point of the cellulosic or lignocellulosic material.