process and apparatus incudes steps and elements useful for reducing the amount of physical contaminants in the digestate.

[0005] In a process described herein, solid waste is pressed at a high pressure, for example 50 bar or more, to separate the solid waste into a dry fraction and a wet fraction. The wet fraction is diluted and floatables (i.e. pieces of plastic and/or paper) in the wet fraction are comminuted. The wet fraction is then de-gritted before being sent to an anaerobic digester. Digestate is withdrawn from the digester, including at least some withdrawal from a free liquid surface of the digester. The digestate is filtered to extract comminuted floatables. The floatables can be disposed of. Optionally, the resulting filtrate is then dewatered to produce a cake, for example with over 18% solids content, which then can be composted or directly applied to land.

[0006] A system described herein comprises a press, a grinder, a hydrocyclone, an anaerobic digester, a filter screw press and a dewaterer. These units can be configured and/or arranged to perform the process described above.

SUMMARY

[0006a] In one aspect, the present disclosure refers to a process comprising steps of, pressing solid waste to produce a wet fraction; comminuting floatables in the wet fraction; degritting the wet fraction; treating the wet fraction in an anaerobic digester; withdrawing digestate including floatables from the digester; and, separating comminuted floatables from digestate.

[0006b] In another aspect, the present disclosure refers to a system configured to carry out the process of the present invention, wherein the system comprises: a press; a grinder in communication with the press; a hydrocyclone in communication with the grinder and located downstream of the press; an anaerobic digester located downstream of the hydrocyclone; and, a filter in communication with the anaerobic digester, wherein the grinder is located downstream of the press and upstream of the anaerobic digester.

BRIEF DESCRIPTION OF THE FIGURES

[0007] Figure 1 is a process flow diagram of a process for treating solid waste.
[0008] Figure 2 is an isometric drawing of a press.
[0009] Figure 3 is a process flow diagram for the grit removal unit in Figure 1.
[0010] Figure 4 shows an anaerobic digester and downstream units for the process of Figure 1.

[0036] The press 116 shown in Figure 2 is further described in International Publication Number WO 2015/053617, Device and Method for Pressing Organic Material Out of Waste, which is incorporated herein by reference. A similar press is sold by DB Technologies. Another suitable press is the commercially available VM Press. Other high-pressure presses may also be used.

[0037] Figure 3 shows an example of a grit removal unit 140. Slurry 132 is fed to the hydrocyclone 402. Grit 412 from the hydrocyclone 402 is sent to a grit washing screen 404 to be washed with water 414. Washed grit 416 may be landfilled. Wash water 418 can be wasted or re-used as dilutant 142. Degritted feedstock 146 can be fed to digester 104.

[0038] A preferred grit removal unit 140 can accept feed at up to 15% solids and will remove 90% of particles with a specific gravity of 1.4 or more that are larger than 200 microns in size from slurry 132. This leaves less grit per unit mass of dry solids than most WWTP sludge and is therefore acceptable for co-digestion in a digester 104 currently in use at a WWTP.

[0039] Degritted feedstock 146 is send to the digester 104. The digester 104 is equipped with submersible mixers 200. At least one mixer 200 is placed close to the liquid surface to break possible floating layers and crust formed by floating plastics. Digestate 108a is pumped from below the liquid surface in the digester 104. Digestate 108b is intermittently pumped from the digester 104 surface, for example using a telescopic weir valve 202. This removes portions of the floating layer and avoids plastics accumulation.

[0040] The digestate 108b, and optionally also digestate 108a, is filtered, for example in a rotary drum filter or filter screw press 204 equipped with slots or perforations configured to retain contaminants larger than, for example, 1.5 to 2 mm. The screw press produces a reject fraction 208 and a liquid fraction or filtrate 206. The reject fraction 208 is disposed of.

[0041] The filtrate 206 from the filter screw press 204 contains suspended solids smaller than 2 mm. Filtrate 206 is sent to a dewaterer 210, for example a flocculating screw press, centrifuge or other mechanical dewatering device. Polymer 212 is added to enable the suspended and colloidal solids to flocculate and be retained by the dewaterer 210. For example, polymer 212 may be injected into filtrate 206 and mixed with a high shear static mixer or mixing valve 66. The cake 214 produced has 20 to 30% solids and is used for composting or directly for land application. The cake 214 preferably meets one or more present or future physical contaminant regulation levels such as those indicated above. The

CLAIMS:

We claim:

1. A process comprising steps of,
pressing solid waste to produce a wet fraction;
comminuting floatables in the wet fraction;
degritting the wet fraction;
treating the wet fraction in an anaerobic digester;
withdrawing digestate including floatables from the digester; and,
separating comminuted floatables from digestate.

2. The process of claim 1 further comprising diluting the wet fraction before degritting the wet fraction.

3. The process of claim 2 wherein the wet fraction is diluted with digestate.

4. The process of any of claims 1 to 3 wherein the solid waste is pressed at a pressure of 50 bar or more.

5. The process of any of claims 1 to 4 comprising removing digestate from at or near a free liquid surface of the digester.

6. The process of any of claims 1 to 5 comprising dewatering the filtered digestate.

7. The process of any of claims 1 to 6 wherein the digester is operated at a solids content in the digester of about 4% DS or less or 3% DS or less.

8. The process of any of claims 1 to 7 wherein the wet fraction is diluted or co-digested with wastewater treatment plant sludge.

9. The process of any of claims 1 to 8 wherein the wet fraction is diluted to 10-15%, or 14-15% solids.

10. The process of any of claims 1 to 9 wherein degritting is performed with a hydrocyclone.

11. A system configured to carry out the process of any one of claims 1 to 10, wherein the system comprises:

a press;

a grinder in communication with the press;

a hydrocyclone in communication with the grinder and located downstream of the press;

an anaerobic digester located downstream of the hydrocyclone; and,

a filter in communication with the anaerobic digester,

wherein the grinder is located downstream of the press and upstream of the anaerobic digester.

12. The system of claim 11 further comprising a dewaterer.

13. The system of claim 11 or 12 further comprising a progressive cavity (PC) pump.

14. The system of claim 13 wherein the PC pump has a discharge outlet connected to the grinder.

15. The process of any one of claims 1 to 10 wherein the floatables are communited to sizes of from 3 mm to 6 mm.