

Preservation of Methanogenic, Hydrogen-utilizing Cultures by Heat and/or Air Drying, and Subsequent Bioaugmentation

Methane is a commercially valuable fuel, as well as synthetic precursor, and can be obtained via microbial fermentation processes. In addition, proper methane production is required for stabilization of municipal, industrial and agricultural wastes via anaerobic digestion.

Anaerobic digesters or other environments may be improved if hydrogenotrophic methane-producing organisms are added. Unfortunately, preserving these organisms can be difficult since they are typically strict anaerobes, and even traces of oxygen are assumed to be toxic to them. In addition, they are thought to be very sensitive to temperatures above about 70 degrees Celcius, and to drying/dessication. This invention is a method for preservation of methanogenic cultures, including hydrogenotrophs, by air drying with or without heating to improve production of methane, using the reconstituted bacterial culture. Active hydrogen-utilizing methanogens can be preserved and stored as air dried and/or heat dried material, which is an unanticipated result. Current use of the invention presented herein is to increase biomethane production and process stability in anaerobic systems, such as anaerobic digesters. Future uses could involve processes to increase pollutant removal, reduce odor, decrease bioreactor size, improve biogas quality, and decrease digester foaming. The method of claim (4) where the bioaugmentation is done after exposure to air or oxygen.