



Project no. **SES6-CT-2004-502824**

Project acronym: **CROPGEN**

Project title: **Renewable energy from crops and agrowastes**

Instrument: Specific Targeted Research Project

Thematic Priority: SUSTDEV: Sustainable Energy Systems

#### **D4: Database of crop species methane production potential - final**

Due date of deliverable: Month 28

Actual submission date: Months 25 (interim) and 39 (final)

Start date of project: 01/03/2004

Duration: 39 months

Organisation name of lead contractor for this deliverable

**Wageningen University (WU)**

Revision [0]

<b>Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)</b>		
<b>Dissemination Level</b>		
<b>PU</b>	Public	
<b>PP</b>	Restricted to other programme participants (including the Commission Services)	PP
<b>RE</b>	Restricted to a group specified by the consortium (including the Commission Services)	
<b>CO</b>	Confidential, only for members of the consortium (including the Commission Services)	

## **D4: Database of crop species methane production potential**

In the interim version of this deliverable, a BMP database was built in Excel from secondary sources concerning BMP of crops and residues with more than 500 data entries already included. In the current version the database is expanded and is presented in both Excel and Microsoft access database versions (see attached files). The remainder of this document is unchanged from the interim version.

Due to the fact that the BMP test is not standardized, the extent of degradation reported for different biomass materials is not only the result of their composition but also of the design of the tests used. Several operational conditions influence the outcomes of the described tests including: retention time; pH; temperature; type of hydrolysing biomass; concentration of hydrolysing biomass i.e. inoculum to substrate ratio; water addition; nutrient addition i.e. media (Gunaseelan 1997; Angelidaki and Sanders 2004; Rozzi and Remigi 2004). The equipment used and applied laboratory analytical procedures also exert an influence in the outcomes (Muller, Frommert et al. 2004; Rozzi and Remigi 2004).

Different types of crop materials and residues will show different anaerobic biodegradability in terms of production (BMP) and rates (Hydrolysis rates) according to their different chemical composition. Factors reported as influencing the degree of degradation achieved via AD are: relative lignin content; relative hemicellulose content; mannose content (among hemicelluloses); relative cellulose content; proportion of structural and non-structural carbohydrates; cellulose cristalinity; degree of association between lignin and carbohydrates; the wood-to-bark ratio and the presence of toxic components (Jimenez, Cartagena et al. 1990; Gunaseelan 1997; Lehtomaki, Viinikainen et al. 2003). These factors will also show variation among the same crop specie according to different cultivation methods, plant parts, harvest time/plant age/growth stage, and genotypes (Deren, Snyder et al. 1991; Gunaseelan 1997; Saint-Joly, Desbois et al. 2000; Lehtomaki, Viinikainen et al. 2003).

In general the biological approach to determine anaerobic biodegradation or methane potentials leads to substantial uncertainty in the determination (Angelidaki and Sanders 2004). In fact, figures reported in literature should always be analysed taking into account the design of the test, as variation is found among procedures currently being used. Colleran and Pender (2002) highlighted the need to harmonize anaerobic biodegradation, activity and inhibition assays, especially in what refers to the standardisation of the test inoculum, the test medium, the test conditions and the duration of the biodegradability tests.

In addition to the actual BMP values that are presented in the database, also physico-chemical characterization of the tested materials is given as well as the experimental conditions at which these values were assessed. When kinetic data were present in the articles this was included as well in the database as it constitutes an input to Deliverable 10. Literature research to include more BMP data is still ongoing and BMP data generated in the CROPGEN project will also be included. Communication has been established with BOKU and Soton in order to facilitate assembly of the databases they are building.

## References

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