WHAT IS CLAIMED IS:

1. A method comprising:

providing a saccharified mixture from a saccharifying process and separating a first cellulase solution from a solid component of the saccharified mixture, said first cellulase solution comprising enzymes and sugars;

saccharifying a first biomass using the first cellulase solution, thereby producing a second biomass and a first sugar solution;

separating the second biomass from the first sugar solution, the first sugar solution enriched in sugars compared to the first cellulase solution; saccharifying the second biomass using a second cellulase solution, the second cellulase solution comprising cellobiase, thereby producing a third biomass and a second sugar solution; and

separating the third biomass from the second sugar solution to obtain a recovered second cellulase solution comprising enzymes and sugars.

2. The method of claim 1 wherein the biomass has been treated by a method selected from the group consisting of irradiation, sonication, oxidation, pyrolysis, steam explosion and combinations thereof.

3. The method of claim 1 wherein the biomass has been treated by irradiation.

4. The method of claim 3 wherein the biomass receives a total dosage of between about 10 and 200 Mrad.

17. The system of claim 16 wherein the first fluid flow path and second fluid flow path provide a constant flow of fluid between the first saccharification tank and second saccharification tank.

18. The system of claim 16 or 17 wherein the first and second separator are independently selected from the group consisting of a mesh, a screen, a vibratory screener, a strainer, a centrifuge, a filter, a settling tank and combinations thereof.

19. The method of claim 1, further comprising introducing a non-ionic surfactant and/or antimicrobial additive during any step in the method.