The supporting data for the process for detoxification of high strength wastewater and its subsequent use to produce biogas are shown in Figures 2 and 3.

The detoxification process was carried out in anaerobic reactors where primarily the biotransformations of the toxic compounds were carried out. There may or may not be a significant change in the VFA concentration during the detoxification process as shown in Figure 2. No significant amount of biogas generation was recorded during this step. Subsequently, when the detoxified feeds were treated in mesophilic single stage anaerobic reactors (HRT 20 days, working volume 10L) significantly high volume of biogas was generated as shown in Figure 3.

Claims

1. A method of decontaminating high strength wastewater comprising inhibitory compounds, said process comprising the steps of:

(a) mixing at least one high strength wastewater with at least one secondary sludge to form a blended slurry having a total chemical oxygen demand (TCOD) loading of from 1g to 4g TCOD/g volatile suspended solids/day;

(b) adding the blended slurry to a detoxification reactor under anaerobic conditions that optionally comprises a microbial population of anaerobic bacteria and facultative anaerobic bacteria to provide a detoxified effluent; and

(c) wherein the detoxified effluent is subsequently treated in an anaerobic reactor to generate biogas.

2. The method of Claim 1, wherein the detoxified effluent is subsequently treated in an aerobic reactor for polishing of the wastewater.

3. The method of any one of the preceding claims, wherein a ratio of the at least one high strength waste water to at least one secondary sludge in the blended slurry is from 1:1 to 5:1.

4. The method of Claim 1 or Claim 2, wherein the ratio of the at least one high strength waste water to at least one secondary sludge in the blended slurry is from 2:1 to 5:1

5. The method of Claim 4, wherein the ratio of the at least one high strength waste water to at least one secondary sludge in the blended slurry is from 2.5:1 to 4:1, such as 3:1.

6. The method of any one of the preceding claims, wherein the high strength wastewater comprises organic and/or inorganic inhibitory compounds.

7. The method of any one of the preceding claims, wherein the high strength wastewater is a high strength industrial wastewater.

8. The method of any one of the preceding claims, wherein no additional chemicals are added.

9. The method of any one of the preceding claims, wherein the detoxification reactor step has a hydraulic retention time of from 1 to 5 days.

10. The method of any one of the preceding claims, wherein the detoxification reactor step has a pH of from 4 to 7.5.

11. The method of any one of the preceding claims, wherein the detoxification reactor step maintains a reaction temperature of from 30 to 60ºC.

12. The method of any one of the preceding claims, wherein the blended slurry has a total chemical oxygen demand (TCOD) loading of from 2.2g TCOD/g volatile suspended solids/day.

13. The method of any one of the preceding claims, wherein when the detoxification reactor comprises a microbial population of anaerobic bacteria and facultative anaerobic bacteria, the microbial population of anaerobic bacteria and facultative anaerobic bacteria is generated by the process of any one of Claims 1 to 10, followed by the return of biomass to the detoxification reactor following a clarification step conducted on the detoxified effluent before further processing of said effluent.

14. The method of any one of the preceding claims, wherein the method may comprise a pre-treatment step of the high strength water and/or at least one secondary sludge before step (a), which pre-treatment step may comprise one or more of UV light, ultrasound, steam treatment, milling, and grinding.

15. The method of any one of the preceding claims, wherein the at least one secondary sludge may be a biosludge obtainable from an aerobic stage of a wastewater treatment plant.

16. The method of any one of the preceding claims, wherein the blended slurry has a soluble chemical oxygen demand to TCOD ratio of from 0.3:1 to 0.95:1.