

## Characterisation of the biochemical methane potential (BMP) of individual material fractions in Danish source-separated organic household waste - DTU Orbit (08/11/2017)

### Characterisation of the biochemical methane potential (BMP) of individual material fractions in Danish source-separated organic household waste

This study is dedicated to characterising the chemical composition and biochemical methane potential (BMP) of individual material fractions in untreated Danish source-separated organic household waste (SSOHW). First, data on SSOHW in different countries, available in the literature, were evaluated and then, secondly, laboratory analyses for eight organic material fractions comprising Danish SSOHW were conducted. No data were found in the literature that fully covered the objectives of the present study. Based on laboratory analyses, all fractions were assigned according to their specific properties in relation to BMP, protein content, lipids, lignocellulose biofibres and easily degradable carbohydrates (carbohydrates other than lignocellulose biofibres). The three components in lignocellulose biofibres, i.e. lignin, cellulose and hemicellulose, were differentiated, and theoretical BMP (TBMP) and material degradability (BMP from laboratory incubation tests divided by TBMP) were expressed. Moreover, the degradability of lignocellulose biofibres (the share of volatile lignocellulose biofibre solids degraded in laboratory incubation tests) was calculated. Finally, BMP for average SSOHW composition in Denmark (untreated) was calculated, and the BMP contribution of the individual material fractions was then evaluated. Material fractions of the two general waste types, defined as "food waste" and "fibre-rich waste," were found to be anaerobically degradable with considerable BMP. Material degradability of material fractions such as vegetation waste, moulded fibres, animal straw, dirty paper and dirty cardboard, however, was constrained by lignin content. BMP for overall SSOHW (untreated) was 404mL CH<sub>4</sub> per g VS, which might increase if the relative content of material fractions, such as animal and vegetable food waste, kitchen tissue and dirty paper in the waste, becomes larger.

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