

# PORTAFERM – A PORTABLE HYDROLYSIS UNIT FOR ANAEROBIC DIGESTION SYSTEMS

T. Pietschmann<sup>1</sup>, A. Klauß-Vorreiter<sup>1</sup>, M Klauß<sup>2</sup>

<sup>1</sup> PORTAFERM, Bauhaus-Universität Weimar, Coudraystrasse 7, 99423 Weimar, Germany

<sup>2</sup> BioVAG, Teichgasse 18, 99423 Weimar; Germany

## 1. ABSTRACT

A portable hydrolysis unit for anaerobic digestion (AD) plants was developed. It is a modular container-based percolation unit for solid organic materials developed to provide instant remedy for biological plant break-downs and to reduce the start-up phase of AD plants. The unit can also be used in singular cases for the digestion of small amounts of biomass. The insulated proto-type of the percolation unit has a volume of 27 m<sup>3</sup> and is equipped with a heating system and a circulation pump. The organic material was charged into the container, percolated for 48 hours under thermophilic conditions. Percolate and remaining biomass can be used as pre-treated materials for digestion. Gas yields will be measured and compared with literature data.

**KEYWORDS:** Anaerobic digestion, dry fermentation, compost, biogas technology

## 2. INTRODUCTION

Increasing energy costs generated by increasing expenses for fossil resources forced a strong use of renewable energy sources in Germany. It is accompanied by several national support initiatives as the German “Renewable Energy Act” [EEG 2004]. One of the most important kinds of power generation occurs by anaerobic digestion plants due to the high availability of biomass as the basic resource. Especially biomass, grown for the energy production in combination with residues from the animal farming is highly interesting for farmers converting themselves into energy farmers. In fact, the oil price jumped within the last year causing in combination with a new legislation (update of the Renewable Energy Act [EEG 2004]) a boom in biogas plant construction activities. 4000 new plants were erected during the last decade in Germany [FVB 2005]. The total number of biogas plants in Thuringia is 57, 19 new AD plants were erected in the year 2005. They have an electrical capacity of 20MW [Reinhold 2005].

The digestion of organic matter to energy and fertiliser is a complex process combining biological and technical matters. The planning and the construction of a plant require detailed knowledge about process biology, material flow management and construction materials and techniques. Some plants were constructed accident-sensitive and working inadequately thus yielding only a part of prognosticated energy yields thus suffering economical losses. Additionally, AD plants suffer hard financial losses in case of break-down of plant biology as the plant does not produce energy for some weeks and no sale of energy is possible. The start-up of an anaerobic digestion plant usually lasts between 4 to 12 weeks. The gas yields and quality are instable during this phase and the normal operation of the co-generator unit is impossible inducing financial losses.