CLAIMS

1. A method for converting a biological waste to an invertebrate feed, the method comprising:

(a) pre-treating the biological waste, wherein the pretreating comprises:

fragmenting the waste,

reducing microbial contaminants in the waste,

inoculating the waste with non-pathogenic mesophilic microorganisms at a density of 10^5-10^6 cells per ml,

wherein the microorganisms are:

chemo-organotrophs,

aerotolerant anaerobes or facultative anaerobes,

acidophilic or acid tolerant at pH ? 3.2,

cellulolithic,

amylolytic,

homofermenters or heterofermenters individually and heterofermenters as a community;

wherein the microorganisms have the capacity to:

ferment pentoses and hexoses, thereby producing alcohols and organic acids,

drive fermentation toward acidic conditions,

produce low levels of soluble alkali,

hydrolyze cellulose and starch to monosaccharides or disaccharides of hexoses or pentoses, and

wherein the microorganisms comprise microorganisms from the genus *Acetobacter*, *Lactobacillus*, *Saccharomyces*, *Bacillus* or *Clostridium*, and

mixing the waste**;**

(b) providing a bioreactor;

(c) performing fermentation of the waste under anaerobic conditions in the bioreactor, thereby producing a fermentation product comprising fermentation leachate having a Brix% of 6-10 and solid fermentate, wherein performing fermentation comprises circulating fermentation leachate in the bioreactor during fermentation,

(d) monitoring the fermentation,

wherein monitoring comprises analyzing the fermentation leachate,

wherein analyzing the fermentation leachate comprises determining pH, fermentable sugar content and nitrogen content of the fermentation leachate,

(e) controlling progression of the fermentation, wherein controlling progression of the

fermentation comprises maintaining:

temperature at 20-45 °C,

pH < 5,

Brix% at 9-10 Brix% during the first 24 hours of the fermentation, and

Brix% at at least 3 Brix% after 24 hours of the fermentation,

(f) post-treating the fermentation product, wherein the post-treating comprises:

separating solid fermentate from fermentation leachate in the fermentation product,

grinding the solid fermentate,

dewatering the solid fermentate, and/or

milling the solid fermentate,

thereby producing the invertebrate feed.

2. The method of claim 1 wherein the biological waste is optimal biological waste or low efficiency biological waste.

3. The method of claim 1 wherein the pre-treating comprises amending the waste with fermentation-optimizing agents.

4. The method of claim 1 comprising monitoring the fragmenting continuously and / or controlling the fragmenting to optimize the average particle size and particle size variance.

5. The method of claim 1 comprising adding lactic acid to the fermenting waste in the bioreactor.

6. The method of claim 1 comprising controlling the Brix% of the fermenting waste in the bioreactor.