Open-BIO
Opening bio-based markets via standards, labelling and procurement

Work Package 8

Product information list

Deliverable N° 8.2:
Requirements of product information list

Public

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1 Abbreviations

ACDV	Association Chimie du Végétal
AUA	Agricultural University of Athens
B2B	business to business
B2C	business to consumer
B2P	business to public procurer
BBP	bio-based products
BTG	B.T.G. Biomass Technology Group BV
CEN	European Committee for Standardization
DLO-LEI	Stichting Dienst Landbouwkundig Onderzoek
FNR	Fachagentur Nachwachsende Rohstoffe e.V.
GPP	Green Public Procurement
IAR	French Pôle de compétitivité vocation mondiale Industries & Agro-Ressources
LCA	Life Cycle Assessment
NEN	Nederlands Normalisatie - Instituut
NOVA	nova-Institut für politische und ökologische Innovation GmbH
TC	Technical Committee
TUB	Technische Universität Berlin
WP	Work Package

2 Publishable summary

This report, produced by the Agency for Renewable Resources (www.fnr.de) in cooperation with Technische Universität Berlin and Stichting Dienst Landbouwkundig Onderzoek under the FP7 Project '*Opening bio-based markets via standards, labelling and procurement' (www.open-bio.eu)* presents stakeholder research on Business, Public Procurement and Consumers regarding their product information requirements towards bio-based products. It analysis data regarding the information and the expressed need for standardization related to a list of product information items and makes suggestions for product information which is streamlined towards the requirements of the analysed stakeholder groups. Results will contribute to the development of a European bio-based product database and information tool.

The results gave sufficient indications regarding the product information requirements of the engaged stakeholders. They provide a valuable contribution to the development of the product database which is the main target of WP8. Results also show a general support for standardized product information. Consumers first need to understand the term bio-based, they need to understand what it is about and what effects it has. They do not know enough about bio-based products to have an opinion about information requirements about these products. Therefore consumer targeted information needs to be very basic. It should start with explaining the idea behind bio-based products in general before focusing on detailed product information.

70 percent or more of the B2B stakeholders supported the items percentage of bio-based content; CO_2 emissions, Environmental Life-Cycle Impact, Toxicity and Recyclability as important product information which should be presented in a standardized format. 70 percent or more of the B2P stakeholders supported these items and added the items type of feedstock, origin of feedstock, biodegradability, compostability, recycled content and life-cycle costs. It can be concluded that these items should be used to describe bio-based products for business and public procurement stakeholders in the Open-Bio product database.

3 Introduction

This document presents research carried out under the project '*Opening bio-based markets via standards, labelling and procurement'* (Open-Bio) (see figure 1) to inform the development of a bio-based information tool within Work Package 8 '*Product Information List*'. It represents the second deliverable of the work package developed in the context of task 8.2 '*Target Group Requirements*'.

The **Open-Bio project** aims at increasing the uptake speed of standards, labels and harmonized product information lists for bio-based products in Europe. As outlined in the European Commission's Bioeconomy Strategy, such measures are expected to have a positive effect on the European bio-based market.

The project covers research and demonstration on direct and indirect biomass content methods, biodegradability and eco-toxicity tests. The goal is to provide results for the adoption by European standards and product information lists. These form the basis for a database on bio-based products for procurement. A label will be developed in order to clearly distinguish bio-based products. Additional research will investigate factors influencing the acceptance of bio-based products by consumers, businesses and public procurement officials. This will ensure that standards, labels and information lists address all relevant aspects for enabling the rapid market uptake of bio-based products.

By participating in the Standardization Committee, CEN/TC 411, on "Bio-based products" (its Secretariat being one of the partners), Open-Bio will directly support the standard development process.

More information on the project can be found at: **www.open-bio.eu**

Figure 1 –Open-Bio Project Description

As indicated Work Package (WP) 8 deals with the development of a bio-based product information tool, which shall consist of a database of bio-based products described according to the needs of procurers from business and public organizations as well as consumers. Furthermore other informative elements are foreseen (i.e. product comparison, information on labels).

Task 8.2 aimed to assess the informational requirements of potential buyers of bio-based products in the business-to-business (B2B) market, in public procurement and in the end consumer market regarding the content of a product information list.

To identify these informational requirements, different methodological approaches were chosen. For the business-to-business market and public procurement, questions on informational requirements were integrated in expert surveys on the market acceptance of bio-based products, which took the form of a Delphi survey. The consumer research was conducted in the form of Focus Groups. First results of this stakeholder research brought insights on the relevant information items which these target groups deem important to describe bio-based products (BBP) when making a purchasing decision.

4. Research approach and connection with other work packages

4.1 Introduction

The Open-Bio project team for WP8 decided at an early stage to join forces with Work Package 9 of the Open-Bio project to implement the task, which is subject of this report. WP9 deals with the stakeholder acceptance of bio-based products. The work plan of WP9 foresaw to approach the same stakeholder groups as in WP8 at almost the same time. Therefore it was decided to integrate survey questions on informational requirements of the three target groups within broader survey exercises developed in work package 9.

Stakeholder groups were jointly identified and resources for the distribution of surveys were mobilized among the participating Open-Bio partners. Furthermore, it was decided to focus on the same selection of Member States. A focus on only few EU countries was necessary due to resource constraints (e.g. for translations of questionnaires).

Following the research approach in work package 9, different survey methodologies were chosen for the business-to-business market and public procurement, on the one hand, and consumers, on the other. For the business-to-business market and public procurement sector, questions on informational requirements were integrated in expert surveys on the market acceptance of bio-based products, which took the form of a Delphi survey. The consumer research was conducted in the form of Focus Groups. Corresponding to the responsibilities in work package 9, the Delphi survey was led by TU Berlin, while the consumer Focus Group research was led by DLO-LEI.

As a result of this cooperation with work package 9, results in this report partly overlap with WP9 work, where the full survey results are reported, including but not limited to the questions on informational requirements. Questionnaires were distributed between months February and July 2014. Results were assessed in August/September 2014. In the upcoming project months these results will be integrated in scheme guidelines which formulate the concept of the future bio-based product database and information tool.

The lead partners for the deliverable are FNR, TUB and DLO-LEI. FNR was responsible for the integration of findings, comparative analysis, development of conclusions relevant to the work package, analysis of the procurement survey data and led the drafting of this deliverable. Moreover, it led dissemination of the public procurement survey and supported dissemination of the business-to-business survey. TUB developed, translated and implemented the Delphi surveys, conducted analysis of the business survey data and led the dissemination of the business-to-business survey and supported dissemination of the public procurement survey. DLO-LEI developed and implemented the Focus Group research and conducted analysis of the resulting data. The task 8.2 was supported by NOVA, NEN, BTG and ACDV. Europabio, European Bioplastics and IAR assisted as advisory partners. The partners NOVA,

and BTG contributed to the identification of target groups and to the selection of Member States. NEN supported liaison to CEN/TC 411. NOVA and BTG substantially contributed to the dissemination of the questionnaire. Additionally all partners gave valuable feedback during project meetings.

4.2 Selection of target groups

According to the Open-Bio description of work, three stakeholder groups, businesses, public procurers and consumers, were to be asked about their product information requirements when purchasing bio-based products. Public authorities are clearly distinguishable from the other target groups due to the fact that their procurement is strongly regulated by European law. There are overlaps between the stakeholder groups business actors and consumers. Business stakeholders who are using upstream bio-based products are engaged as buyers and producers. Consumers as required in WP9 are defined as end consumers who are not engaged in any business activities.

Survey dissemination

Due to differing requirements, the dissemination strategies differed across the three target groups. Business experts were approached at two industry conferences, via mailing list administered by Nova Institute covering European businesses in the bio-based sector as well as via a number of national associations and other national multiplier organizations in the field. The survey was available in the major European languages English, French, German, Spanish and Italian.

Since no relevant, Europe-wide mailing list could be identified for the field of public procurement, dissemination could only be conducted via national multiplier organizations in this field. Moreover, it was assumed that the knowledge of the English language especially among procurement officers active at the local level may not be sufficient for participating in the survey. For this reason, translations were prepared for all target countries (see following section).

For the Focus Group research, sub-contractors were used to find participants and conduct the Focus Groups in the target countries.

Target countries

Due to resource constraints, a set of target countries was selected for conducting the procurement survey and consumer research. Research on the business-to-business market took a Europe-wide approach, while ensuring a minimum number of participants from the target countries. The following indicators were chosen to identify relevant Member States for the public procurement and consumer surveys:

- regional distribution (Scandinavia, Western Europe, Eastern/Central Europe, Mediterranean), and

- top runner status in bio-economy (GPP policy, bio-technology status, eco innovation index, other environmental legislation in favour of BBP[1])

Based on a regional pre-selection, top runner countries were selected. Within each region the most suitable country was chosen. Therefore the status of the bio-economy[2] in each country and the eco-innovation performance[3] was taken into consideration to get a picture of the economy status. To assess the policy framework environmental legislation, bio-economic strategies and Green Public Procurement (GPP) policies were considered assuming that countries supporting environmentally sustainable procurement will also be open to the opportunities of bio-based products.

Region	Selected Country
Scandinavia	Denmark, Finland
East/Central Europe	Czech Republic, Germany
Western Europe	The Netherlands, UK
Mediterranean/ Southern Europe	Slovenia, Italy, France

Figure 2: Selected Countries for B2P research

The consumer research was organized in Focus Groups which took place in pre-selected European countries. Again the selection focused in a first step on regional distribution and secondly on the front-runner status of a Member State. For the consumer research this was operationalized applying data on consumer awareness related to eco-friendly products (Eurobarometer 2009-1; Eurobarometer 2009-2), biotechnology (Eurobarometer 2006) and their general attitudes towards sustainability certification (Eurobarometer 2012) and environmental protection (Eurobarometer 2009-3). The special regard to attitudes and acceptance as well as labelling and certification was particularly relevant for research in WP9 which focuses on the acceptance of bio-based products and also provides input to the label development in WP7. However these aspects are also of high relevance for product information requirements of consumers.

Region	Selected Country
Scandinavia	Denmark,
East/Central Europe	Czech Republic, Germany
Western Europe	The Netherlands
Mediterranean/ Southern Europe	Slovenia, Italy

Figure 3: Selected Countries for B2C research

[1] Relevant are national strategies on biotechnology or other relevant legislation (i.e. plastic bag legislation in Italy). (Banaccorso and European Commission:4)
[2] This was assessed based data on key biotechnology indicators which was collected by the OECD. The indicators were the Number of biotechnology firms as well as the employees in the biotechnology sector. (OECD)
[3] The sub-indicators cover both governmental and private sector activities and spending, while 4.1 - material productivity, 4.2 water productivity, 4.3 - energy productivity, 4.4 GHG emissions intensity cover all sectors. 5.2 Employment in eco-industries covers private and civil sectors. (Eurostat/ EcoInnovation Index)

Based on the Member States selection for the three stakeholder groups, network resources among the Open-Bio partners were mobilized to reach the target groups. Furthermore partners conducted desk research to find relevant stakeholders in each country. For the consumer research sub-contractors were commissioned by DLO-LEI (as leader of WP9) to identify participants in the selected countries. They organized and implemented all national Focus Groups.

4.2 Development of questionnaires

As described before, the research on the product list requirements in WP8 was combined with research on the social acceptance of bio-based products, labelling and certification in WP9. The concept and questions of the Delphi Expert Surveys as well as the Focus Groups were developed in close cooperation between all partners of WP9 and WP8.

For the business and public procurement surveys, the Delphi method based on expert opinions was used. A Delphi study uses multi-stage survey rounds. Between these rounds intermediate anonymous feedback is provided by the participant panel. It aims to obtain consensual expert opinions and to identify needs for action. For the Expert Surveys with business and public procurement stakeholders, two rounds are planned. The Delphi Studies are led by TUB. Questions regarding the product list requirements were integrated in this questionnaire. This report reports on results from this first survey round.

DLO-LEI organized Focus Groups with consumers. This will be followed by a survey to be distributed to a larger group of consumers. Focus Groups use interactive group settings were participants are asked about attitudes and feelings about a certain issue. A Focus Group Guide is used as basis for moderated face-to-face group discussions with participants. The questions on the product list requirements were used in the Focus Groups to ask participants about their product information needs.

The B2B and B2P questionnaires started with items exploring the respondents and organizational profiles. The B2B questionnaire then focused on market drivers and barriers for bio-based products including the topics environment & health, feedstock, performance & cost and public opinion and policy. A section on product information requirements followed, which was the main source of input for the current deliverable. Respondents were given different potential information items and were asked to provide feedback whether or not they were important for a purchasing decision. They were also asked if this information should be standardized (see Figure 4). A number of the items within this block were taken from a CEN Questionnaire Template for reporting product characteristics. (CEN 2013) Literature gave reason to add additional items. A number of these dealt with purchasing processes and were not directly related to product characteristics and attributes (i.e. location of manufacturer or product availability and terms of delivery.) (Behördenspiegel 2014; Beck/Schuster 2013; FNR 2013) For these additional items the linkage to standardization is not straightforward and sometimes even questionable. However, for the sake of a consistent question structure, it

was still asked accordingly. The questionnaire ended with items about the development and content of a bio-based label.

The B2P questionnaire looked into procurement practices. Therefore it asked about green and innovation oriented public procurement. A detailed section on green public procurement dealt with environmental, cost and performance related aspects. Another section asked about measures which would be most effective to support the uptake of bio-based products. The questions regarding product information needs were identical to those in the B2B questionnaire to facilitate comparison across the two target groups.

The Focus Groups used a different approach compared to the Delphi Expert Surveys. It focused on attitudes and feelings about bio-based products. Participants were given more time to get familiar with the concept of bio-based products and they could express their attitudes about them in a face-to-face group meeting. Furthermore they were introduced to concrete products and asked about the characteristics they associate with them. The different methodology also had the aim to get important information about the characteristics that are relevant for consumers and therefore should be part of bio-based product information. The Focus Groups also dealt with labels and the attitudes of consumers towards them. Here moderators also provided the list of possible product information items that was used in the Delphi Rounds and asked participants whether or not an item would support a buying decision.[4]

For each item, please answer to what extent you agree or disagree with the following statements:	a) Importance of information					b) Standardization requirement				
a) Information on this item is very important for taking the decision to purchase a bio-based product. b) Information on this item should be standardized to facilitate the comparison of similar products.	I strongly disagree				I strongly agree	I strongly disagree				I strongly agree
	-2	-1	0	1	2	-2	-1	0	1	2

Figure 4: Survey questions - product information and standardization

[4] For a full assessment of the First Delphi Round for B2B and B2P as well as the Focus Groups for B2C see the report on deliverable 9.1 of the Open-Bio project.

5. Assessment of results

This chapter will present survey results regarding product information requirements from the first Delphi Rounds for B2B and B2P stakeholders as well as the B2C Focus Groups. After the description of the respondent profiles, it presents the responses regarding a list of information items and the attributed necessity for standardization of the various items. While the B2B survey did not focus on a certain set of EU countries, the B2P and B2C made a selection. Nonetheless the turnout shows in both Delphi Rounds a similar over-representation of Germany and France and to a lesser extent of The Netherlands and Italy. Although other Member States were also intensively targeted, only a few persons working in those countries answered the questionnaires. It is a fair assumption that bio-based products are more salient in countries with a stronger stand in the European bioeconomy than in countries which play a more modest role at present. This would appear to be reflected in the motivation to participate in the survey.

5.1 Business to Business

The B2B assessment of the survey results is taken from the analysis by TUB that is presented in the Open-Bio Deliverable 9.1 on Stakeholder Acceptance. While D9.1 covers results of the whole survey here we will focus specifically on the basic information of the respondent profiles and the issue of product information requirements and needs for standardization.

5.1.1 Respondents‘ profiles

The survey was completed by 314 respondents from more than 17 different EU Member States and a number of non-EU Member States countries, defined according to their place of work. The largest number of respondents indicated France (33%) as their place of work, followed by Germany (28%), the Netherlands (9%), Italy (7%) and Belgium (6%).

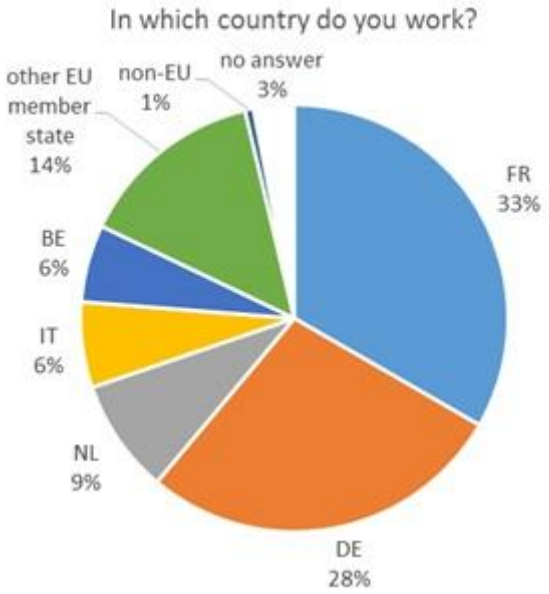

Figure 5: Geographic distribution of respondents

Slightly over half of the respondents work for businesses (51%). The second largest share works at universities and research institutes (25%), followed by representatives of government and public agencies (8%), and industry associations (6%). Only a small share represents non-governmental organizations (2%).

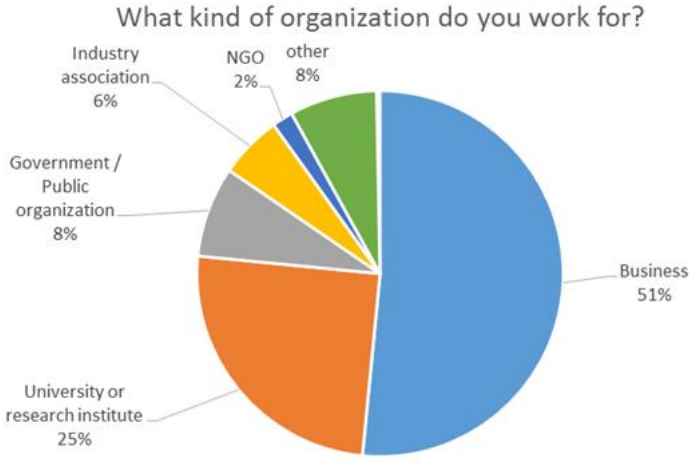

Figure 6: Type and size of respondents' organizations

5.1.2 Role in the bio-based industry

Reliance on bio-based sources

Over 60 percent of respondents' organizations are actively engaged in the production, purchase and/or trade of bio-based products or materials. The declared reliance on bio-based sources reveals relatively strong participation from both organizations with only marginal involvement in the sector (i.e. less than 10 percent reliance on bio-based sources) and organizations whose activities are already primarily centred around markets for bio-based products (i.e. more than 50 percent reliance on bio-based sources). Each group represents about a quarter of the total respondents and close to a third of those respondents who replied to the question (excluding respondents who selected "not applicable" or who failed to answer the question).

Figure 7: Reliance on bio-based sources among respondents' organizations

Type of business activities

Regarding the specific type of business activities, the largest number of respondents declared to be involved in the production of intermediate bio-based products (42%). This was closely followed by the production of end products (35%). A combined total of 24 percent of respondents declared to be involved in the purchase and/or trade of bio-based products. It should be noted that many respondents declared their involvement in multiple categories. Of those involved in the production of bio-based products (52%), about two thirds are exclusively producers, representing about one third of all respondents. Those exclusively involved in the purchase of bio-based products represent only approximately four percent of the total. A total of 126 respondents or 39 percent declared that they do not produce, purchase or trade bio-based products.

Figure 8: Types of business activities among respondents' organizations

Type of bio-based product

In a separate question, respondents were asked to indicate which type of bio-based product their organization buys or sells. The largest number of respondents declared to produce or buy bio-plastics (31%). Among this group, close to 40 percent, or twelve percent of the overall total, are involved exclusively in that product category. This was followed by the category "Other bio-based products or materials" with 23 percent and wood-based materials with 16 percent. Among the latter, about one quarter, or four percent of the overall total, are involved exclusively in the field of wood-based materials. The remaining product types ranged from 15 percent for bio-surfactants to twelve percent for bio-lubricants. Aside from bio-plastics and wood-based materials, only a very small number of respondents indicated that they are involved exclusively in a single product category.

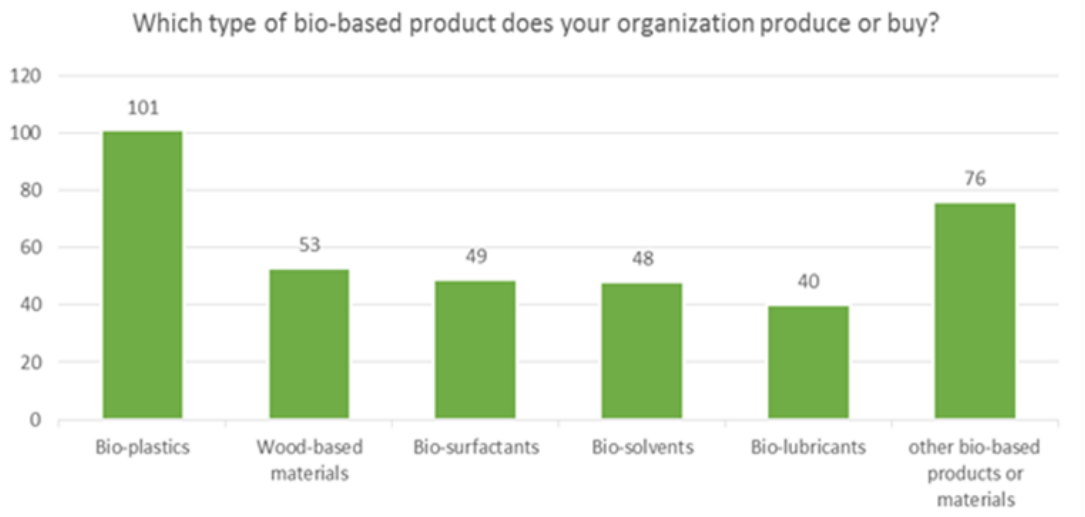

Figure 9: Involvement of respondents' organizations in production or purchase of different types of bio-based products

Individual expertise

Respondents were also asked to indicate their level of expertise in the field of bio-based products as well as labelling and certification. More than 85 percent claimed to have at least some expertise in the field of bio-based products. Of this, slightly less than half (i.e. 41 percent of respondents) consider themselves experts. Approximately 15 percent declared that they have no special expertise in the field of bio-based products.

Figure 10: Declared level of expertise among of respondents: bio-based products and labelling and certification

5.1.3 Survey results

Figure 11 and Figure 12 present the responses regarding the perceived importance of information (Figure 11) and the perceived need for standardized information to facilitate comparison of similar products (Figure 12) for the various items included in the questionnaire. The items are ranked in descending order according to the average of all responses (i.e. the sum of all responses ranging from 1 to 5 divided by the total number of respondents who answered the particular item). The results show that most of the items included in the list were considered important for taking the decision to purchase a bio-based product. Moreover, with a small number of exceptions, the perceived importance of the items shows a positive correlation with the perceived need for standardization to facilitate comparison with similar products. For most items, respondents more strongly agree with the need for the standardization of information. Figure 11 provides a graphical illustration of the positive correlation between the importance of information and the need for standardization.

Information on the percentage of bio-based content is considered the most important for taking the decision to purchase bio-based products. This is closely followed by toxicity. The only items that received less than 50 percent positive responses were the categories “intended use” (49%), “life-cycle costs” (44%), “location of manufacturer” (39%) and “calorific value” (33%).

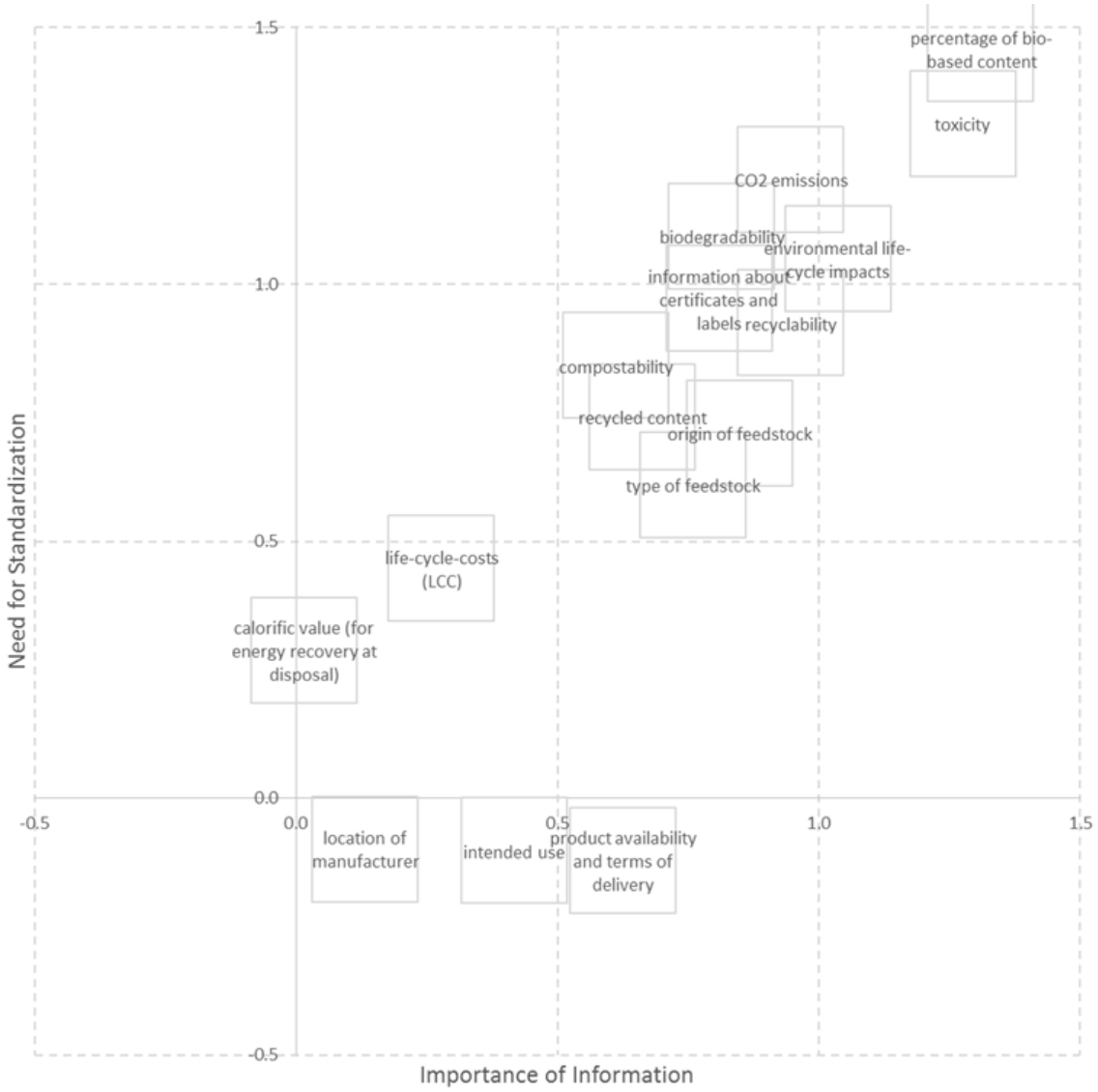

Figure 11: The relationship between the perceived importance of information and the perceived need for standardization

As already mentioned, the perceived need for standardization is for the most part positively correlated with the perceived need for information. Accordingly, the items with the highest number of positive responses are also “bio-based content” and “toxicity”. The only exceptions to this pattern are the items “intended use” and “product availability and terms of delivery”, for which the perceived importance of standardization is even lower than the relatively low level of importance attributed to these items. This pattern can be explained by the fact that these items do not lend themselves to formal standardization.

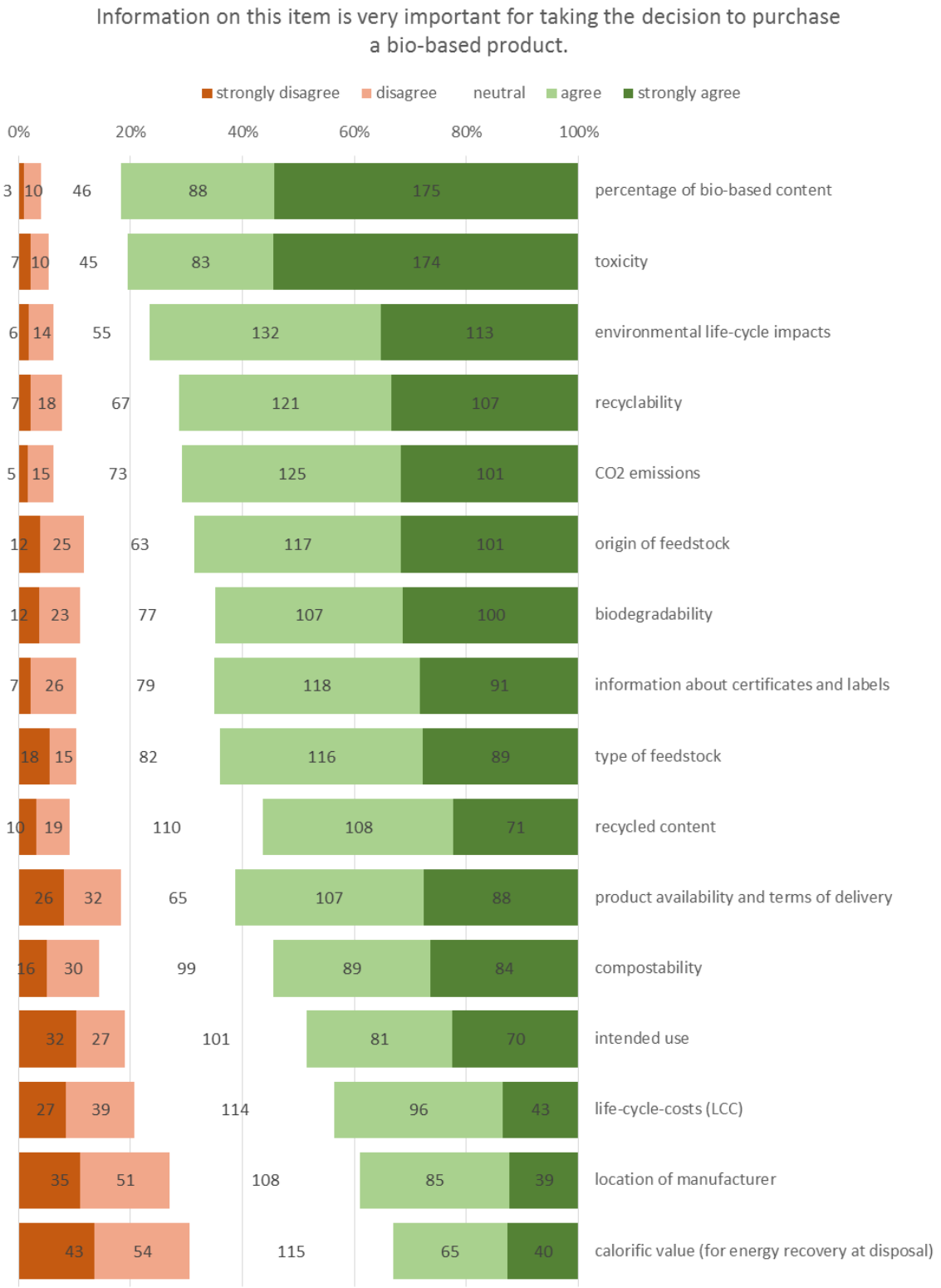

Figure 12: Perceived importance of information for purchasing bio-based products, ranked according to the average of all responses

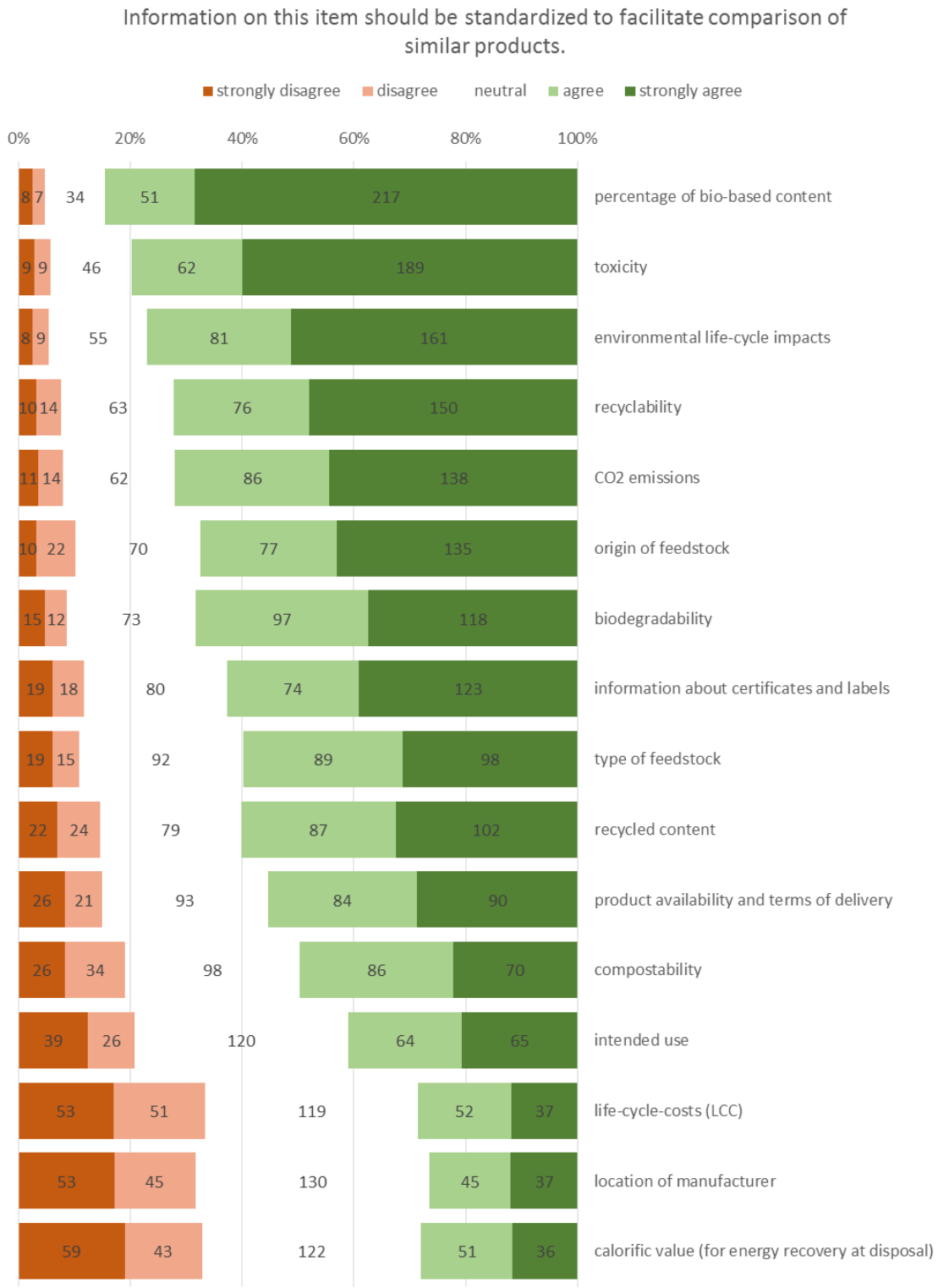

Figure 13: Perceived need for standardization, ranked according to the average of all responses

5.1.4 Conclusions for the product information list

Most of the information items tested in the survey were considered important for a purchasing decision. Usually they were also perceived as important subjects to standardization. Compared with public procurers (see 4.2), business representatives are less enthusiastic about standardization and the need for information.

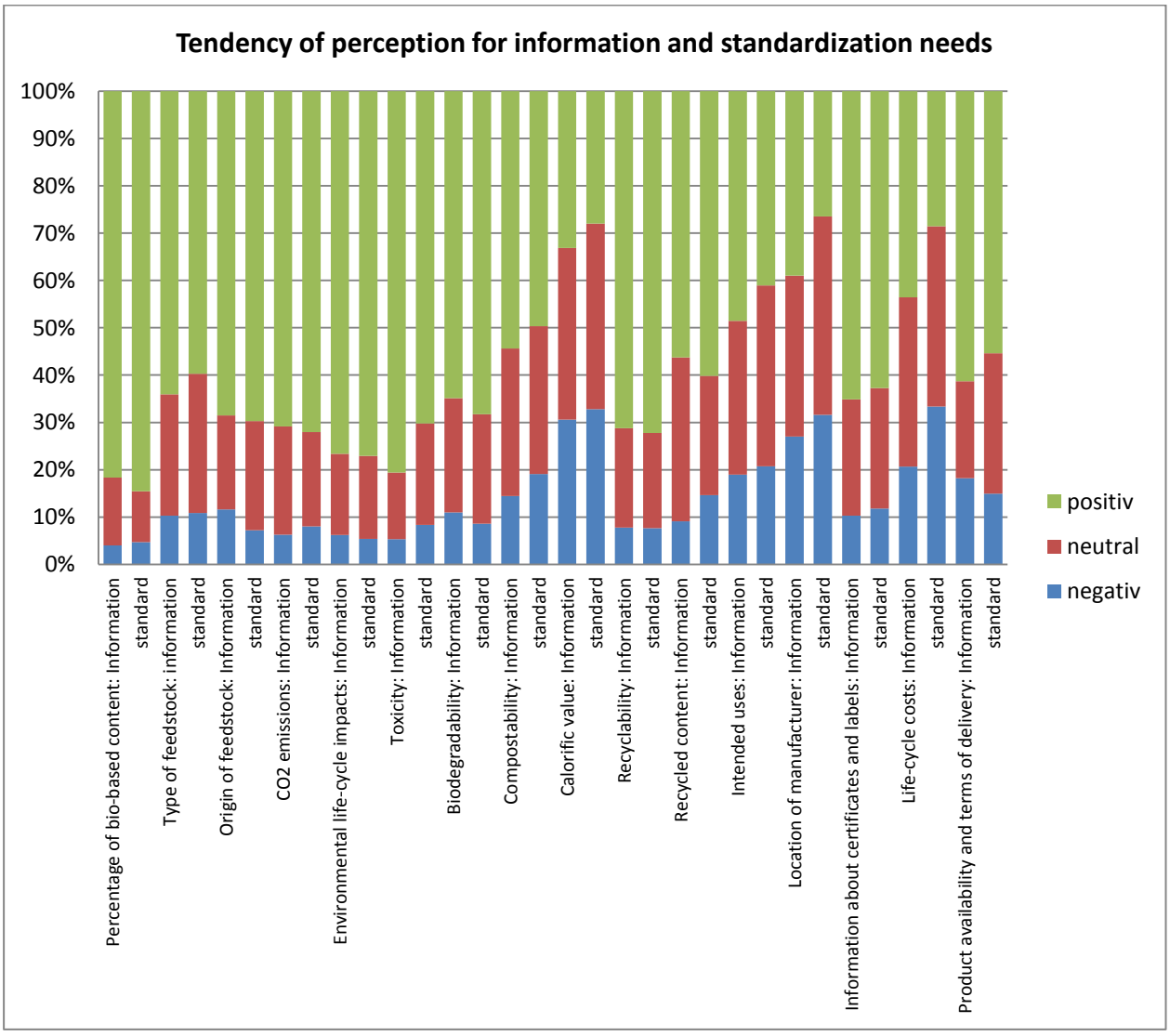

Figure 14: General attitude towards information and standardization (B2B)

When summing up the positive *(I strongly agree; I agree)* and the negative *(I strongly disagree; I disagree)* answers, only five items reach a support level above 70%. Four items were supported by less than 50 percent of respondents (see Figure 15).

Level of Support for Information and Standardization (both categories need to be within the threshold)		
>70%	**>50%**	**<50%**
Percentage of bio-based content	Type of feedstock	Calorific Value
CO_2 Emissions	Origin of feedstock	Intended Use
Environmental Life-Cycle Impact	Biodegradability	Location of manufacturer
Toxicity	Compostability	Life-Cycle Costs
Recyclability	Recycled content	
	Information on certificates and labels	
	Product availability and terms of delivery	

Figure 15: Relevant items for a product information list (B2B)

5.2 Public Procurement

Although the selected countries, which represent all European regions, were targeted with translated versions of the questionnaire through crucial national multipliers in public procurement, the turn-out was merely satisfactory. Almost three quarters of all respondents are based in Germany, France, the Netherlands and Italy which are also among the biggest players in the European bioeconomy.

5.2.1 Respondent profiles

The survey was completed by 171 respondents from more than 11 different EU Member States. 4 percent of the respondents work in non-EU Member States countries. 12 percent choose not to answer this question. The largest number of respondents indicated Germany (45%) as their place of work, followed by Italy (12%), France (8%), the Netherlands (6%) and Slovenia (4%) (see figure 16).

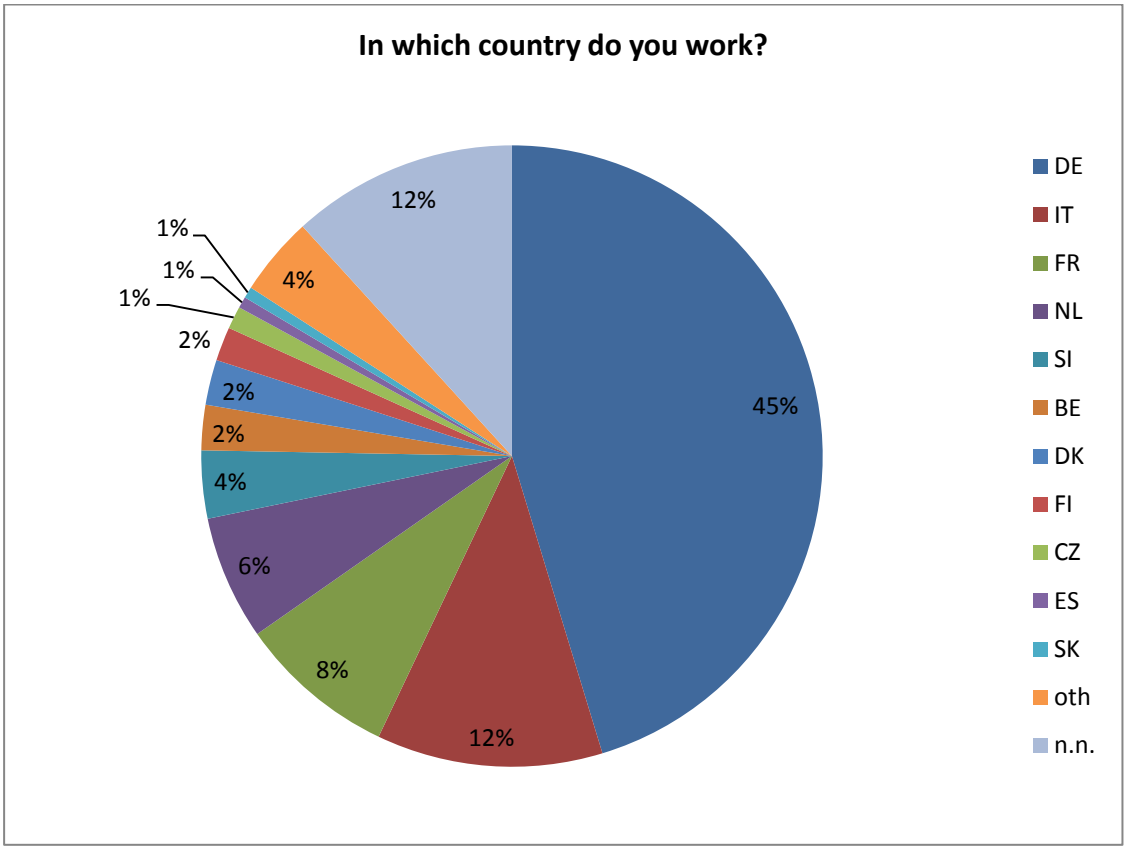

Figure 16: Working country of respondents

An equal share of respondents came from government or government agency (30%) and municipal or other state-owned service providers (30%). 7 percent of the respondents came from public sector associations or networks. 33 percent were not attributed to either of these organisations (see Figure 17).

Respondents who could not fit their organisation into the three options were asked to provide additional information regarding the type of organisation they were coming from. Among the answers were public health organisations, government agency or bodies, municipalities and chambers. Some of the answers would have fitted to either of the answer options. Organisations with clear public background which did not fit into the provided categorisation were public business organisations, universities, research institutes and the European Commission. There were also a few answers from respondents which did not entirely fit to the stakeholder group targeted by the questionnaire, among them business companies, consultants and NGOs.
Regarding the administrative level, 4 percent came from the European level, 25 percent from national, 35 percent from regional and 32 percent from the local/municipal level. 4 percent came from neither of these levels (i.e. global) (see Figure 18).

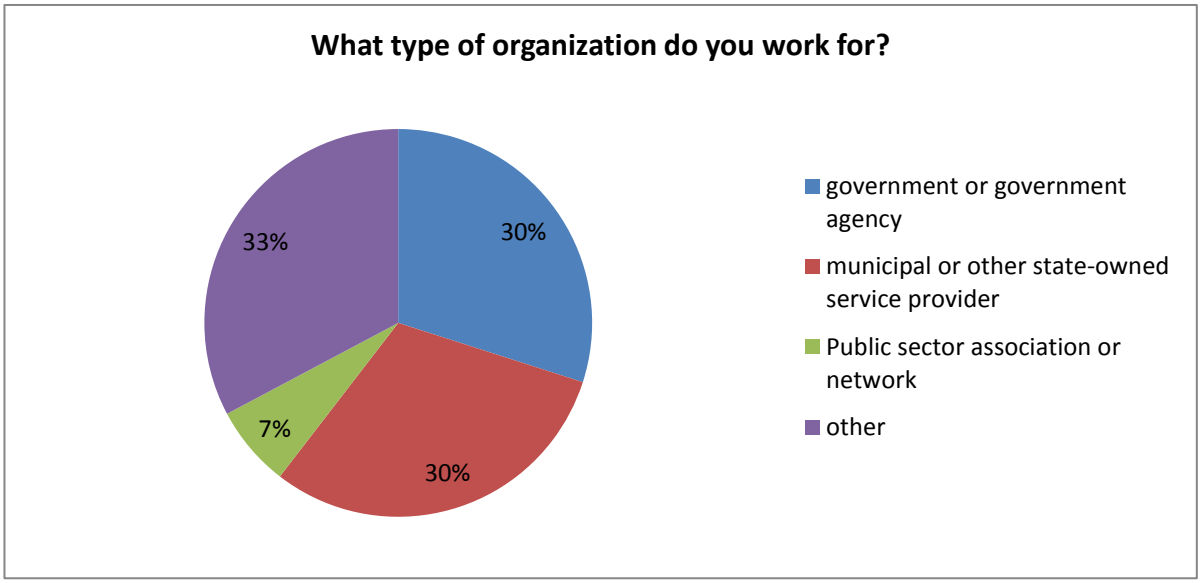

Figure 17: Type of procurement organization

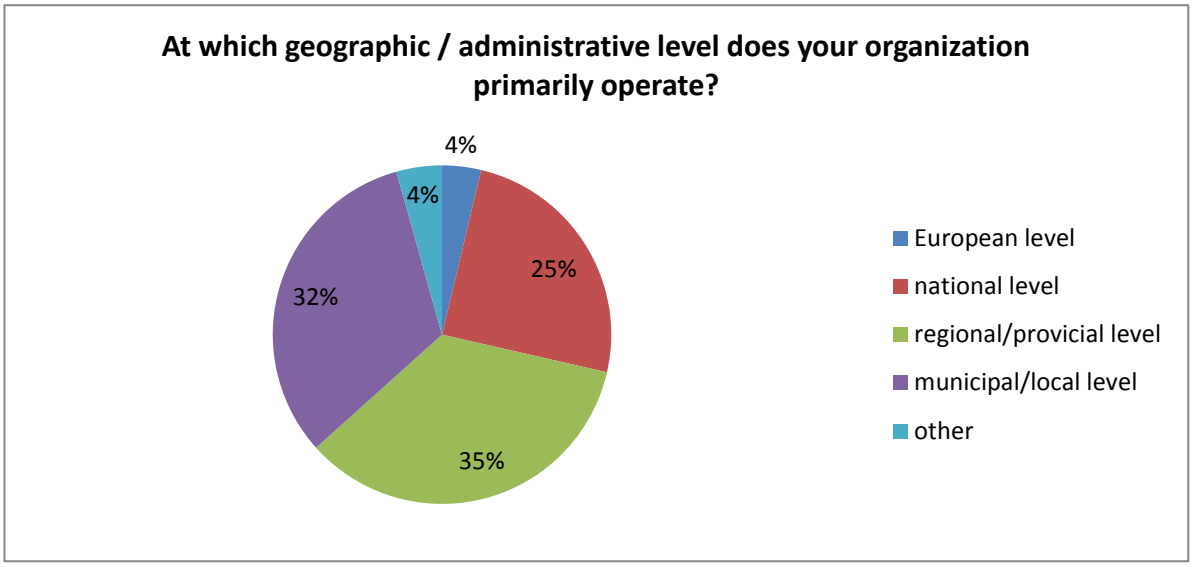

Figure 18: Administrative level of procurement organisation

Respondents were asked to specify their role in public procurement. An equal share of respondents were *public procurement officers* (25%) or *directors/ managers of public procurement units*. 12 percent identified themselves as *(technical) material specialists supporting public procurement* and 2 percent as *(legal) officers in support of public procurement*. 9 percent were *policy advisers in public procurement* and 20 percent somehow involved with public procurement (i.e. environmental manager or head of administration). 11 percent were not involved in public procurement activities (see Figure 19).

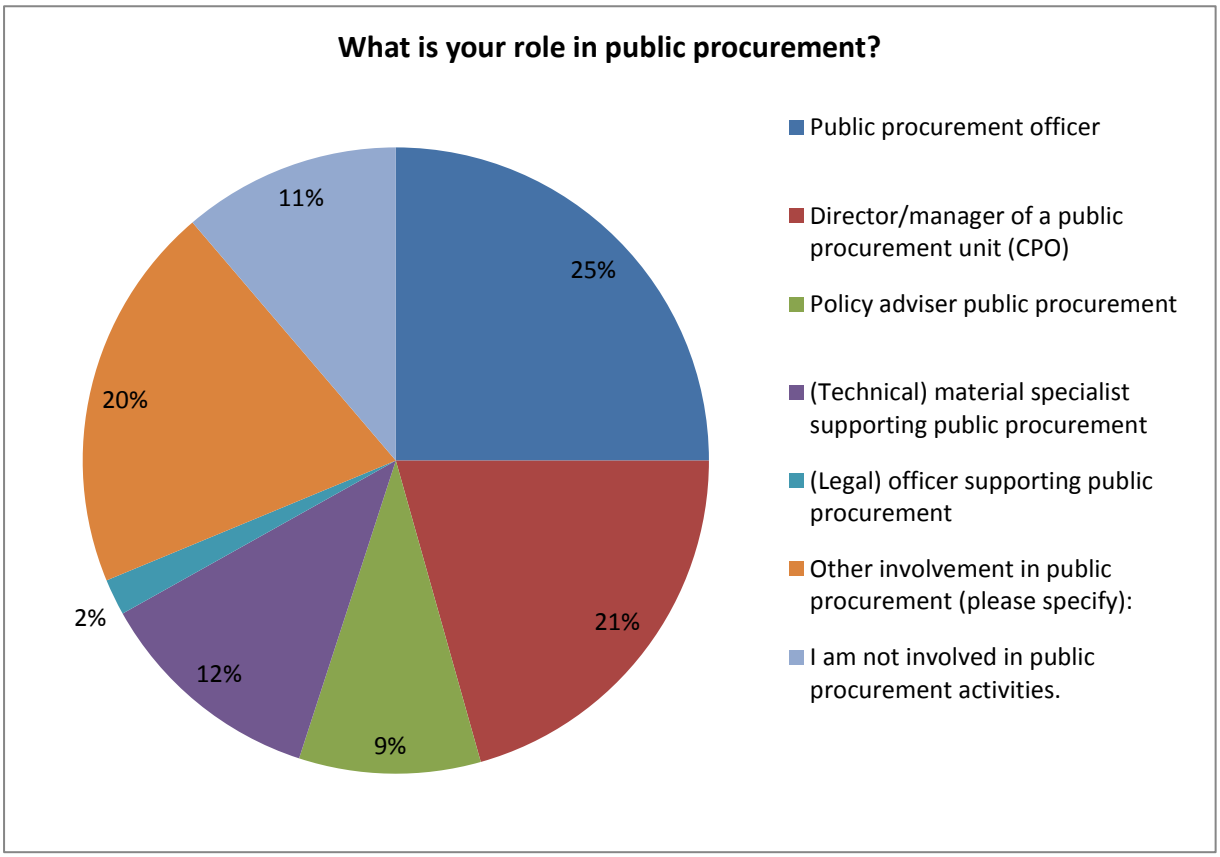

Figure 19: Respondent' role in procurement

Asked how familiar they were with the term 'bio-based products', 45 percent of the respondents answering that they have either never heard the term before or heard it before but were not sure what exactly it means. 55 percent were familiar with the term or said that they were well informed about bio-based products.

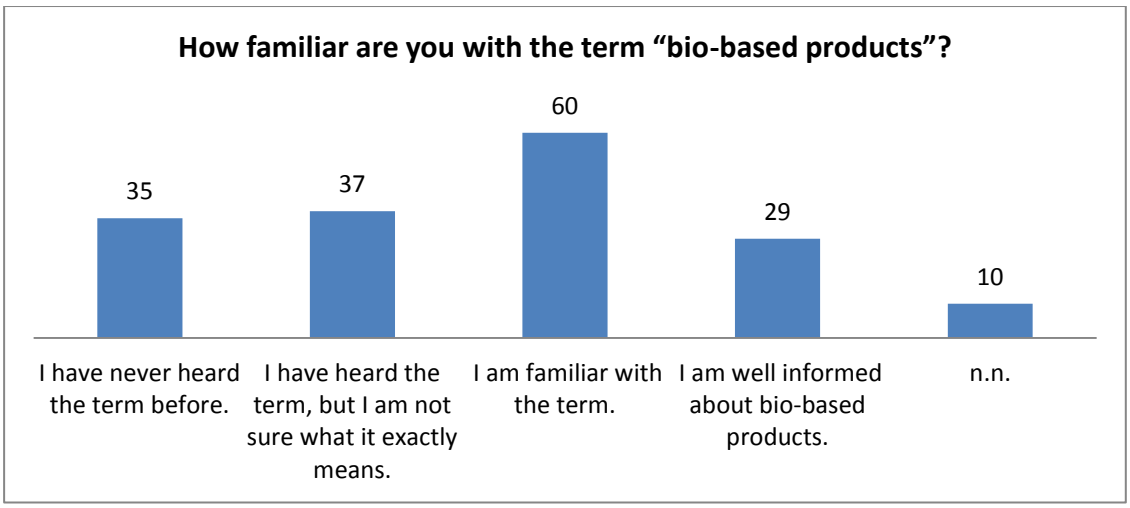

Figure 20: Familiarity towards bio-based products

5.2.2 Survey results

Regarding their information needs, respondents were provided with a list of information items dealing with product characteristics and other relevant information for purchasing. They were asked to rank on a scale from *I strongly agree* to *I strongly disagree* if they deem information on each item necessary for a purchasing decision and secondly if information on a selected item should be standardized.

Respondents showed a generally positive attitude to almost all information options given in the questionnaire. Only the items *calorific value* and *location of manufacture* did not find the support of a majority of respondents. The highest score of consent (*I strongly agree*) was given to *toxicity* (86), *environmental life cycle impacts* and *percentage of bio-based content* (70). The highest need for standardization was seen in *percentages of bio-based content* (98), *environmental life cycle impacts*[5] (96) and *toxicity* (96) (see figure 21).

[5] There is already an ISO norm (ISO 14000) for environmental life cycle assessment. The fact that it is still mentioned here show either that public procurers do not know about this standardized information or they think that the level of standardization is not sufficient.

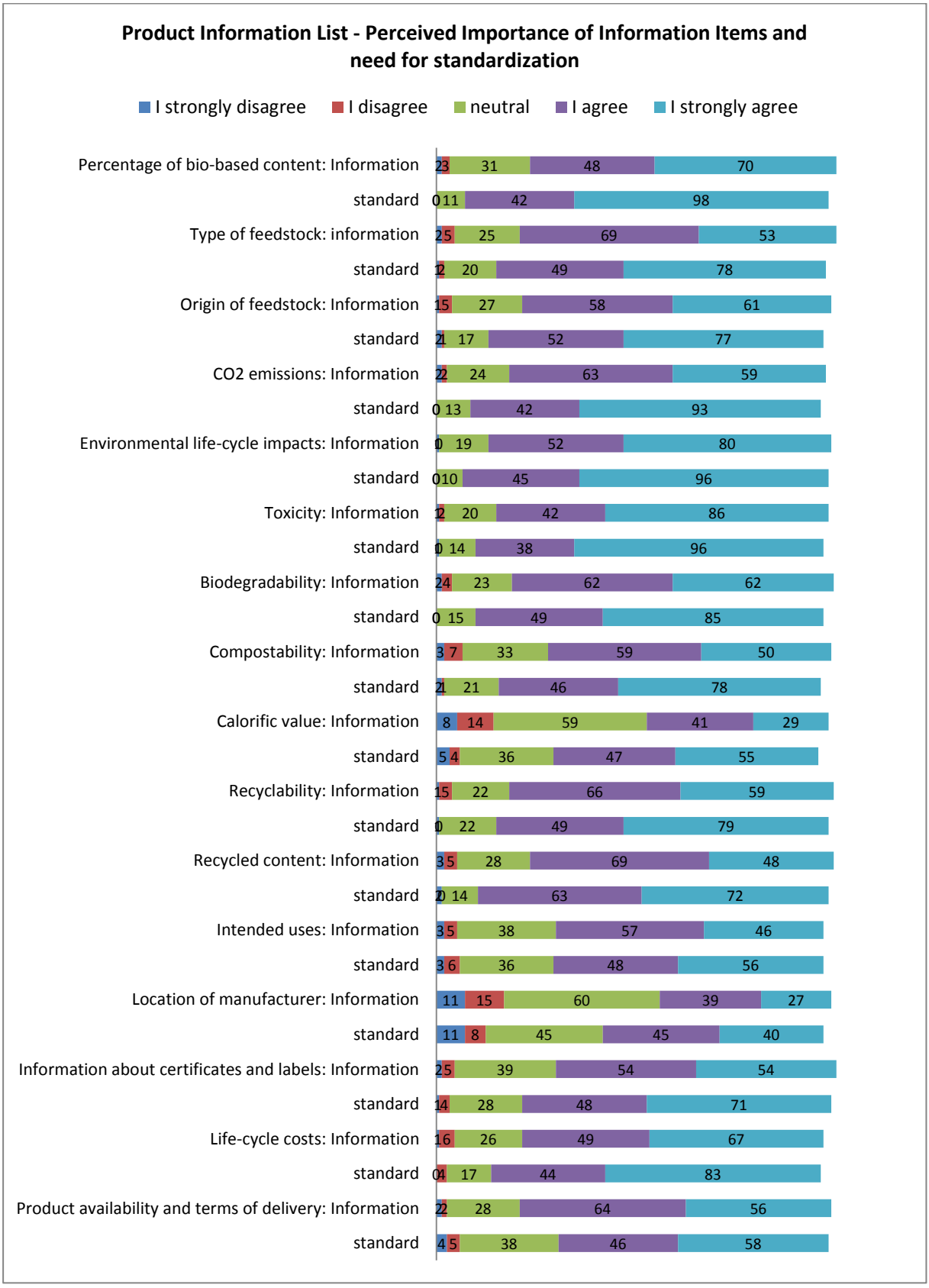

Figure 21: Attitude towards product information and standardization (B2P)

5.2.3 Conclusions for the product information list

If all positive and negative votes are summed up this gives a good visualisation of a general support for an item and allows developing a hierarchy regarding the information and standardization needs (see Figure 22).

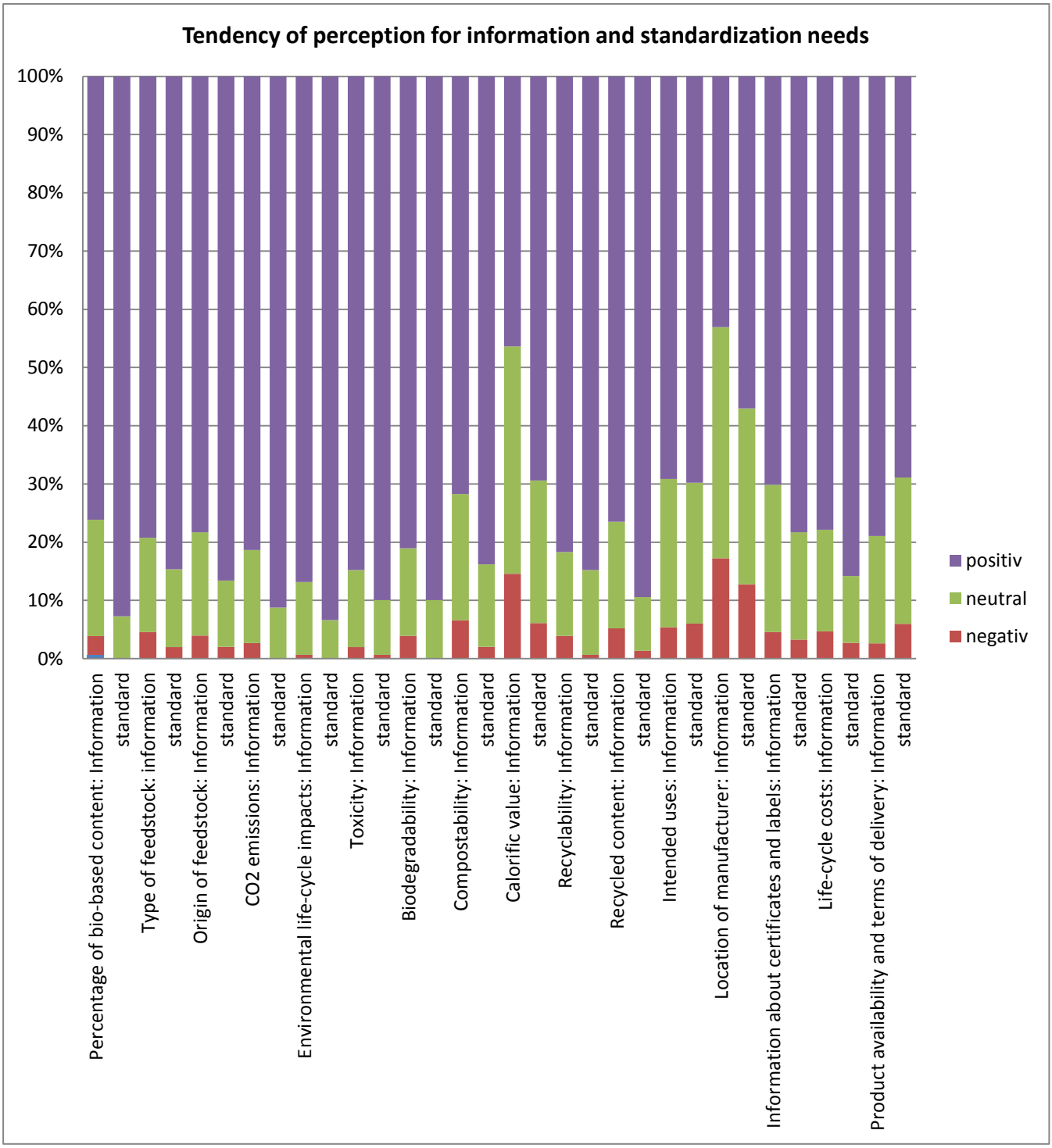

Figure 22: General attitude towards information and standardization (B2P)

Figure 23 shows that all items derived from the CEN/TC 411 information sheet, except *calorific value,* found a majority regarding the need for information and standardization. All items that were added based on the literature review found less than 70 percent support. It seems that the CEN information sheet chose a relevant list of characteristics in the view of public procurers. One may assume that some of the new items led to confusion since standardized information about them would not be straightforward or not useful. This the question format explicitly related to the need for standardization for the presented information items this could have irritated the respondents. This might also be another reason why most of them did not achieve the same level of appreciation as standardized information (i.e. intended use or product availability and terms of delivery). Nonetheless, with almost 80 percent the item *product availability and terms of delivery* got a relatively high level of support regarding a general information need. In contrast the items *calorific value* and *location of manufacturer* were clearly not supported. They also got the highest disagreement scores among all items on the list.

Level of Support for Information and Standardization (both categories need to be within the threshold)		
>70%	**>50%**	**<50%**
Percentage of bio-based content	Intended Use	Calorific Value
CO_2 Emissions	Information on certificates and labels	Location of manufacturer
Environmental Life-Cycle Impact	Product availability and terms of delivery	
Toxicity		
Recyclability		
Type of feedstock		
Origin of feedstock		
Biodegradability		
Compostability		
Recycled content		
Life-Cycle Costs		

Figure 23: Relevant items for a product information list (B2P)

5.3 Business to Consumer[6]

For the B2C research the methodology used is different than for the B2B and B2P research described above. A Focus Group approach was chosen because the target group was not expected to have a profound knowledge about bio-based products. More than with the B2B and B2P research the approach focused on perceptions and less on knowledge about prod-

[6] This paragraph was developed in close cooperation with DLO-LEI which also provided parts of the text below.

ucts and markets. The Focus Group discussions helped to gather an idea about associations, motives, and feelings towards bio-based products

5.3.1 Respondent profile

Chapter 4 described the approach taken to select the Member States where to conduct Focus Groups. Focus Groups were organized in Germany, the Netherlands, Denmark, the Czech Republic, Slovenia and Italy. Per country three Focus Group sessions were organized each involving six participants, who had been carefully pre-selected with the help of a questionnaire and according to strict criteria.
In each session two participants were so called lead users who scored high on dispositional innovativeness (Steenkamp & Gielens, 2003) or personal norms (Gärling et al., 2003). The other four participants were representative of their country in terms of age, gender, and education. Additionally, all participants had to meet the following criteria: (1) Participants may not be illiterate and (2) Participants may not work in sectors and industry related to the bio-based economy (i.e. petro-chemical industry, energy sector). The last criterion was chosen because the aim was to explore the perception of consumers towards bio-based products, and not the perceptions of experts.

5.3.2 Survey results

Slovenia had to be excluded from the analyses because the moderator of the Focus Groups used the term ‘natural’ instead of ‘bio-based’. This could result in a bias toward naturalness and environmental friendliness. In total, 107 persons who participated in the Focus Groups were included in the analysis.

The Focus Groups showed that the term ‘bio-based’ is an unknown term among the participants. Participants had questions regarding the meaning of the concept ‘bio-based’. They asked to what extent bio-based is organic and if it is environmental friendly. They also had no good understanding about the composition of a bio-based product and related product cycles. Since the knowledge of the participants about the subject was very vague, the presentation of results at this stage could lead to wrong conclusions lacking a good scientific foundation. Therefore only some observations made during the Focus Groups can be presented at this point. Empirical data can only be presented after the quantitative survey which follows the Focus Groups.

When participants were asked to assess bio-based products, which were presented to them by the moderator, they mainly focused on environmental aspects. Participants who perceived bio-based product as environmental friendly were interested to learn more about them but did also formulate feelings of distrust. Here, they were mainly afraid of marketing tricks of big companies that might mislead consumers. This was less the case when participants perceived bio-based products as innovative products.

Labels and product information were perceived as helpful in a purchasing process for a group of participants. For products that are applied on, or used close to, the body (i.e. cos-

metics or textile), relevant information should deal with the benefits for the consumers (i.e. durability, convenience). Many questions arose about the environmental effects of bio-based products. Therefore, information should show whether a product is biodegradable or how and where it is produced. Sustainability of a product is also seen as an important aspect. The percentage of the bio-based share within products was also discussed in the Focus Groups. Although specific minimum percentages of bio-based were not mentioned, there was a feeling that bio-based products should at least contain 50 percent bio-based material[7]. Many participants required clear definitions on product information.

The product information items which were used in the B2B and B2P surveys were presented to participants towards the end of each Focus Group session. However, since there was a general lack of understanding of the term 'bio-based', there is doubt that the concepts behind the different product information items were understood. Consumers who indicated that they are familiar with a certain information item might therefore only know it in relation with other non-bio-based products. The validity of the collected data is very limited and should be interpreted with caution.

The items chosen for product information are quite technical and not necessarily known by consumers. Therefore participants were first asked if they were familiar with the terminology. The depth of understanding behind each information item was not evaluated. Therefore the statement that a product information item is familiar to a participant could mean very different things.

The highest scores regarding the familiarity of an item were given to *recyclability, biodegradability* and *information about certificates and labels*. The lowest scores were given to *calorific value*, *life-cycle costs* and *heat and chemical resistance*.

In a next step, participants were asked to indicate which items they perceive as relevant for product information and a purchasing decision. Again the data needs to be treated carefully. Since consumers showed no knowledge about the subject of the presented product information, which would be a bio-based product, the reliability of their answers is low.

As most relevant, participants saw information on *toxicity, recyclability* and *type of feedstock*. Lowest scores were given to *life-cycle costs*, *calorific value* and the *percentage of bio-based content*. The results generally correspond with the familiarity question.

When talking about bio-based products and labelling, the bio-based content of a product or material is usually the first attribute to be mentioned. However, the B2C results show that the terminology is not known by consumers. This is a strong indication that additional information

[7] This statement shows the lack of knowledge among consumers since such a general share of bio-based content is technically not possible. The maximal bio-based content is different for every product group. A standard for a minimal bio-based content for a bio-based product needs to take that into account.

is needed to explain consumers what is meant by a bio-based product and how it can be characterized by its bio-based content.

The Focus Group showed that consumers lack an understanding of the term 'bio-based' and do not know bio-based products. Marketing and awareness raising about bio-based products, needs to start at a very basic level. Information about such products needs to be clear and limited to simple terminology.

5.4 Comparison between stakeholder groups

Due to the different research methodologies between the Delphi-Round Surveys and the Focus Groups, a comparison of all three stakeholder groups is difficult to make. For the B2C research only some general observations can be presented. Empirical evidence is not available at this point. Conclusions regarding the product information items cannot be made from the consumer perspective. Since the knowledge of consumers about bio-based products is very, low product information needs to be simple. Technical product information needs a minimal level of understanding of a product. For bio-based products this is clearly not the case. Therefore any information should to be clearly defined and presented with explanations.

Generally, there seems to be a stronger support for information and standardization among B2P than among B2B respondents. For business stakeholders, only 5 items received support of 70 percent or more for both information and standardization. The public procurer survey showed such a support level for 11 items. (see figure 24)

>70% of the respondents for standardization and information	
B2P	**B2B**
Percentage of bio-based content	Percentage of bio-based content
CO_2 Emissions	CO_2 Emissions
Environmental Life Cycle Impact	Environmental Life-Cycle Impact
Toxicity	Toxicity
Recyclability	Recyclability
Type of feedstock	
Origin of feedstock	
Biodegradability	
Compostability	
Recycled content	
Life-Cycle Costs	

Figure 24 Support of information and standardization. Comparison B2P and B2P

Less than 50 percent of B2P respondents supported the items c*alorific value* and *location of manufacturer*. For B2B stakeholders the information items *calorific value, intended use, location of manufacture* and *life-cycle cost* did not find the support by at least 50 percent of the respondents. (see figure 25)

<50% of the respondents for standardization and information	
B2P	**B2B**
Caloric value	Caloric value
Location of manufacturer	Intended use
	Location of manufacturer
	Life Cycle Costs

Figure 25 Disagreement to the need for information and standardization

The item *location of manufacturer* was derived from literature. It seems that B2B and B2P do not support such information. Beside the confusion caused by asking about the need for standardization on this items (see above) information on the location of a manufacture might be perceived as contradiction to public procurement law which usually does not allow favouring companies from a certain region.

The item *intended use* did fail to achieve the support of more than 50 percent of B2B stakeholders but is just below the 70 percent support level for the public procurers participating in the survey. A reason for the low support from the B2B community might be that information about the intended use is not needed by business stakeholders who have profound product knowledge. For B2P stakeholders such expertise might be less obvious.

The item *calorific value* was not supported by either of the two stakeholder groups. Information on the calorific value is relevant to evaluate after-life pathways for a product and relates to the energy recovery options. It is the only information item from the CEN template which failed to reach broad embracement.

The item *life cycle costs* was not supported by more than 50 percent of the B2B stakeholders. At the same time it is supported by more than 70% of B2P stakeholders. Life Cycle Assessment (LCA) is strongly discussed in public procurement communities which might be a reason for the high support level. An explanation why this is not evenly reflected by the B2B stakeholders might be that businesses have a stronger understanding of the complexity of LCA and are therefore reluctant to include this information in product descriptions.

6. Conclusion

The Open-Bio task 8.2 aimed to assess product information requirements of three stakeholder groups (B2B, B2P, B2C). B2B and B2P stakeholders were approached through the Delphi Round method and B2C stakeholders through Focus Groups. The results of the Delphi Rounds gave sufficient indications regarding the product information requirements of the engaged stakeholders. They provide a valuable contribution to the development of the product database which is the main target of WP8. Results also show a general support for standardized product information. The Focus Groups did show that the term bio-based is not known by consumers. Consumers first need to understand the term, they need to understand what bio-based is about and what effects it has. Then they are more able to formulate wishes and needs regarding product information. Next the focus groups clearly show that consumers do not know enough about bio-based products to have an opinion about information requirements about these products. Therefore consumer targeted information needs to be very basic. It should start with explaining the idea behind bio-based products in general before focusing on detailed product information. Information should always be presented with explanations to avoid misunderstandings.

70 percent or more of the B2B stakeholders supported the items *percentage of bio-based content; CO_2 emissions, Environmental Life-Cycle Impact, Toxicity and Recyclability* as important product information which should be presented in a standardized format. 70 percent or more of the B2P stakeholders supported these items as well. They added to this list the items *type of feedstock, origin of feedstock, biodegradability, compostability, recycled content, life-cycle costs* which as well got a support level of 70 percent or higher. It can be concluded that these items should be used to describe bio-based products for business and public procurement stakeholders in the Open-Bio product database.

This report will form the groundwork for the development of a product database and will be used, together with results from other Open-Bio work packages (i.e. WP7 Labelling), to create a database and interaction tool for bio-based product procurement. Relevant products will be selected and described according to the findings of the presented survey. The concept of the database and interaction tool will be formulated in scheme guidelines. Stakeholder assessment throughout the developing process of the tool will deliver constant feedback on the results. A final database and interaction tool will be presented at the end of the Open-Bio project in autumn 2016.

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