

Pre-normative work on sampling and testing of solid biofuels for the development of quality assurance systems

(BioNorm)

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**BIO-ENERGY
ENLARGED PERSPECTIVES**

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EU Political Targets

- **Reduction of GHG emissions by 8 %**
- **White Paper on Renewable Sources of Energy**
- **Renewable Electricity Directive**
- **European Biofuel Directive**

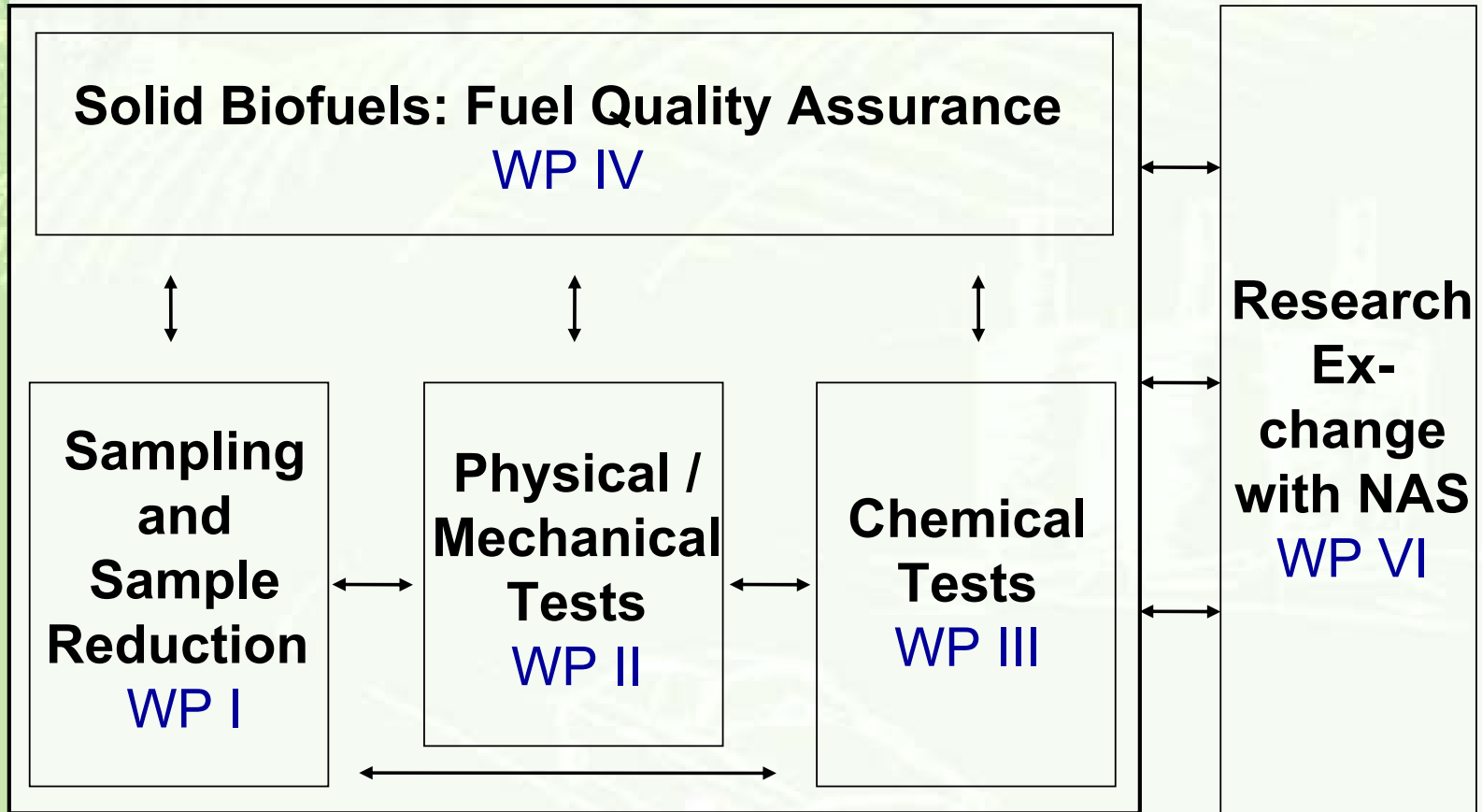
Measures to achieve targets

- **Definition of acceptable standards for classification, sampling and testing of solid biofuels**
- **Development and implementation of QA and QC systems for solid biofuels**
- **Elimination of trade barriers by harmonisation of the existing rules within Europe**
- **Development of a European market for solid biofuels**

Aim of BioNorm

- **To carry out pre-normative work on solid biofuels in cooperation with CEN TC 335 "Solid biofuels" in the field of**
 - **sampling and sample reduction**
 - **physical / mechanical tests**
 - **chemical tests**
 - **QA systems**
 - **integration of Newly Associated States (NAS) in the standardisation process**

BioNorm Structure



Overview Data

- **Project runs from 1st Jan 2002 to 31st Dec 2004 (3 years)**
- **33 partners from 14 European countries and 16 subcontractors involved in WP I to IV**
- **6 partners from the NAS are active in WP VI (Bulgaria, Czech Republic, Latvia, Lithuania, Poland, Hungary)**
- **Total budget: 5.7 Mio €, EC contribution 3.5 Mio €**
- **Project has been designed to support the work of CEN TC 335 "Solid biofuels" (i.e., pre-normative research)**

Work Package I

Sampling and Sample Reduction

- **Task I.1: Investigation of methods for sampling biofuels**
(i.e., assess the bias that may occur when samples are taken from stockpiles instead of moving streams and define the number of increments needed to provide a representative bulk sample)
- **Task I.2: Investigation of methods for sample reduction of biofuels**
(i.e., assess the variations introduced by sample reduction and determine the usefulness of a range of practical sample reduction methods)
- **5 partners from 3 countries involved**

Work Package II

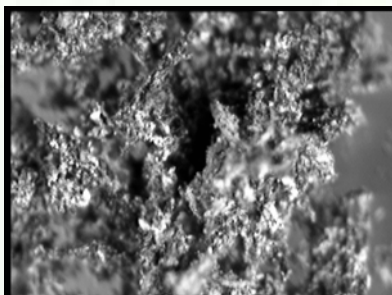
Physical / Mechanical Tests

- **Task II.1: Moisture content and bulk density**
(i.e., improvement of the exactness of procedures to determine bulk density and moisture content)
- **Task II.2: Ash melting behaviour**
(i.e., improvement of the exactness of procedures to measure ash content & melting behaviour)
- **Task II.3: Particle size distribution and dimension**
(i.e., improvement of the accuracy of methods to measure dimension and size distribution)
- **Task II.4: Durability and raw density of pellets and briquettes**
(i.e., improvement of procedures for the determination of density of compressed biofuels)
- **18 partners from 12 countries involved**

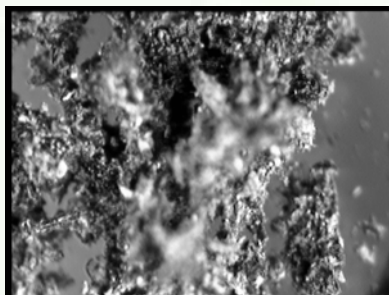
Results of WP II

e.g. in Task II.2 Ash melting behaviour:
melting of ashes at different temperatures under
the microscope

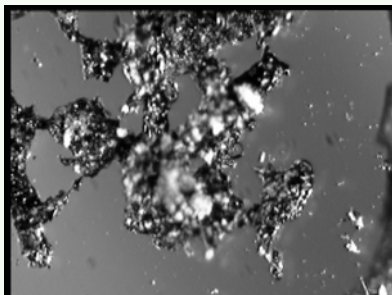
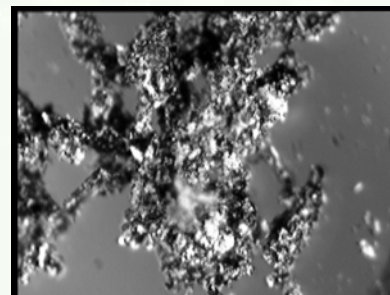
550 °C



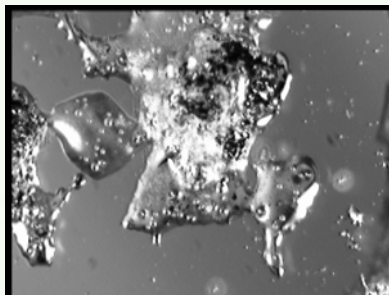
850 °C



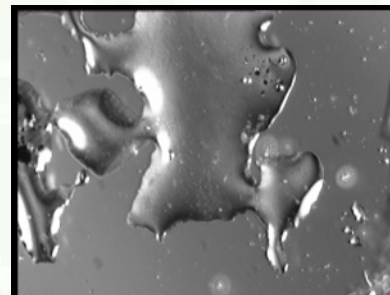
950 °C



1000 °C



1050 °C



1100 °C

Work Package III

Chemical Tests

- **Task III.1: Determination of sulphur, chlorine and nitrogen**

(i.e., improvement of the exactness of existing procedures for the determination of the S, Cl and N content especially in herbaceous biofuels)

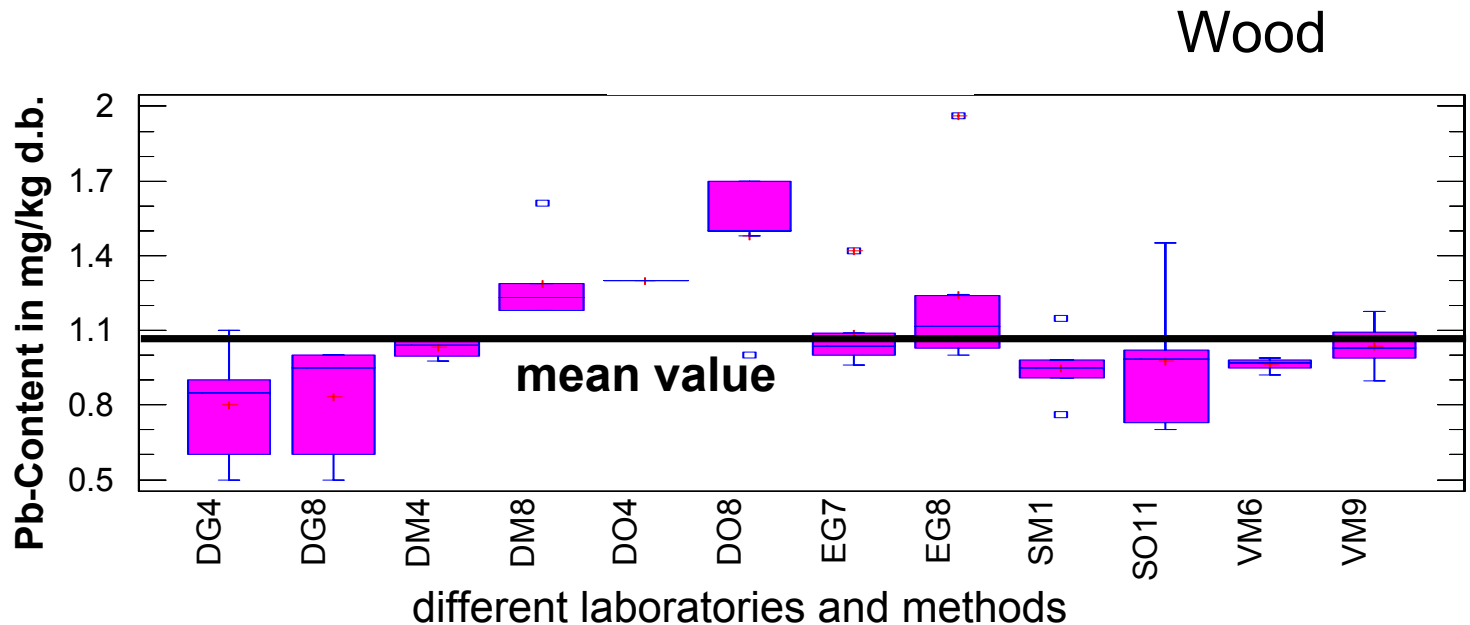
- **Task III.2: Determination of major and minor elements**

(i.e., the available tests will be screened and improved because the precision of these tests is fairly poor)

- **12 partners from 9 countries involved**

Results of WP III

e.g. in Task III.2 Major & minor elements:
Pb content shows high variation among methods tested



Work Package IV

Fuel Quality Assurance (QA)

- **Task IV.1: Review on quality assurance systems**
(i.e., development of the basics of a quality assurance system especially for solid biofuels)
- **Task IV.2: Implementation of quality assurance systems**
(i.e., performance of case studies for different kinds of companies and different types of fuels)
- **Task IV.3: Proposal for a Draft Standard**
(based on the results of these case studies a proposal for a Draft Standard on QA will be developed)
- **6 partners from 5 countries involved**

Results of WP IV

e.g. in Task IV.2 Implementation of QA systems: Design of a draft manual for QA

1. Description of the steps within the fuel chain
2. Definition of the specification for each intermediate and final product
3. Factors considered to be most influential in terms of fuel quality
4. Appropriate measures of QA:
 - a system for the allocation of responsibilities to trained staff
 - a system recording the results of the evaluation of raw material
 - a system for recording deliveries
 - a system of quality-control at critical-control points (CCP's)
 - a system for dealing with non-complying material
 - appropriate documentation about origin, production, transportation, sampling and quality declaration.
 - etc.

Work Package VI

Research Exchange with NAS

- **Task VI.1: Country report**
(i.e., evaluation of the solid biofuel quality situation in NAS)
- **Task VI.2: National platforms**
(i.e., organisation of an optimal information flow between the project consortium and affected NAS bodies)
- **7 partners from 7 countries involved**

Schedule



WP	Milestones	1 st project year												2 nd project year												3 rd project year																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36							
0	Project Management	■			■			●	■			●	■			●	■			●	■			■			●	■			●	■			●									
	Project Meetings	■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■								
1	Sampling	■			■			■			■			■			■			■			■			■			■			■			■			●						
1.1	Sampling	■			■			■			■			■			■			■			■			■			■			■			■			■						
1.2	Sample reduction	■			■			■			■			■			■			■			■			■			■			■			■			■						
2	Physical/mechanical Tests	■			■			■			■			■			■			■			■			■			■			■			■			■			●			
2.1	Moisture content and bulk density	■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		●				
2.2	Ash melting behaviour	■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		●				
2.3	Particle size distribution	■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		●				
2.4	Durability and raw density of pellets + briquettes	■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		■		●				
3	Chemical tests	■			■			■			■			■			■			■			■			■			■			■			■			●						
3.1	Sulphur, Chlorine and Nitrogen	■			■			■			■			■			■			■			■			■			■			■			■			■			●			
3.2	Major and minor elements	■			■			■			■			■			■			■			■			■			■			■			■			■			●			
4	Fuel quality assurance	■			■			■			■			■			■			■			■			■			■			■			■			■			●			
4.1	Review	■			■			■			■			■			■			■			■			■			■			■			■			■			■			
4.2	Implementation	■			■			■			■			■			■			■			■			■			■			■			■			■			■			●
4.3	Developing draft standards	■			■			■			■			■			■			■			■			■			■			■			■			■			■			●
6	Research Exchange with NAS	■			■			■			■			■			■			■			■			■			■			■			■			■			●			
6.1	Country Report	■			■			■			■			■			■			■			■			■			■			■			■			■			■			●
6.2	National Platform	■			■			■			■			■			■			■			■			■			■			■			■			■			■			●

- Reports and Deliverables

Summary

- **The co-operation with CEN TC 335 "Solid biofuels" has proven to be excellent.**
- **First results are available, indicating an often fairly large error of existing test procedures.**
- **Improved test methods are currently being developed as well as the existing procedures and their limitations of application are being assessed deeply.**
- **Thus BioNorm contributes significantly to better and more reliable standards.**
- **This will help to extend the market for solid biofuels and thus the confidence of the customer within Europe.**

**Thank
you very
much.**