Standards and Regulations for the Bio-based Industry STAR4BBI

Work Package 5

D5.4

Report on standardization proposals delivered and impacts realised

PUBLIC

Final version – 29th of August 2019

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This project has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 720685

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1 Background and Objective

Through Interviews and desk research several issues related to standards and certificates in the bio-based economy were identified. These issues resulted in a long list of standards that have been evaluated by participants of a workshop organised by the STAR4BBI project (D4.3). The results have been evaluated during a project meeting and the final selection of standards or topics that are in most need of harmonization or show the best feasibility of success within the project time were chosen. The following topics were dealt with in the remaining time of the project:

- Compostability standard (EN 13432)
- Non-functional specifications (Climate test)
- Biodegradability of lignin (New Fertilizer Act)

This report shows the progress that has been made on each topic.

2 General Approach

To find solutions that work for all parties concerned, the identified issues were discussed with different identified stakeholders. Suggestions for the issues were formed based upon the different interviews. These suggestions were checked with additional stakeholders during a workshop organiser for the purpose of this project. Stakeholders' verification and input was required for all work packages. During the workshop the suggestions were elaborated in more detail to proposals for standardization. These proposals were offered to the correct technical committees to take action to amend or harmonize the standards.

3 Identified issues related to standardization

3.1 Compostability standard

3.1.1 Description of the issue

Biodegradable refers to the ability of materials to break down into natural elements within a certain time after disposal. Biodegradation can occur at different conditions: Composting (elevated temperature, aerobic), anaerobic digestions, biodegradation in soil and in (marine) water. Compostability is a characteristic of a product, packaging or associated component that allows it to biodegrade under specific conditions (e.g. a certain temperature, timeframe, etc.). The compostability standard, the EN 13432 "Packaging: requirements for packaging recoverable through composting and biodegradation" is a standard developed for compostable packaging. This standard defines how quickly and to what extent a biodegradable plastic must degrade under industrial composting conditions. The EN 13432 is a harmonised European standard linked to the European Directive on Packaging and Packaging Waste (94/62/EC). The standard prescribes (among other requirements) for disintegration: after twelve weeks, at least 90% of the product should be converted to CO_2 and H_2O and the remaining material should be able to pass through a 2 x 2 mm mesh. Biodegradable product producers use this standard and certification schemes developed upon this standard to show that their products are compostable. Most biodegradable product producers do not have problems to comply with the requirements in the standard where their products will degrade within the required 12 weeks.

Industrial composters run their process in less time than the described 12 weeks in the standard. The Dutch Waste Management Association (VA) states that composting time is around 2-3 weeks and sometimes even shorter between 5 and 18 days. As a result, the compostable products might not be fully composted. On the other hand, compostable plastic producers question whether the composting cycles are long enough to fully compost the organic waste. Compost cannot be sold with visible 'non soil' parts, such as plastics, included. To avoid this problem, the composters sieve out all plastics (compostable and fossil) before the composting cycles start.[i] Compost buyers are reluctant to see any plastic (compostable or not) in their compost. Due to this reason, most compostable plastics currently end up in the incineration facilities. To both the government and the biodegradable product producers this is a less than optimal situation.

The compostability standard issue was raised during the interviews with the different stakeholders.

3.1.2 Stakeholder consultation

Research was performed on the drivers of the stakeholders. Interviews with producers and composters were conducted. These interviews were mainly with Dutch and German stakeholders. These organizations however confirmed that the issue is the same throughout the rest of Europe. They claimed that other countries are even stricter with their current policies regarding the rejection of all plastics from their streams.

Position of composters:

In most biodegradable plastics there are little to none nutrients. These products will only break down to CO_2 and H_2O. This does not add any value to the end-product, the compost.

Currently the composters do not accept any compostable materials (except for the waste bags to facilitate collection of organic waste) in their composting facilities. There is a regulation set up by Rijkswaterstaat called LAP3 sector plan 6. This states that no compostable packaging according to the EN 13432 belongs in the green bin. This is the case in the Netherlands. Composters confirm that other countries within Europe are even stricter with regard to accepting compostable products (Germany, Belgium, Scandinavian countries). See Table 1 for the products that belong in the organic waste.

Table 1- List of what belongs and what does not belong in the organic waste

Yes	No
Potato peels	Ash from ashtray fireplace or barbeque
Biodegradable paper bags and compostable bioplastic bags with seedling logo, **if used as a collection tool for organic waste**	Glass
Flowers and house plants	Human and animal hairs
A piece of newspaper on the bottom or for wrapping fat, meat and fish scraps	Wood and thick branches
Cooked food scraps and leftovers	Hydro granules
Vegetable and fruit waste	Cat litter without an eco-label
Gravy and fat (solidified)	Fertilizer

Yes	No
Cheese crusts without plastic	Diapers
Cat litter with an eco-label	Milk and fruit juice packs
Christmas trees that are made small and fit in the mini container	Metals
Paper towel	Paper
Small pruning waste, foliage, mowed grass and leaves	Plastic such as bags and pedal bin bags
Coffee grounds, coffee filter, coffee pads, tea leaves and tea bags	Dog and cat shit
Corks	Potting soil with expanded clay pellets or sand
Manure from small pets such as guinea pigs and rabbits	Cigarette butts
Old bread	Offal / dead (domestic) animals
Plant pots of organic material	Stone and porcelain
Garden and potting soil	Vacuum cleaner bags and their contents
Fish and meat scraps, including bones, shells, nutshells and eggshells	Plastic tea bags
	Birdcage sand
	Bioplastic packaging (with or without the seedling logo)
	Sand and soil

Position of compostable products producers labelled with an EN 13432 label for industrial compostability

Compostable product producers that have an EN 13432 label want their product to be com-posted. Compostable product producers believe that they offer a solution for the current waste challenges.

Several compostable product producers have combined efforts to conduct research into solution routes for compostable products. They are looking into possible product groups that could be accepted by compositing facilities. The producers are aware that it will be difficult to have an agreement with the composters where all EN 13432 certified products are accepted in the composting facilities. The goal is to have product groups with co-benefits accepted. Compostable products that bring co-benefits for composters, for example additional organic waste, will then be accepted. Examples are coffee cups, tea bags and cucumber wraps. In these cases, the products will bring additional organic waste for the compost, which brings an incentive for composters to take on the biodegradable products.

3.1.3 Possible solution routes

Th Throughout the project, several potential solutions to solve this problem were identified:

- Find a middle ground that is acceptable for all parties concerned. For this solution, the composters and the compostable products producers come to an agreement on the

amount and length of cycles. This could also mean that some compostable products will be excluded as they possibly cannot compost within the proposed time. This could result in different classes within compostability (e.g. gold, silver and bronze). This would mean however further complication of certification schemes. The segregation between certain products could cause unclarity among compostable product producers, composters, consumers, certifying bodies and other parties concerned (see 3.2.5 Conclusion for the standard).

- Composters should run an extra cycle for materials that have not yet composted in the (first) cycle. The claim is however that composters already run additional cycles for certain products (e.g. banana peel, wooden sticks).
- Compostable product producers should change their products to comply with the 'shorter 'composting' cycles of the composters. Actually, in these cases the process is not composting anymore, however, biological drying. This means that the compostable plastics will have to be composted in less time than the previously agreed terms in the standard (12 weeks). According to several compostable product producers they are able to produce biodegradable products that compost within 6 weeks. The 12 weeks in the standard is a historical result when the thickest part of the packaging product was tested. Producers are targeting their plastic to the 12 weeks at the maximum thickness as the test is expensive and then they can certify their plastic for a broader range of applications. Most parts of the certified packaging will degrade faster than the 12 weeks. However, shortening the time further could in some cases reduce other quality characteristics of the product. Currently the biodegradable plastic producers do not have an incentive to target at lower limits. For products to degrade fast in an industrial composting facility Polylactic acid (PLA) can be used.
- Agree on certain product groups with co-benefits that can be accepted by the composting facilities. Compostable products that bring co-benefits for composters – for example additional organic waste -will be accepted. Examples are coffee cups, tea bags, organic waste collection bags and plant pots. In these cases, the products will bring additional organic waste for the compost which brings an incentive for composters to take on the biodegradable products. Currently in The Netherlands, the VA together with BioHolland are undertaking tests with four potential product groups made of compostable materials. In the end, the use of compostable materials for such products should be mandated by the (European) government to avoid confusion among consumers.
- Change the economics of the composters. Composters currently receive a "gatefee" when they accept waste in their facilities. Increasing this fee for compostable products might increase the willingness of composters to take on these products.
- Separate collection of compostable products could lead to large enough volumes to have separate composting cycles. However, the best solution could also be biogas production. An LCA should in these cases result in the optimal route.

3.1.4 General conclusions and recommended solution route

The compostability of compostable products is heavily debated at the moment. The compost-ers and the biodegradable products producers are on opposite sites. All certified products la-belled

with the EN 13432 are currently exempted from the composting facilities (except for the compostable bags to facilitate collection of organic waste).

The project partners of STAR4BBI recommend to agree on certain product groups with co-benefits that should be accepted by the composting facilities. To have the desired result this should happen in cooperation with the government to make these product groups mandatory compostable. Examples are coffee cups, tea bags and plant pots. In these cases, the products will bring additional organic waste for the compost which brings an incentive for composters to take on the biodegradable products. Further research on specific products is currently under-taken by a combination of composters, bio-based product producers and policy makers.

3.1.5 Further recommendations related to composting of plastics

Besides the co-benefits, the selection of specific product groups could also depend on the waste that can currently be found in the compost. This is the same approach as the European Commission took with the single used plastics. They identified the top 10 products that end up in the ocean and these are now banned. With the identification of these products conclusions and recommendation can be made of which product groups shall be produced from compostable materials. The EOL route for a product should in any case be based on an LCA.

Further research should also be performed to get a clear overview of the additional advantages of combining the different streams. Supposable, in some cases composters fear the amount of nitrogen in their feedstock. They therefore need to add more carbon in the composting pro-cess. This carbon could be provided by the compostable products. Linked to this is further research in to the micro-organism portfolio of composters to investigate where micro- organ-ism could support the improvement of the compost and where compostable products could play a role in providing for these organisms.

Communication towards end consumers will be crucial with any route taken. Communication could be supported by a labelling system with clear colours. A colour for the end-of -life solution. For this to work optimal, municipalities should also strive to standardize their collection systems.

3.1.6 Conclusions for the standard

The conclusion from the research and interviews is that changing the standard is not the solution for the current market situation. The composters do not accept any compostable plastics in their composting facilities. The opposition of composters to biodegradable products does not depend on the standard as such as they do not accept any compostable products. The standard should however be in line with the current practise. The standard was developed in 2000. As composting processes have changed considerable over the last years a revision of the standard is recommended. The goal is to come to an agreement which matches the industrial practices of today and the near future with what can be achieved for compostable plastics for products for which composting may have benefits. The standard is not yet in the review phase. However, any country can propose to start the revision.

The EC is however working on guidelines for EOL options. These guidelines also refer to the EN 13432 standard. In this way it is recommended that the standard should be changed towards the most optimal cycle length. It is necessary that all relevant stakeholders are involved in the process (including the composters, recyclers, farmers) and reach consensus.

The EN 13432 has been prepared by Technical Committee CEN/TC 261 'Packaging'. The secretariat of which is held by AFNOR. The Standards has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s).

The review is currently take place for the EN 13427 until the EN 13431. The ballot ends the 31st of August 2019. The EN 13432 was not part of this review process. There have been several requests from parties to review this specific standards as it no longer fits the current practise. The expectations are that the review will start shortly.

3.2 Non-functional specifications – Climate test

3.2.1 Description of the issue

Through different projects, several standards have been identified that hinder the development of the circular economy. Certain materials (e.g. recycled) are deliberately excluded from the standard or the standard criteria are based upon more traditional materials and thereby excluding new materials.

The climate test was raised during interviews as a barrier to bring bio-based products on the market. During transport, vibrations, shocks, knocks, pressure loads, changes in temperature or changes in air humidity can have a great influence on products and/or packaging. Customers of packaging products producers (usually) are required to successfully passing a climate test to secure that the material can deal with these possible issues during shipment. Climate testing involves exposing a package or a product to different controlled levels of temperature and humidity inside a calibrated test chamber. This simulates a range of climatic changes that may occur during distribution. The test can expose flaws in packaging such as seals and glue joints becoming impaired and packaging getting damaged, impairing its ability to protect the product. The conditions for these climate tests are however not based upon actual transportation situations and the high relative humidity (RH), generally part of the tests, is not representative for real life situations.

The atmospheric test is perceived to be too strict as the conditions in real life are never as extreme as in the climate tests. The tests are historically based upon plastic being resistant to 100% RH, so only faults in the package (design) would then lead to water leakage and thus test failures. Due to their hydrophilic nature, bio-based materials respond differently to changes in the RH (and to a lesser extent temperature). For this reason, bio-based materials (can) fail the climate test, whereas the test actually is set to determine failures in the product and not in the materials used. At the time the standards were developed, alternative materials entering the market were not considered.

3.2.2 Further background to the test

Climate tests are accredited to standards for environmental testing. Standards that are the basis for the climate tests are usually from ASTM, ISTA conditioning, IEC standards and ISO. It is usually up to the final customer to decide which test should be taken. In most cases to establish the atmospheric (pre)conditioning the ASTM D4332-14 'Standard Practice for Conditioning Containers, Packages, or Packaging Components for Testing' is used. This standard is by ASTM subcommittee D10.21 on Shipping Containers and Systems - Application of Performance Test Methods.

The D4332 standards states the following:

1. Scope

1.1 This practice provides for standard and special conditioning and testing atmospheres that may be used to simulate particular field conditions that a container, package, or packaging component may encounter during its life or testing cycle.

1.2 This practice describes procedures for conditioning these containers, packages, or packaging components so that they approach or reach equilibrium with the atmosphere to which they may be exposed. This standard is commonly used for conditioning when conducting transit simulation tests.

1.3 Practice D685 should be used as the relevant conditioning standard when quantification of box compression strength at standard atmosphere conditions is required.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

4. Significance and Use

4.1 Many materials from which containers and packages are made, especially cellulosic materials, undergo changes in physical properties as the temperature and the relative humidity (RH) to which they are exposed are varied. Therefore, the package should be placed and kept in a specified atmosphere for a length of time such that subsequent measurements of physical properties will be meaningful and reproducible.

4.2 The conditions described in this practice are either historically accepted standard conditions or special laboratory conditions chosen to represent particular phases of the distribution environment. These special conditions do not necessarily duplicate actual field conditions, but tend to simulate them and have effects on packages and materials which may be related to their field performance.

5. Atmospheric Conditions

5.1 *Preconditioning Atmosphere*—20 to 40°C (68 to 104°F) and 10 to 35 % relative humidity.

5.2 *Standard Conditioning Atmosphere*— 23 ± 1°C (73.4 ± 2°F) and 50 ± 2 % relative humidity.

NOTE 1—Average values must fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary up to ±2°C (±3.6°F) and ±5 % relative humidity without significant impairment of test precision.

5.3 *Environmental Conditioning Atmosphere*—The environmental conditions shown in Table 1 may be selected when appropriate (also see Practice F2825).

NOTE 2—In the absence of a specific requirement for a particular atmospheric condition, use the conditioning atmosphere given in 5.2.

NOTE 3—Conditioning at the desert condition (see Table 1) at a constant temperature of 60°C (140°F) may have effects on some materials that do not relate to effects of cyclical field conditions.

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TABLE 1 Environmental Conditions

Environmental Condition	Temperature, °C (°F)	Relative Humidity, %
Cryogenic	−55 ± 3 (−67 ± 6)	. . .
Extreme cold	−30 ± 2 (−22 ± 4)	. . .
Frozen food storage	−18 ± 2 (0 ± 4)	. . .
Refrigerated storage	5 ± 2 (41± 4)	85 ± 5
Temperate high humidity	20 ± 2 (68 ± 4)	90 ± 5
Tropical	40 ± 2 (104 ± 4)	90 ± 5
Desert	60 ± 2 (140 ± 4)	15 ± 5

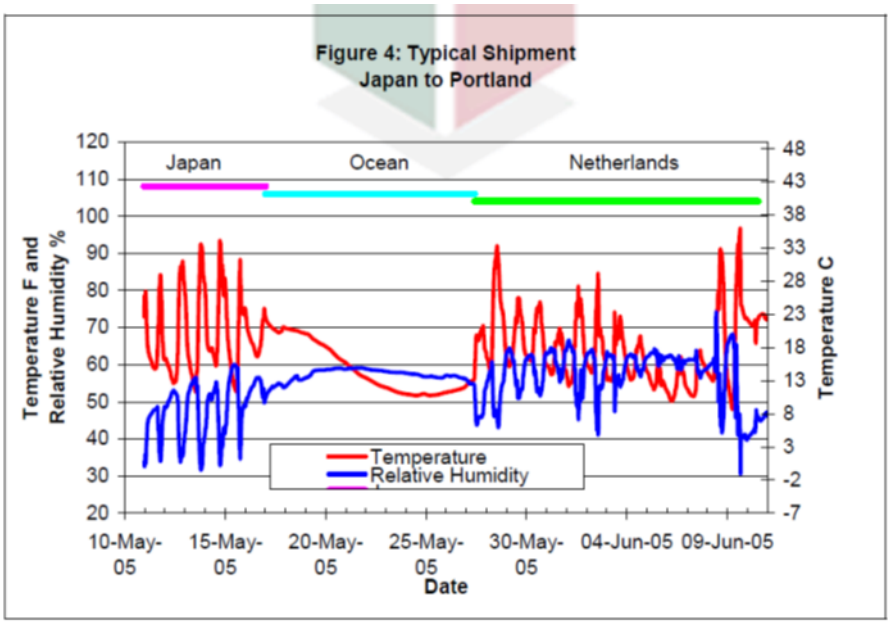
Research and several test results have been evaluated. From the researcher David Leinberg[1] it turns out that when he temperature is 39°C, a 90% humidity will not be reached. That research shows that in general a temperature rise is contradictory to the humidity, meaning that the humidity will drop with a temperature rise. The most extreme circumstances measured are:

- Highest temperature 57°C with humidity of ± 33%
- Highest humidity: ± 30°C with humidity of 96%
- When the humidity is 90%, the temperature was always ≤ 30°C

Figure 1 presents a graph from Leinberg.

[1] David Leinberg, Ocean Container Temperature and Humidity Study, 02/27/2006

Figure 1 – Exemplary data of a ocean container study



3.2.3 Conclusions and recommendations

The test results have been evaluated and the specific problem is that the conditions required in the test cannot be met by normal weather conditions. To ask for that products comply with these conditions is not realistic. The recommendation is to reformulate the test conditions to either a lower humidity with the temperature of a lower temperature with the humidity. Or another combination that reaches the average normal conditions.

The results of this research will be send to the subcommittee D10.21 on Shipping Containers and Systems with the proposal to make changes to the ASTM D4332-14 'Standard Practice for Conditioning Containers, Packages, or Packaging Components for Testing'. Changing standards that focus directly on the material instead of looking at the functioning of materials has become part of the focus of standardization institutions including CEN and ISO. This was also the result of the ancillary action "Sustainable Chemicals"[2] that was presented to both CEN and the European Commission. The recommendation was to set up a platform where "traditional" standards that exclude certain materials can be flagged with the intention to update these standards.

3.3 Biodegradability of lignin

3.3.1 Description of the issue

When bio-based materials are biodegradable, their constituents can be returned to nature by means of organic recycling based on biological processes, enabling biogenic circular routes where the biodegraded material becomes nutrients for new plants and trees which can then become new bio-based products and thus closing the loop. There are several standards to demonstrate the biodegradability of products. These standards prescribe for degradation to CO_2, water, methane, biomass and minerals within a certain time (typically 90% within 6 months). This requirement

[2] CENCENELEC, Identification of Potential Needs of Standardisation for Sustainable Chemicals from Primary and Secondary Raw Materials Related to the Circular Economy Action Plan, 21/12/2018

cannot be met by products containing lignin. Lignin is a recalcitrant biopolymer, meaning that it resists degradation. When a plant is degraded in soil, the polysaccharides are degraded to CO2 and water fast, while the last 30% of the plant, the lignin, is converted to soil organic matter (humins, humic acid). The latter is essential for soil to be productive. Lignin will, in the end, degrade to CO2 but this takes longer than the prescribed 6 months in the standard tests.

Inorganic Fertilizer are regulated in the harmonized European Fertilizer Act. This fertilizer act is being updated to also include the organic fertilizers. The aim of the European Commission's amended Fertilizer Regulation is to make this possible by harmonizing definitions and quality standards for all types of fertilizing material that can be traded across the European Union. This includes the organic fertilizers as well. For the first time, materials covered by the amended Regulation include organic and organo-mineral products, liming materials, soil improvers, growing media, agronomic additives, plant bio-stimulants and fertilizing product blends. Their access to the EU market depended on mutual recognition between Member States, which often posed difficulties because of diverging national rules on their definition and make-up. The new Regulation is intended to create a level playing field for all fertilizing materials in Europe. It also addresses their environmental impact by defining common quality, safety and labelling requirements, including limits on undesirable elements. Products will need to comply with these in order to be traded freely throughout Europe.[3] The new act was published in May 2019 and will come into force in 2022.

3.3.2 Lignin in the New Fertilizer Act

The assumption of one of the interviewees was that lignin was excluded from the New Fertilizer Act as it does not biodegrade as fast as prescribed. When looking into this topic further and after discussion with the Commission is was concluded that lignin is not excluded from the fertilizer act because it does not degrade fast enough but because all polymers are excluded from the act.

The Commission also mentioned that COM services are aware of the issue of natural polymers and will explore all available ways to address it the best possible way. According to the compromise text for the new regulation on EU fertilising products, all components of a fertiliser need to comply with a respective CMC (component material category).

The biodegradation criteria relates to CMC 9 refer to a special category of polymers that are used as coating agents or agents that help increase the water retention of a fertilising products and are not linked to natural polymers such as lignin. With the text as it stands now the natural polymers do not comply with the CMC1, as all polymers (without exceptions for natural polymers) are excluded. However before concluding that lignin is not allowed, the idea from the commission was to see if the lignin material would comply to requirements of CMC2 (Plants, plant parts or plant extracts)

[3] https://www.fertilizerseurope.com/new-fertilizer-regulation/

The following letter was sent to the European Commission on this topic:

RE: Questions on P8_TA-PROV(2017)0306 - European Parliament legislative resolution of 27 March 2019 on the proposal for a regulation of the European Parliament and of the Council laying down rules on the making available on the market of CE marked fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 (COM(2016)0157 – C8-0123/2016 – 2016/0084(COD)).

Borregaard AS (BAS) questions and suggestions are herein summarized:

1. Registration of lignosulfonate complexed micronutrients according to Annex I (PFC) and Annex II (CMC).

Lignosulfonates (LS) are currently approved as complexing agents in EC 2003/2003. Consequently, micronutrient formulations meeting the requirements set for complexed micronutrients designation types in EC 2003/2003 are considered "EC fertilisers".

When the new Fertilizer Regulation enters into force, current EC fertilizers based on micronutrients complexed by LS shall:

> (a) meet the requirements set out in Annex I for the relevant product function category;
>
> (b) meet the requirements set out in Annex II for the relevant component material category or categories

Micronutrient formulations are covered by *PFC 1(C)(II) – Inorganic Micronutrient Fertilizer* in Part II of Annex I in the new regulation proposal. *PFC 1(C)(II)* specifies that complexing agents should fulfil the requirements of *CMC 1: Virgin Materials Substances and Mixtures* in Part II of Annex II.

LS meet the requirement of a natural polymer, and are hence exempted from registration under Regulation (EC) No 1907/2006 (REACH) in accordance with Article 2(9). Therefore, it is BAS concern that LS may not fulfil the requirements of CMC 1 since polymers are excluded from that Component Material Category. In practice it may mean that LS-based micronutrient fertilizer formulations which are currently marketed as "EC Fertilizers" will not meet the requirements to be considered "EU fertilizing products" according to Fertilising Products Regulation (FPR) text adopted by European Parliament 27 March 2019

There is no reason to believe that LS-based micronutrient fertilizer formulations currently marketed as "EC fertilizers" present any risk to human, animal or plant health, to safety or to the environment, that may justify its withdrawal from the market according to Chapter V Fertilising Products Regulation (FPR). Therefore, BAS would appreciate getting the input of The Commission and The Fertilizer Working Group on how to fit LS-based complexed micronutrient formulations into Fertilising Products Regulation (FPR) text adopted by European Parliament 27 March 2019

2. Annex II – Part II: Requirements related to CMCs - CMC 1: Virgin material substances and mixtures.

Point#3 - The EU fertilising product shall remain stable in water solution at pH 6 and 7 for at least 1 day. 1-day pH stability at pH 9 is already measured in existing harmonized EN standard for the determination of the complexed fraction of micronutrients (EN 15962:2011). Therefore, if Point#3 is kept Fertilising Products Regulation (FPR) text adopted by European Parliament 27 March 2019 then it may make more sense to mention pH 9 instead if pH 6 & 7, it would be more consistent with harmonized standard currently used to determine complexed fraction. Otherwise, it would require the development and validation of a new standard to verify that complexing agents remain stable after 1 day in water solution at pH 6 and 7.

We are looking forward to receiving your input. Meanwhile, if you have any further questions, please do not hesitate in contacting us further.

Yours sincerely,

This letter was sent to DG GRPW in April 2019, so far they have not received any reply.

At this point Borregaard states that the CMC2 is in their understanding not applicable for lignosulfonates (chemically modified natural polymer), as this category only covers mechanically processed plants (parts or extracts). According to Regulation (EC) No 2003/2003, lignosulfonates are approved as complexing agent for micronutrients (E.3.2 of Annex I). According to Article 52 of the new Regulation, lignosulfonates should hence be described in the appropriate Product Function Category and corresponding Component Material Category.

Micronutrient chemically combined with complexing agent(s) (according to PFC1(C)(II)) must fulfil the requirements of CMC1, the problem is that this Material Category specifically excludes polymers. In conclusion, at the given stage it is very unclear how micronutrient formulations complexed by lignosulfonates shall be registered under the new Regulation.

3.3.3 Conclusions for the lignin challenge

The European Commission acknowledges that there are challenges are the use of natural polymers. Individual companies such as Borregaard have made this known but also associations such as Fertilizers Europe. Taken this challenge on in our report to the European commission, the STAR4BBI project hopes to support in finding a solution for these companies that want to use lignin in their fertilizers. This challenge is not directly related to standards.

In the beginning the assumption was made that the biodegradation conditions in the New Fertilizer Act resulted from standards. For this particular lignin issue this was however not the case.

4 Conclusions

The STAR4BBI project partners have dealt with several issues related to standards that arose during the interviews with the value chains for the project. During the project, interviewees raised several issues that they thought were related to standards. After further research these issues were however not directly related to standards (f.e double testing). Other issues were well known issues, like the multiple certificates in the market. The challenge that there are many certificates that are similar or overlapping or that there are just many certificates in the market was again raised. This challenge is however very difficult to solve as the certification market is a free market. The issues related to standards that could be further researched within the project were taken on. Most of the issues are not exclusively related to standards but also to regulation or societal challenges.

However updating the standards that are related to the identified issues has been recommended to the correct standardization committees. The STAR4BBI project partners performed thorough research on specifically the EN 13432 “Packaging: requirements for packaging recoverable through composting and biodegradation” and the ASTM D4332-14 ‘Standard Practice for Conditioning Containers, Packages, or Packaging Components for Testing’. This has lead to specific recommendation to these standards. The information is transferred to the right standardization committees and it is now up to them to execute these changes in the standards.

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This project has received funding from the Bio Based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 720685