Evaluation of dry fermentation as a preliminary stage for composting organic waste (W2C&G)

K. Ludwig[1], L. Poschmaier-Kamarad[2], E. Binner[2], M. Enigl[1], A. Sonnleitner[1], C. Strasser[1], M. Huber-Humer[2], B. Drosg[1]

[1] BEST GmbH, [2] BOKU

Biochemical Technologies; Sustainable Supply & Value Cycles

Introduction

In biogas production, a distinction can be made between wet and dry fermentation based on the dry matter content – however, there is no clear distinction. Dry fermentation is of particular interest if mainly stackable biomass (organic and residual waste, green waste, crop residues, solid manure) is available; substrates with dry matter contents of 20 to 40% can be fermented. The substrate is generally neither pumpable nor flowable, nor is there constant mixing. A moist environment is nevertheless necessary for the biological process and can be achieved by mixing with process liquid before fermentation or by percolation.

Aims & Objectives of W2C&G (COMET-Project; FFG) are to evaluate different dry digestion technologies for the pre-treatment of biowaste as effective approaches to produce biogas without negative impacts on existing composting plants (Fig. 1).

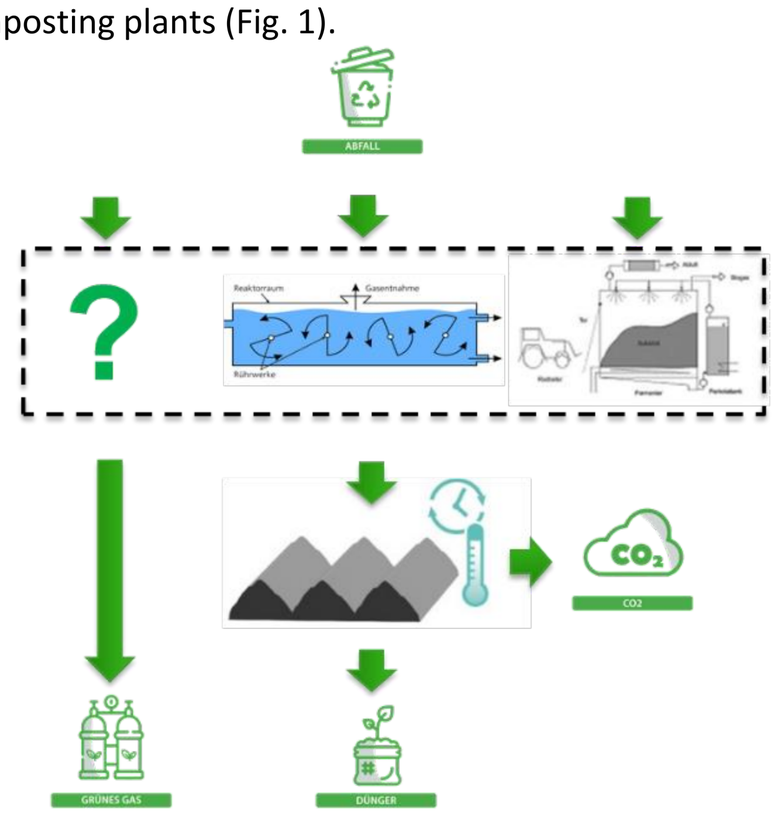


Fig. 1: Aim of the project – integrating dry fermentation into an existing composting plant.

Continuous systems

Vertical plug flow reactor

- **Dranco** has a conical outlet at the bottom, digestate is intensively recirculated.

Horizontal plug flow reactors

- **Laran®** consists of several individually driven agitators with a short shaft, which are arranged at right angles to the flow direction (Fig. 2a).
- **Kompogas®** and **Thöni** have a horizontal longitudinal agitator (Fig. 2b).

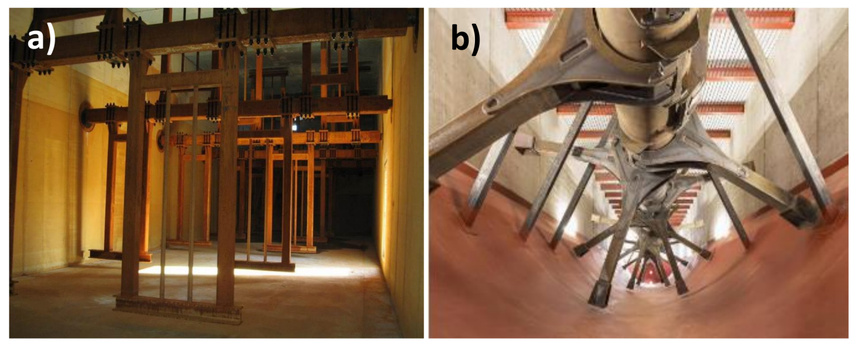


Fig. 2: View inside a) Laran®, b) Kompogas® & Thöni reactors with agitators

Batch / Garage systems

No circulation of the substrate in the reactor. Operation of several digesters in parallel for continuous gas production.

- In **BEKON** systems substrate is inoculated with percolate (green waste, rural biowaste) or digestate (biowaste, cattle manure)
- **Herhof** system (Fig. 3) consists of two parts (dry fermenter, process water storage tank). Substrate is sprinkled with process water (percolate).

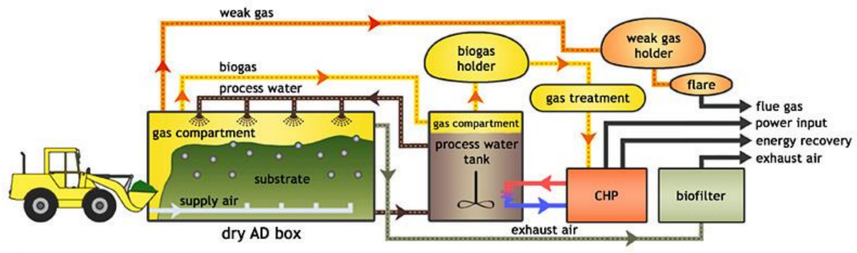
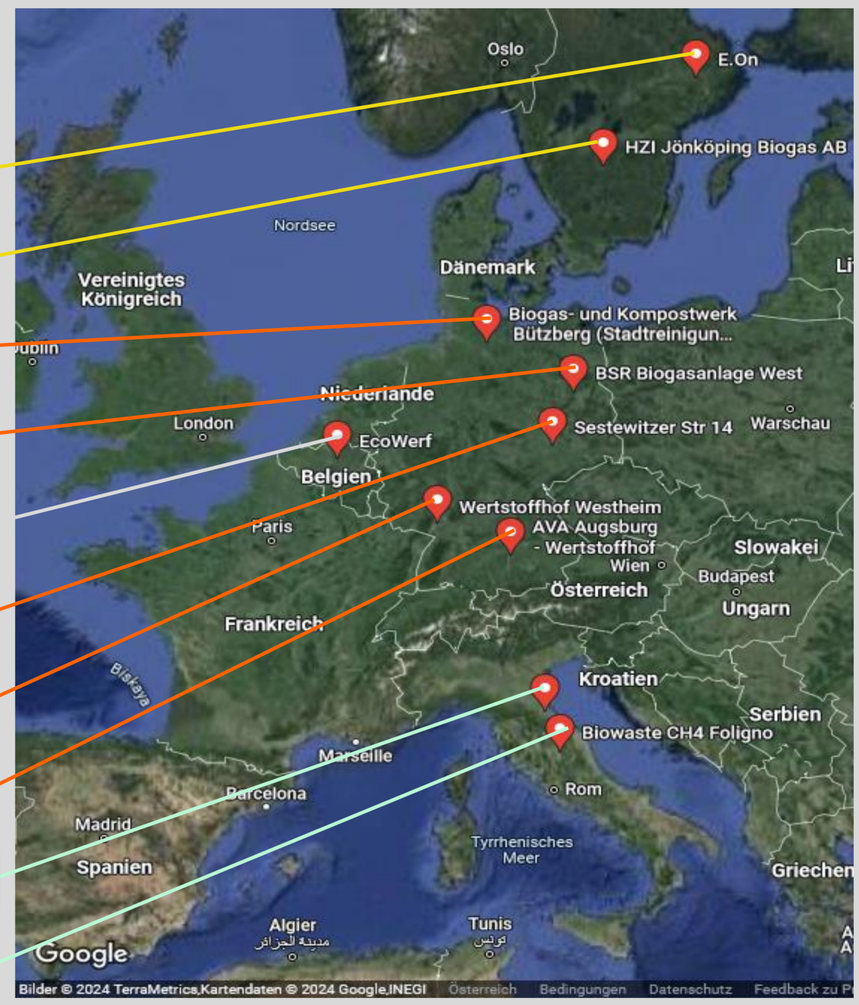


Fig. 3: Scheme of the Herhof system

Examples of existing
dry fermentation plants in Europe

Food-and green waste, 83 000 t/a – Kompogas	Högbytorp - SE
Food- and green waste, 40 000 t/a – Kompogas	Jönköping - SE
Organic waste, 70 000 t/a – Garage digesters	Hamburg - DE
Organic waste, 75 000 t/a – Laran	Berlin - DE
Organic- and green waste, 50 000 t/a – Dranco	Leuven - BE
Organic waste, 42 000 t/a – Herhof	Cröbern - DE
Organic- and green waste, 45 000 t/a – Laran	Westheim - DE
Organic- and green waste, 90 000 t/a – Thöni	Augsburg - DE
Organic waste, 35 000 t/a – BEKON	Cesena - IT
Food- and green waste, 53 000 t/a – Kompogas	Foligno - IT



BEST – Bioenergy and Sustainable Technologies GmbH

Head Office Graz
Inffeldgasse 21b
A 8010 Graz

P +43 5 02378-9201
office@best-research.eu
www.best-research.eu

FFG Promoting Innovation. | Federal Ministry Republic of Austria Labour and Economy | Federal Ministry Republic of Austria Climate Action, Environment, Energy, Mobility, Innovation and Technology | wirtschaftsagentur wien | Für die Stadt Wien | Das Land Steiermark – Wirtschaft, Tourismus, Regionen, Wissenschaft und Forschung | SFG NEUES DENKEN. NEUES FÖRDERN.