

Device for Thermo-Magnetic Depolymerisation of Plant Biomass Prior to Methane Fermentation

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Abstract : This publication presents a device for depolymerisation of plant substrates applicable to agricultural biogas plants and closed-chamber sewage treatment plants where sludge fermentation is bolstered with plant mass. The device consists of a tank with a cover equipped with a heating system, an inlet for the substrate, and an outlet for the depolymerised substrate. Within the tank, a magnet shaft encased in a spiral casing is attached, equipped on its upper end with an internal magnetic disc. A motoreducer is mounted on an external magnetic disc located on the centre of the cover. Depolymerisation of the plant substrate allows for substrate destruction at much lower power levels than by conventional means. The temperature within the reactor can be lowered by 40% in comparison to existing designs. During the depolymerisation process, free radicals are generated within the magnetic field, oxidizing the conditioned substrate and promoting biodegradation. Thus, the fermentation time in the fermenters is reduced by approximately 20%.

Keywords : depolymerisation, pre-treatment, biomass, fermentation

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