MICRO SUPER CRITICAL WATER OXIDATION SOLIDS TREATMENT SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of and priority to U.S. Provisional Application No. 63/222,736, titled "MICRO SUPER CRITICAL WATER OXIDATION SOLIDS TREATMENT SYSTEM," filed on July 16, 2021, the entire contents of which are hereby incorporated herein by reference.

BACKGROUND

[0002] An estimated 4.5 billion people worldwide do not have access to safe, affordable sanitation systems. High levels of child death and disease have been linked to oral fecal contamination where pathogen laden fecal matter enters the food or water supply. Non-sewered sanitation systems are needed where traditional sanitary sewer systems are unavailable or impractical.

SUMMARY

[0003] According to a first aspect of the present invention, there is provided a system for treatment of fecal waste, comprising:

an injector vessel;

a reactor configured to receive an injection of a slurry batch from the injector vessel and an input of compressed air to be heated to a temperature over a heating time, the temperature being at or above the critical point of water into the super critical fluid phase; and

a combined concentrator and phase separator comprising:

a concentrator vessel configured to receive and contain a liquid to be concentrated; and

a separator configured to receive a treated output from the reactor and separate solid ash volume from liquid and gaseous effluent; and

a drying tunnel configured to receive and dry the solid ash.

[0003a] According to a second aspect of the present invention, there is provided a method for treatment of human waste, the method comprising:

receiving a slurry batch of feces into an injector;

pressurizing the slurry batch with air;

injecting the slurry batch into a reactor;

heating the slurry batch, within the reactor, to a temperature over a heating time, the temperature being over the temperature of the critical point of water into the super critical fluid phase;

maintaining the slurry batch at a minimum temperature, within the reactor, for a predetermined treatment time to produce a treated output, wherein the minimum temperature is greater than the critical point of water;

ejecting the treated output into a phase separator;

separating the treated output into a solid ash volume, a liquid waste, and a gaseous effluent; and

transporting the solid ash volume to a disposal bin for removal.

[0004] Other systems, methods, features, and advantages of the present disclosure will be or become apparent to one with skill in the art upon examination of the following drawings and detailed description. It is intended that all such additional systems, methods, features, and advantages be included within this description, be within the scope of the present disclosure, and be protected by the accompanying claims. In addition, all optional and preferred features and modifications of the described embodiments are usable in all aspects of the disclosure taught herein. Furthermore, the individual features of the dependent claims, as well as all optional and