## CLAIMS

1. A method comprising:

a) heating a drying gas;

b) providing the heated drying gas to a dryer containing a gasification feedstock, and directly contacting the drying gas with the gasification feedstock to generate a dried gasification feedstock;

c) passing at least a portion of the dried gasification feedstock to a gasification process, and gasifying the dried gasification feedstock to generate syngas;

d) fermenting at least a portion of the syngas in a bioreactor using a microorganism to generate tail gas, and a fermentation broth comprising at least one product and microbial biomass comprising the microorganism;

e) passing the fermentation broth to a product recovery process to produce a microbial biomass depleted water stream, a crude ethanol stream, a fusel oil stream, and a product stream, wherein microbial biomass comprising the microorganism is separated from the fermentation broth;

f) drying at least a portion of the microbial biomass comprising the microorganism;

g) passing at least a portion of the dried microbial biomass of step (f) to the gasification process, gasifying the dried microbial biomass to generate syngas, and sending the syngas to the bioreactor of step (d), and further passing at least a portion of a stream selected from the microbial biomass depleted water stream, the crude ethanol stream, the fusel oil stream, and any mixtures thereof to the gasification process; and

h) utilizing at least a portion of the tail gas to provide heat for heating the drying gas.

2. The method of claim 1, wherein the gasification feedstock is sorted municipal solid waste, unsorted municipal solid waste, industrial solid waste, agricultural waste, forest waste, lignocellulosic material, sewerage, sludge from wastewater treatment, or any combination thereof.

3. The method of claim 1, wherein the tail gas comprises carbon dioxide.

4. The method of claim 3, wherein the tail gas further comprises carbon monoxide, hydrogen, nitrogen, and methane.

5. The method of claim 1, wherein the microorganism is one or more C1-fixing microorganism.

6. The method of claim 5, wherein the Cl-fixing microorganism is selected from *Moorella, Clostridium, Ruminococcus, Acetobacterium, Eubacterium, Butyribacterium, Oxobacter, Methanosarcina, Desuljotomaculum,* and any combination thereof.

7. The method of claim 1, wherein the drying gas is air.

8. The method of claim 1, wherein the gasification process produces a greater yield of syngas as compared to gasification without drying the gasification feedstock.

9. The method of claim 1, wherein the gasification process produces a greater quality of syngas as compared to gasification without drying the gasification feedstock.

10. The method of claim 1, wherein the tail gas is burned to provide heat for heating the drying gas.

11. The method of claim 1, wherein the microbial biomass depleted water stream ~~which~~ is passed to the gasification process.

12. The method of claim 11, wherein the $H_2$:CO ratio of the syngas from the gasification process is increased to at least 2: 1.

13. A method comprising:

a) heating a drying gas;

b) providing the heated drying gas to a dryer containing a gasification feedstock, and directly contacting the drying gas with the gasification feedstock to generate a dried gasification feedstock;

c) passing at least a portion of the dried gasification feedstock to a gasification process, and gasifying the dried gasification feedstock to generate syngas;

d) fermenting at least a portion of the syngas in a bioreactor using a microorganism to generate tail gas, and a fermentation broth comprising at least one product and microbial biomass comprising the microorganism;

e) passing the fermentation broth to a product recovery process to produce a microbial biomass depleted water stream, a crude ethanol stream, a fusel oil stream, and a product stream, wherein microbial biomass comprising the microorganism is separated from the fermentation broth;

f) drying at least a portion of the microbial biomass comprising the microorganism;

g) passing at least a portion of the dried microbial biomass of step (f) to the gasification process and gasifying the dried microbial biomass to generate syngas, and sending the syngas to the bioreactor of step (d), and further passing at least a portion of a stream selected from the microbial biomass depleted water stream, the crude ethanol stream, the fusel oil stream, and any mixtures thereof to the gasification process; and

h) utilizing at least a portion of the tail gas to provide heat for heating the drying gas wherein at least 92% of energy in the tail gas is recovered.

14. The method of claim 13, wherein the microbial biomass depleted water stream is passed to the gasification process.

15. The method of claim 14, wherein the $H_2$:CO ratio of the syngas from the gasification process is increased to at least 2:1.