

# Dry Anaerobic Bioreactors at the All4Waste Circular Economy Park

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## Abstract

The major objective of All4Waste Circular Economy Park is to enable primarily private organizations to carry out their innovative research activities connected to wastewater management, usage, and treatment within the context of the Circular Economy. The All4Waste park has the needed environmental licensing for waste and wastewater treatment, according to the current EU legislation (3982/2011). Energy and food production must have minimal environmental impact in order to meet the demands of the growing world population. In order to manage organic wastes, anaerobic digestion uses biological processes to break down proteins, lipids, and carbohydrates without the use of oxygen in order to produce biogas. Dry anaerobic digestion has a variety of advantages to wet anaerobic digestion, including less fresh water use and a more favorable energy balance. Agricultural waste, like lignocellulosic biomass, has a high TS content. This article describes the two types A and B pilot anaerobic bioreactors that are situated in the All4Waste park and operate solidly under intermittent conditions with a useful volume of 3 m<sup>3</sup>. A horizontal reactor with an internal horizontal mixing shaft and fins of particular design, the Type A bioreactor is a reactor. A double cone container is the fundamental element of the design. The concentration of the created gas in one spot is guided by the design's simple shape. This location, specifically, is the reactor's center, where a hatch contains machinery for extracting gas. The main chamber has two sides so that hot water can pass between them and maintain a controlled temperature. A horizontal, spinning, cylindrical reactor is the Type B bioreactor. All of the components are churned while the reactor body spins in this alternative method, which also features a new mixing logic as a significant component. The bioreactors have a sensor and an automation system and are installed in All4Waste park. The bioreactors are able to manage an estimated amount of 60 t of waste per year and produce high added value products such as bio-methane and biochar.

**Keywords:** Waste management, Solid anaerobic digestion, biogas

**Acknowledgments:** This research is co-funded within the Partnership Agreement for the Development Framework 2014-2020 by European Union and Greek national funds, through the

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