KBBPPS
Knowledge Based Bio-based Products' Pre-Standardization

Work package N° 5

Bottlenecks and impacts on functionality tests

Deliverable N° 5.1:
Stakeholder workshop report

Public

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2 Introduction

The following presents the main goals of the first stakeholder workshop organized within the KBBPPS project:

1) Presentation of project's objectives and scope as well as a brief description of the tasks and targets of each work package to the workshop attendees.
2) Identification of the most relevant bio-based intermediates and products from different branches for the methodology, measurement and validation: Shaping of the product list presented by the nova-Institute.
3) Analysis of the need, expectations, hurdles and acceptance of bio-based certification methodologies amongst industry and consumers.

1 Publishable summary

The aim of the European Union's FP7 project „Knowledge Based Bio-based Products' Pre-Standardization (KBBPPS)" is to execute pre- and co-normative research, which will be used directly in the CEN standardization process on the same topic. This will provide the European and global market with horizontal standards on biogenic carbon and biomass content as well as biodegradability that have been assessed on a first set of selected bio-based products.

The main aim of the first stakeholder workshop, part of the functionality work package and led by the nova-Institute, was to get feedback and stakeholders' opinions on the identification of a set of bio-based products, which will be the subject and scope of the project's research work. So the goal was to know the essential product groups for further research that would cover a broad area of research-related questions and also would cover complete market relevance in terms of share, prospect and actual possibilities

For the stakeholder workshop, the nova-Institute sought the participation of important stakeholders from industry, associations and certification bodies and invited them to share their expertise and shape the product list so that it covers a wide range of bio-based products, including bio-based plastics, composites, solvents, lubricants, adhesives, wood plastic composites, and CO_2-based materials among others.

The list proposed by the nova-Institute was presented and after an open feedback round with the workshop participants, a final list of 26 products was defined.
In addition, the needs, expectations, hurdles and acceptance of bio-based certification methodologies amongst industry and consumers was the focal point of an open brain storm and discussion at the end of the workshop.

The stakeholder workshop took place on 16 January 2013, from 10:30h to 17:00h at the Representation of the Federal State of North Rhine-Westphalia to the European Union, Rue Montoyer 47, 1000 Brussels.

Participation was free of charge and was kept to a maximum of 40 people.

General information about the workshop, together with the agenda, the participant list and the given presentations is still available at http://bio-based.eu/kbbpps-stakeholder/home

3 List of participants

First Name	Name	Company/Organization	City	Country
Ylwa	Alwarsdotter	SEKAB BioFuels &Chemicals	Örnsköldsvik	Sweden
Francesca	Dr. Aulenta	BASF SE	Luswigshafen	Germany
Dr. Achim	Boenke	EC, DG Enterprise and Industry, Chemicals Industry Unit	Brussels	Belgium
Michael	Carus	nova-Institut	Hürth	Germany
Constantin	Ciupagea	European Commission, Joint Research Centre	Ispra	Italy
Prof. James	Clark	University of York Green Chemistry Centre	UK	United Kingdom
Bengt	Davidsson	CEPI	Brussels	Belgium
Antoine	de Forton	Sappi Europe S.A.	Bruxelles	Belgium
Bruno	De Wilde	OWS nv	Gent	Belgium
Dr. Francesco	Degli-Innocenti	Novamont	Novara	Italy
Anna Chloe	Devic	REPSOL	Mostoles, Madrid	Spain
Dr. Oliver	Ehlert	DIN CERTCO GmbH	Berlin	Germany
Bakker	Frits	ECN	Petten	Netherlands
Prof. Dr. Hilmar	Förstel	TUV Rheinland Agroisolab GmbH	Jülich	Germany
Dr. Jaap	Hooijmans	ECN	Petten	Netherlands
Berthold	Hülk	LABNET GmbH	Dülmen	Germany
Marco	Jansen	Braskem Netherlands BV	Rotterdam	Netherlands
Manfred	Kircher	CLIB2021 - Cluster Industrielle Biotechnologie	Düsseldorf	Germany
Matthew	Krolac	A and O Filmpac ltd	Olney	United Kingdom
Dr. Harald	Käb	narocon	Berlin	Germany
Dr. Iain	Moore	Croda Europe Ltd	Goole	United Kingdom
Nike	Mortier	OWS	Gent	Belgium
Huub	Omloo	DSM Engineering Plastics	AP Geleen	Netherlands
Dr. Thomas	Prasch	BIO.NRW	Düsseldorf	Germany

Paul	Reinshagen	Biobased Press	Amsterdam	Netherlands
Adriana	Sanz Mirabal	nova-Institut	Hürth	Germany
Lena	Scholz	nova-Institut	Hürth	Germany
Dogan	Sivasligil	Cargill	Vilvoorde	Belgium
Martin	Snijder	GreenGran BV	Ede	Netherlands
Thomas	Stintzing	SKZ - TeConA GmbH	Würzburg	Germany
Hasso	v. Pogrell	European Bioplastics	Berlin	Germany
Dr. Maarten	van der Zee	Wageningen UR Food & Biobased Research	Wageningen	Netherlands
Dr. Jeroen	van Soest	Rodenburg Biopoly-mers	Oosterhout NB	Netherlands
Dr. Richard	Vendamme	Nitto Denko Corpora-tion	Genk	Belgium
Ward	Vervoort	CEI-Bois aisbl	Brussels	Belgium
Bart	Vleeschouwers	Boerenbond	Leuven	Belgium
David	Webber	PA Europe - Bioplas-tics Value Chain	Brussels	Belgium
Harmen	Willemse	NEN	Delft	Netherlands

5 Conclusion

The following presents the main outcomes of the stakeholder workshop.

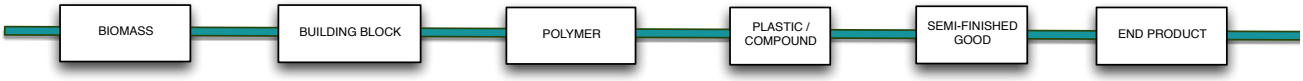
5.1 Identification of the bio-based products to investigate

The bio-based products list should let us to identify the most important bio-based intermediates and products for the measurement methodology and validation while also covering the most challenging ones (e.g. extremes or boundaries from the point of view of the analytical complexity) and identifying the problems posed in that case.

In order to achieve the right coverage of the existing bio-based products portfolio, the following classification pathways, by which bio-based products can be classified, were identified:

1) Biomass source

2) Value chain position



3) Application sector

4) Market volume (tonnes/year)

5) Market share

6) Growth potential

7) Mixing level

8) Bio-based content

9) State of matter

10) Biodegradability

The first six classification pathways give a good market overview on bio-based products and would be interesting for the analysis of functional bottlenecks, current amount of renewable raw materials, current market share, structure of suppliers and consumers, potential of bio-based products in different fields and for communication of the results.

The following three and classification pathways would be especially relevant from a measurement and test point of view.

A general feedback on these variables and in what case they pose problems for measurements could help find the most challenging bio-based products.

Definition of the qualities "Biodegradability" is one central goal for the standardisation process.

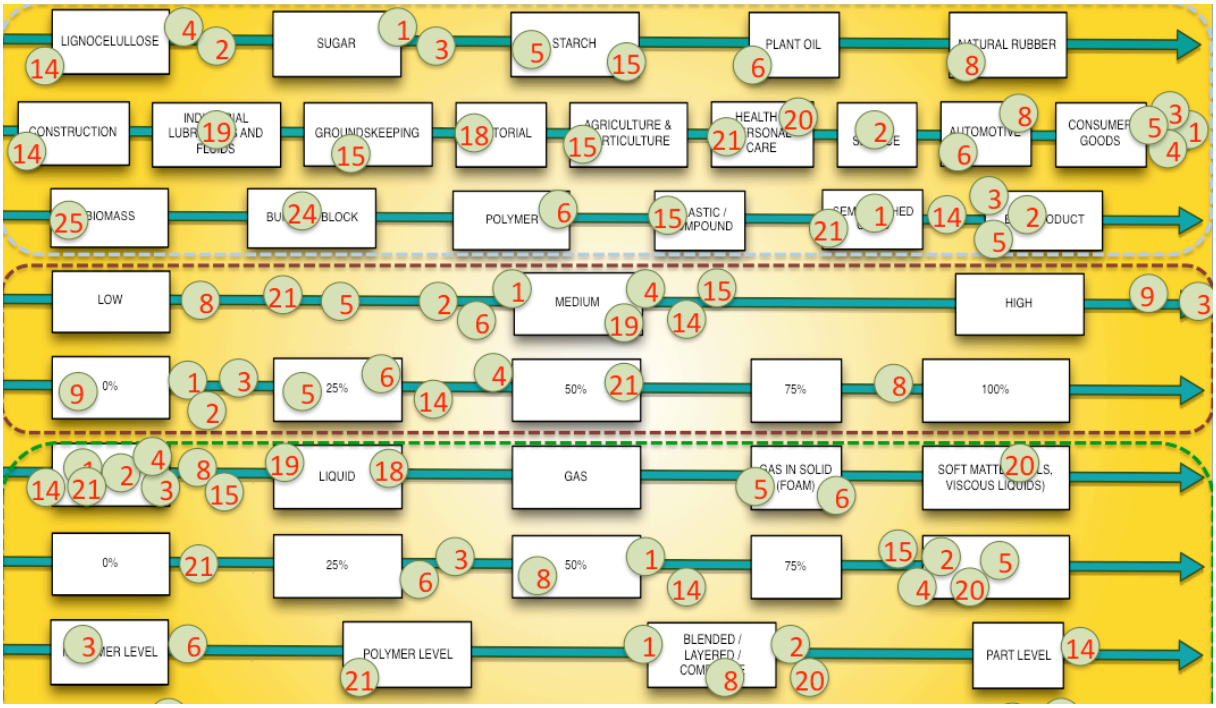
The bio-based products list was presented to all workshop participants. After an interactive discussion, where all attendees could share their views and expertise, all feedback was gathered and summarized and thus the list was shaped and improved (please see Table 1).
Fig. 1 shows how the proposed products cover the different categories included in the ten different classification pathways above mentioned.
The bio-based products list was once again reviewed in detail by all project partners at the second General Assembly (6 March 2013, Hürth, Germany) and the final version will be publicly presented for a last feedback round at the first KBBPPS Advisory Workshop, on 9 April 2013, Cologne, Germany.

Table 1: Bio-based products list presented at the stakeholder workshop

	Bio-based product	Market Sector	Biodegradability	Typical average Biomass content in This application	Biomass source	Value chain Position	Heterogeneity / Mixing level	State of matter	Volume of Market sector Size	Market Sector Share	Growth Potential
1	**Packaging films (PLA + PBAT+ additives): End product, printed**	Packaging films	Industrial compostable	40 - 50%	Starch/sugar	Semi---finished (film, printed)	Blend /layered	Solid	140 kt	< 5%	Medium
2	**Disposable cups and plates (PHA-coated paper), high calcium carbonate containing (mineral fillers)**	Food service	Anaerobic Degradation, Industrial compostable, home composting	80 - 90%	Starch + Lignocellulose	End product	Layered	Solid	2 kt	< 5%	Medium
3	**Beverage bottles (Bio-based PET from bio- based MEG)**	Packaging - plastic Bottles	No	30 - 87%	Sugar	End product (b2b)	Monomer mix	Solid	700 kt (worldwide)	< 5%	Very high
4	**Packaging chips (Starch-based loose fill flips)**	Packaging	Home compostable, industrial compostable	100%	Starch	End product (b2b)	Pure starch	Solid		10 --- 20 %	Low
5	**Seat cushions (25% soy-Based polios in PU foams)**	Automotive Interior	No	20 - 50%	Plant oil	Semi finished	Monomer level, Mixed on site	Gas in solid	100 kt (worldwide)	< 5%	Medium
6	**Door trimming, Hemp/flax/kenaf/PP-mat press molded parts**	Automotive Interior Trimming	No	50 - 80 %	Lignocellulose (natural fibers)	Semi finished	Composite	Solid	190 kt	10 --- 20 %	Medium
7	**Tires**	Automotive - Tires	No	50 - 60 %	Natural rubber, Starch	Finished product	Blend	Solid	400 kt (Germany)	50 --- 100%	Low
8	**CO2-based PPC-PHA vacuum cleaner casing**	Consumer goods --- Consumer Electronics	Industrial Compostable	0 - 100%	CO_2; Carbohydrates	End product	Blend	Solid	< 1 kt	< 5%	Very high
9	**Technical high performance polyamide**	Consumer goods --- Consumer Electrics	No	60 - 80%	Castor oil	End product	Plastic	Solid	50 kt	< 5%	High
10	**Consumer electronics Casing; cellulose acetate and additives**	Consumer goods --- Consumer Electronics Casing	Industrial Compostable	40 - 50%	Lignocellulose	End product	Blend	Solid	90 kt	< 5%	Medium
11	**Particle Board (<95% wood particles, adhesives and waxes)**	Construction and Furniture Engineered Wood Products	No	90 - 100%	Lignocellulose	Semi finished Product	Composite	Solid	9.4 mio t (Germany)	50 --- 100%	Low
12	**WPC decking from extruded profiles (60% wood flour +PP + additives)**	Building and Construction - Decking's	No	50 - 70 %	Lignocellulose	End product	Composite	Solid	250 kt	10 --- 20%	Medium
13	**Remanufactured construction components**	Building and construction - Remanufactured Houses	No	20 - 80 %	Lignocellulose, Plant oils, starch	Semi---finished Product	Composed structure	Solid		20 --- 50%	Medium
14	**Fertilizers**	Agriculture and Horticulture - Fertilizer	n.a.	80 - 100%	Starch + Byproducts	End product (b2b)	Blend	Solid	241 mio t (worldwide)	< 5%	Medium
15	**Mulch Films (starch blends)**	Agriculture and horticulture	In soil, defined after growing period	50 - 60%	Starch	End product (b2b)	Blend	Solid	130 kt	10 --- 20%	Medium
16	**Natural Paint; plant oil based, inorganic fillers, volatile compounds**	Paints and coatings	No	< 10%	Plant oil, proteins	Semi-finished to end product	Emulsion	Liquid	2,2 mio t (Germany)	10 --- 20 %	Low

17	**Solvents**	Solvents	In soil, in marine Water, in fresh water	50 - 60%	Plant oil, carbohydrates	End product	Pure	Liquid		10 - 20%	low
18	**Lubricants**	Industrial Lubricants	in soil, in marine water, in fresh water	50 - 80%	plant oil	end product (b2b)	solution	Liquid/gel		10 - 20%	medium
19	**Facial scrub cream with PHA pearls**	Personal care Facial care products	disposable in waste water treatment plants	80 - 100%	Plant oil, carbohydrates	End product	Emulsion	Solid in gel/liquid		20 - 50%	low
20	**Blended fabrics: Viscose, Cotton, polyester**	Textiles	no	10 - 95%	Cellulose (viscose, cotton, flax, hemp)	Semi finished product	Fiber mix	Solid	4.7 mio t (worldwide)	< 5%	low
21	**Boat hulls; glass/carbon fiber mats in bio-based matrix, hand laminated**	Sport Yachts	no (inert in marine and fresh water environment)	50 - 60 %	Plant oil	End product	Composite	Solid		< 5%	low
22	**Natural Oil Polios (NOPs)**	Thermoset-Precursors	no	50 - 100%	Plant oil	Precursor	Solution	Liquid	2.2 mio t	5 - 10%	low
23	**Chemical Pulp**	Resource for cellulose-based chemicals	in soil, in marine water, in fresh water, industrial compostable	99 - 100%	Lignocellulose	Treated biomass	fibrous gel	Gel	300 kt (Germany)	50 - 100%	low
24	**Adhesives and binders**	Production Accessory-Adhesives / Binders	in soil, in marine water, in fresh water	70%	Plant oil, proteins	end product (b2b)	Emulsion	Liquid		10 - 20 %	low
25	**LPG**	Camping gas	n.a.	100%	Carbohydrates	end product	Pure	Gas		< 5%	medium
26	**Bio-butane**	Resource for organic chemistry	n.a.	100%	Carbohydrates	precursor	Pure	Gas		< 5%	medium

Fig. 1: Overview of the number of products covered by the different categories.



5.2 Expectations, hurdles and acceptance of bio-based certification methodologies

The following presents a summary of the different opinions and ideas expressed during the open discussion and brainstorm at the end of the workshop (please see chapter 4).

The bio-based products market includes a broad range of intermediate products, product components, and ready made products, e.g. bio-based plastics, bio-based lubricants, natural fibres for textiles, composite materials for construction and automotive applications, chemical and pharmaceutical building blocks and organic acids among others. Market and technological barriers are factors that hinder the successful development and market entry of bio-based products. The bio-based market is overlapping to existing markets; only in niche areas completely new markets can emerge. Therefore, many bio-based products must first gain entrance to existing markets, substituting existing products and deal with existing regulations and other barriers (see more examples below) that were set in place before the bio-based alternatives were available. This often led to “non-bio-based” regulations, which in some cases should be reviewed in order to give the bio-based alternatives a fair chance while not compromising the aims of the regulations.

Market entry barriers can come from many sources, such as societal barriers, customer acceptance, regulations, local waste management, etc. In order to develop the use of bio-based products in different markets it is necessary to identify and review these barriers. Specific challenges for a bio-based market include, measurement and communication of environmental benefits and product properties (need for LCA skills and data to prove economic, environmental and societal benefits), development of the raw material supply and scaling up from pilot scale to industrial scale production, and balanced regulations and political frameworks to develop a level playing field for biomass applications.

Based on the identified barriers, some of the industry needs are access to funding, technology transfer and development of strategic partnerships. The process from basic research to commercialised bio-based products is normally longer than the one for "conventional" products because of regulatory issues to overcome before commercialisation of the products may occur. This can delay the commercialisation of certain products by several years.

Europe is currently well placed in the markets for innovative bio-based products, building on established knowledge and a leading technological and industrial position. However, perceived uncertainty about product properties and weak market transparency hinder the fast take-up of these products. The social acceptance of bio-based products is normally high but the uncertainty about environmental benefits and product properties sometimes restrict market penetration. Therefore, the acceptance and commercial adaptation of bio-based products can be improved by communication, standardisation and labelling.