CLAIMS

1. A method of separating solids from liquids of a slurry, the method comprising:

treating biomass with ionizing radiation to reduce its recalcitrance;

saccharifying the irradiated biomass to form a saccharified biomass comprising glucose and xylose;

selectively fermenting the glucose in the saccharified biomass to provide a fermentation sugar composition, wherein the fermentation sugar composition includes a fermentation product and is substantially devoid of glucose;

and applying fermentation sugar composition to a surface of a filter device, wherein the filter device comprises a vacuum belt filter.

2. The method of claim 1, wherein the saccharified biomass comprises an aqueous solvent.

3. The method of claim 1, wherein the saccharified biomass comprises a non-aqueous solvent.

4. The method of claim 1, wherein the saccharified biomass includes cells.

5. The method of claim 4, wherein the saccharified biomass includes cells selected from the group consisting of yeast cells, bacterial cells, fungal cells and mixtures thereof.

6. The method of claim 1, wherein the saccharified biomass includes protein material.

7. The method of claim 6, wherein the protein material is substantially denatured protein material.

8. The method of claim 6 or 7, wherein the protein material includes an enzyme material.

9. The method of any one of the above claims, wherein the fermentation product includes an alcohol.

10. The method of claim 9, wherein the alcohol is ethanol or butanol.

11. The method of claim 1, wherein the saccharified biomass includes an organic acid.

12. The method of claims 11, wherein the saccharified biomass includes butyric acid.

13. The method of claim 1, wherein the biomass has been saccharified using one or more saccharification agent.

14. The method of claim 13, wherein the saccharification agent is selected from the group consisting of enzymes, acids, bases, oxidants and mixtures thereof.

15. The method of claim 13, wherein the saccharification agent includes sulfuric acid and an enzyme.

16. The method of claim 13, wherein the saccharification agent is a cellulolytic enzyme.

17. The method of claim 1, wherein recalcitrance has been reduced by the application of electron beam radiation to the biomass.

18. The method of claim 1, wherein the filter device comprises a filter face through which liquid of the saccharified biomass can pass, while retaining solids of the saccharified biomass thereon.

19. The method of claim 18, wherein the filter face has a filter aid extending outwardly therefrom.

20. The method of claim 19, wherein the filter aid covers substantially the entire filter face.

21. The method of claim 19, wherein the filter aid is selected from the group consisting of diatomaceous earth, celite, silica, pumice, perlite, alumina, zeolites, sand, cellulosic material, lignocellulosic material, and mixtures thereof.

22. The method of claim 19, wherein the filter aid extends from the filter face a distance of from between about 0.5 mm to about 250 mm.

23. The method of claim 22, wherein the filter aid extends from the filter face a distance of from between about 1 mm and about 100 mm.

24. The method of claim 23, wherein the filter aid extends from the filter face a distance of from between about 1 mm to about 50 mm.

25. The method of claim 24, wherein the filter aid extends from the filter face a distance of from between about 2 mm to about 25 mm.

26. The method of any claim 18, wherein the vacuum belt filter includes an inner portion and wherein the inner portion is maintained at a lower pressure than the filter face.

27. The method of claim 26, wherein the inner portion is in communication with a vacuum pump and/or a vacuum source.

28. The method of claim 18, wherein the filter face includes a filter cloth.

29. The method of claim 28, wherein the filter cloth is a woven cloth.

30. The method of claim 29, wherein the cloth has a weave selected from the group consisting of a twill weave, a plain weave, a satin weave, a knot weave, a basket weave, an oxford weave and combinations of these.

31. The method of claim 28, wherein the filter cloth has a porosity rating range from about 1 to 100 CFM/ft^2 (11 to 1076 CFM/m^2) can be utilized (e.g., about 1-3 (11 to 32 CFM/m^2), about 1-10 (11 to 108 CFM/m^2), about 10-30 (108 to 323 CFM/m^2), about 15-20 (161 to 215 CFM/m^2), about 30-50 (323 to 538 CFM/m^2), about 30-40 (323 to 431 CFM/m^2), about 50 to 70 (538 to 753 CFM/m^2)).

32. The method of claim 1, further comprising utilizing a vibratory screener to remove solids from the saccharified biomass prior to and/or after applying the saccharified biomass.