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WASTE2FUNC

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Plan for Dissemination, Communication and Exploitation of Results Ready

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1 Contents

2 INTRODUCTION 8
3 GENERAL PROJECT OBJECTIVES 8
3.1 PROJECT OBJECTIVES 8
3.1.1 Objective 1 8
3.1.2 Objective 2 8
3.1.3 Objective 3 8
3.1.4 Objective 4 8
3.1.5 Objective 5 9
4 COMMUNICATION AND DISSEMINATION PLAN: INTRODUCTION 9
4.1 COMMUNICATION OBJECTIVES 9
4.1.1 Communication objectives with the aim to INFORM 9
4.1.2 Communication objectives with the aim to PERSUADE 9
4.1.3 Communication objectives with the aim to ENGAGE 10
5 TARGET GROUPS 10
5.1 APP USERS/FEEDSTOCK 10
5.1.1 Farmers/Primary sector 10
5.1.2 Auctions 10
5.1.3 Food processing companies 10
5.1.4 Companies with waste streams that meet the requirements of the project 10
5.1.5 Waste processing companies 10
5.2 END PRODUCT USERS 10
5.3 POLICY MAKERS 10
5.4 GENERAL PUBLIC/CONSUMERS 11
6 MESSAGES 11
6.1 USE OF THE APP 11
6.2 VALORISATION OF WASTE STREAMS 11
6.3 MESSAGE ON END PRODUCTS 11
7 ACTIVITIES 11
7.1 PRESS RELEASES 11
7.2 WEBSITE 11

7.3 VIDEO 12
7.4 STAKEHOLDER FOCUS GROUP 12
7.5 PRIMARY SECTOR WORKSHOPS 12
7.6 SOCIAL MEDIA 12
7.7 PARTICIPATION IN EXTERNAL NETWORKING EVENTS 12
7.8 VARIOUS 12
8 EXTERNAL COMMUNICATION 12
8.1 DISPLAYING FUNDING 13
8.2 PROJECT IDENTITY 13
8.2.1 Logo 13
8.2.2 Templates 13
9 EXPLOITATION PLAN: INTRODUCTION 13
10 EXPLOITABLE RESULTS 16
10.1 CHARACTERIZATION OF EXPLOITABLE RESULTS 16
10.1.1 BS production from 2G feedstocks 16
10.1.2 LA production from 2G feedstocks 17
10.1.3 App/website on point for registration of waste streams 17
10.1.4 Prototype consumer products designed with functional LA and/or microbial BS ingredients 18
10.2 IP LANDSCAPE 18
10.2.1 Background IP 18
10.2.2 Competing technologies and projects 19
11 EXPLOITATION ROUTES 19
12 REFERENCES 20

List of Figures

Figure 1: The WASTE2FUNC Project logo..... 13

2 Introduction

This deliverable is part of WP 7 Communication and dissemination and is in particular related to the activities within Task 7.3 “General WASTE2FUNC communication, exploitation and dissemination process”.

The WAST2FUNC project is seeking to create, as a demonstration, a new and sustainable biomass waste supply chain. This will integrate fluctuating supplies of agricultural food-crop biomass waste with an industrial food waste supply chain in order to demonstrate the potential for converting this combined stream into lactic acid and microbial biosurfactants as functional ingredients for home and personal care applications.

Dissemination and exploitation efforts are thus focusing on all value chain stakeholders/actors to capture all opportunities, convince biomass suppliers, B2B/B2C companies and consumers of the WASTE2FUNC functional and sustainable lactic acid and microbial biosurfactant ingredients and developed bio-based formulations.

3 General Project Objectives

3.1 Project objectives

The overall objective of WAST2FUNC is to create a new and sustainable biomass waste supply chain integrating erratic agricultural food crop biomass waste with an industrial food waste supply chain to demonstrate the conversion and use of this waste biomass supply chain into lactic acid and microbial biosurfactants as functional ingredients of home- and personal care applications thus creating new and integrated supply- and value chains in Europe. WAST2FUNC aims to decrease CO2 emissions with at least 20%, increase employment in the rural and urban sectors and extract 2-10 times more value from the WASTE2FUNC biomass waste streams benefiting the primary-, but also the downstream sectors in Belgium and Europe.

3.1.1 Objective 1

Create a new sustainable biomass waste supply chain with projected volumes of 450 000 tonnes derived from the food value chain and integrate it into new value chains for 2G lactic acid and 2G microbial biosurfactants as functional ingredients for higher value home- and personal care applications.

3.1.2 Objective 2

Demonstrate (1-15m³) optimized cost-efficient and sustainable (minimum 20% less CO2 emissions compared to the 1G SOTA bioprocesses) converting regional food (crop) waste streams into purified and characterized functional biochemicals (lactic acid and microbial biosurfactants).

3.1.3 Objective 3

Demonstrate the sustainable integration of the WASTE2FUNC biomass waste feedstock supply chain with the WASTE2FUNC bioconversion and purification technologies to formulate and demonstrate at least four B2C prototype consumer products such as laundry detergent and hand wash applications extracting 2-10 times more value from the feedstocks and emitting at least 20 % less overall CO2 compared to the SOTA.

3.1.4 Objective 4

Establish the market readiness and consumer acceptance of innovative, green and performant functional ingredients for the B2B and B2C industries (2G lactic acid and 2G biosurfactants) equalling or outperforming fossil-based counterparts and compliant with EU regulation on chemical risk management, toxicity and safety.

3.1.5 Objective 5

Design multi actor business models with financial models ready for an integrated biorefinery concept for the conversion of food waste into biogas, heat, lactic acid and microbial biosurfactants meeting all market requirements for home- and personal care market applications.

4 Communication and dissemination plan: introduction

A tailor-made communication and dissemination strategy is crucial to accelerate the use of the registration and collection system (the app) and to present WASTE2FUNC to a professional and public audience. This document describes the essential elements and status of the dissemination and communication activities.

This plan covers both, dissemination and communication. Dissemination refers to the outward flow of results, know-how, and methodologies. Communication refers to the two-way engagement between the project and a variety of external groups.

Communication will support all activities within the WASTE2FUNC project.

WASTE2FUNC will communicate its project results to the stakeholders, using the most appropriate communication channels per target group. This next paragraphs will provide more detail on the communication objectives, describe the target groups and communication activities.

4.1 Communication objectives

The communication of WASTE2FUNC should be linked to the communication of the objectives of the proposal, but also more generally.

4.1.1 Communication objectives with the aim to INFORM

Inform farmers and primary sector, auctions, food processing companies, companies with waste streams that meet the requirements of the project and waste processing companies on the possibility to have waste streams collected and processed to serve as a feedstock for the production of lactic acid and microbial biosurfactants.

Inform potential end-users of the second generation lactic acid and microbial biosurfactants of the potential to formulate these bio based second generation alternatives in their end products.

Inform the consumers on the sustainable alternatives for home- and personal care products and bioplastics.

4.1.2 Communication objectives with the aim to PERSUADE

Persuade farmers and primary sector, auctions, food processing companies, companies with waste streams that meet the requirements of the project and waste processing companies of the usefulness of the app which will be developed to register waste streams and have them collected to be processed.

Persuade potential end-users of the second generation lactic acid and microbial biosurfactants to test the potential of these bio based second generation alternatives in their end products.

Persuade the consumers to in the future use these sustainable alternatives for home- and personal care products and bioplastics.

4.1.3 Communication objectives with the aim to ENGAGE

Engage farmers and primary sector, auctions, food processing companies, companies with waste streams that meet the requirements of the project and waste processing companies to use the app and register their waste streams to create an added value.

Engage potential end-users of the second generation lactic acid and microbial biosurfactants to use and implement these of these bio based second generation alternatives in their end products.

Engage the consumers to in the future use these sustainable alternatives for home- and personal care products and bioplastics.

5 Target Groups

5.1 App users/feedstock

5.1.1 Farmers/Primary sector

We want farmers to indicate via the app whether they have agricultural waste crops available for collection and processing by WASTE2FUNC. We reach this group via Innovatiesteunpunt, Boerenbond and COPA COGECA for Europe. As Innovatiesteunpunt is embedded within Boerenbond, the conglomerate of the main farmers organization, around 17 000 member farmers can be reached ensuring impact.

5.1.2 Auctions

At the auctions, lots of fruit and vegetables often remain unsold. That is why it is very interesting to convince this group of the usefulness of having these waste streams collected and processed in the context of WASTE2FUNC.

5.1.3 Food processing companies

Production problems at food processing companies can result in waste streams that can be registered via the app for collection and processing via WASTE2FUNC.

5.1.4 Companies with waste streams that meet the requirements of the project

Companies other than food processing companies can have waste streams that meet the requirements of the project. These companies can register their waste streams to be collected and processed.

5.1.5 Waste processing companies

Next to consortium partner Group Op de Beeck, also other waste processing companies might be interested in the app/website and in the targets of the project to add value and potentially change the current valorisation strategy of certain waste streams.

5.2 End product users

The waste biomass will be converted into lactic acid and microbial biosurfactants as functional ingredients of home- and personal care applications. Potential end users are personal – and home care developing companies like EVONIK, CRODA, ECOVER, UNILEVER, P&G and bioplastic producing companies.

5.3 Policy makers

Special attention is given to standardisation and regulation authorities as lactic acid and microbial biosurfactants based on food waste are a first of a kind and proof of their safety for the registration as an ingredient for home- and personal care products will be crucial. For this OVAM the Belgian organisation on

waste regulation and also the European Commission will be engaged in case we run against European regulation, making exploitation of the ingredients difficult.

5.4 General public/consumers

The general public/the consumer will also be targeted to showcase the advantages of the WASTE2FUNC technologies compared to current technologies and state of the art on the environmental, social and economic level. These target groups can be reached via consumer organisations and journalists.

6 Messages

6.1 Use of the app

In communication the emphasis must in the first place be on the usefulness of the app for the target groups that have waste streams on offer.

6.2 Valorisation of waste streams

It must be made clear to suppliers of raw materials that they can create value with their waste streams. By offering the waste flows for collection and processing via the app, added value is created. They earn something extra themselves than if they would leave the residual flows on the field or throw them away or give them away.

6.3 Message on end products

The end products, lactic acid and microbial biosurfactants, are being produced with a very low carbon-footprint. This has an impact on the increasing sustainability of the end products in which the lactic acid and microbial biosurfactants are used.

7 Activities

7.1 Press releases

Press releases will communicate on the project and intermediate results and important milestones to key media actors. This will include at least one press release at the start of the project, one midterm, and one at the end. The first press release will be published mid January 2022.

7.2 Website

A specifically tailored website is developed for displaying information about the project objectives, activities and results to interested public and stakeholders. The aim of the website is to inform, persuade and engage the target groups and the general public. A first version of the website will be online in month 6. The website is set up by the lead partner, but all consortium partners contribute to the content.

The consortium will identify relevant messages to be included using the list of messages in the communication plan.

Analytics and its impacts of these dissemination and communication will be measured using Google Analytics and content will be managed according to the results.

The WASTE2FUNC website was published on October 27th, 2021 under the URL https://www.waste2func.eu. The website will be updated regularly. News and events related to the work will be updated. It is based on the Open-Source software WordPress, which allows improving the visibility of WASTE2FUNC via Search Engine Optimisation (SEO). The European General Data Protection Regulation (GDPR) will be adhered to.

7.3 Video

A project video will be made to inform, persuade and engage the key target groups and to inform the general public. This movie will be online available by month 36.

The project video will be distributed via the project website, the project LinkedIn page, all partner websites, newsletters and databases, presence at external networking events, stakeholder focus groups, all project meetings involving stakeholders, YouTube,…

The development of this project video will be the task of the lead partner, all project partners will contribute.

7.4 Stakeholder Focus Group

The Stakeholder Focus Group represents stakeholders from across the value chains in the WASTE2FUNC project. Various aims for the Stakeholder Focus Group are outlined in the Grant Agreement: to regularly review the project results, to provide advice on the feasibility of new supply chains (from wastes and residues), to improve the credibility of the proposed business models, to help identify on regulatory hurdles, and in general to provide inputs around challenges and opportunities in the project.

7.5 Primary Sector Workshops

The purpose of the primary sector workshops is to collect information on the following topics: practical and economic feasibility of collecting agricultural waste streams, registration system and related functionalities of the app and website. Depending on the input that is needed from the agriculture and horticulture sector, only technical consultants from Boerenbond will be invited. When more concrete information is needed (e.g. testing the app), farmers and horticulturalists will also be invited.

7.6 Social Media

A WASTE2FUNC LinkedIn account will be created after the project kick-off. This channel will be used to communicate on developments in the project and spread news.

All partners will use their existing social media channels (personal, organization) to disseminate news.

7.7 Participation in external networking events

All partners will participate in relevant external conferences, exhibitions, seminars and workshops to promote the project and to identify, inform, persuade and engage more stakeholders. The consortium will identify the relevant messages to be included. Impact of this outreach will be reviewed in the consortium meeting to fine tune the dissemination activities.

7.8 Various

If the consortium feels during the project the need to organize other, supplementary communication activities, these will be discussed and deployed.

8 External communication

A clear strategy will be developed to define the key messages, address the public audience, interested parties and stakeholders, select the tools and plan the dissemination programme.

Led by Bio Base Europe Pilot Plant, the consortium will implement various external communication tools and channels for the project. All partners are responsible for the promotion and communication of the project.

8.1 Displaying funding

All communication activities and products of the WASTE2FUNC project (articles, project website, presentations, flyers, press releases, videos, etc.), will include:

- the BBI JU logo
- the EU emblem with text referring to Horizon 2020 funding
- the BIC logo

The BBI JU logo should be the biggest. The minimum height of the EU emblem shall be 1 cm. When displayed together with another logo, the JU and BIC logos and the EU emblem will have appropriate prominence.

Project-related communication and dissemination materials of all types will always mention the funding received from the BBI JU programme through Horizon 2020. This includes materials produced by participants in the project.

8.2 Project identity

The project identity was developed at the start of the project by Bio Base Europe Pilot Plant in close coordination with the whole consortium to convey uniform message format and for brand recognition.

8.2.1 Logo

The project identity has been developed by Bio Base Europe Pilot Plant while considering and including the input of the whole consortium. The aim was to develop a logo that is as simple, clear and memorable as possible. It was also ensured that the font and the symbol remain legible for as long as possible when the logo is scaled down and that the standard version of the logo has a square shape.

Figure 1: The WASTE2FUNC Project logo

8.2.2 Templates

A Word template was developed to be used for the harmonised creation of deliverables, reports, letters and other Word documents.

To let the partners freely use their own company template it was decided not to foresee a WASTE2FUNC powerpoint template.

9 Exploitation plan: introduction

The WASTE2FUNC consortium has the ambition to bring the technology/processes, product and LCA-related innovations to the market in the first years after termination of the project. The project develops a number of very concrete products, primarily targeting the home- and personal care sector and bioplastics. The work plan and consortium were carefully selected to cover the complete value chain through the partners or the

Stakeholder focus groups and to enable promising research results to progress from the lab to the market. The WASTE2FUNC work plan encompasses several essential steps to remove the main bottlenecks preventing market entry of the research results: developing robust production strains, developing scalable and low-cost processes using several industrial side streams and food waste streams, scaling up the processes, developing prototypes of the scaled-up ingredients and characterisation of these prototypes, all regulatory and LCA studies to bring these products to the market, performing dissemination actions including exploratory marketing, and drafting the final exploitation plan for further commercial development of the processes and the products.

The specific objective of the exploitation part within this deliverable is the development of the WASTE2FUNC exploitation plan aiming at defining a route to successful exploitation of the WASTE2FUNC results during the project lifetime. This is achieved by defining the exploitable results, identifying dependencies between them, and by mapping the related IP landscapes. On this basis, the most realistic routes to exploitation will be elaborated per (group of) exploitable results, taking into account their most important barriers and measures to counter them, means to secure them, beneficiaries involved, etc. In this first version of this deliverable the provided information are based on exploitable results and exploitation strategies as partly derived from the WASTE2FUNC proposal and additionally updated input is provided from the partners within a first iteration round. There will be a second deliverable due at the middle of the project "Plan for Dissemination, communication and exploitation of results: revision (D7.14, M20) which will contain a concrete and comprehensive roadmap for the further development (e.g. demonstration phase) and commercialization (e.g. attract missing partners in the value chain, investments, etc.) of each promising product or processing technology. Different business models will be considered and reported in deliverables in WP6.

Dr. Sophie Roelants is the WASTE2FUNC Risk and Exploitation manager . Exploitation managers (one per partner) are appointed to make sure the exploitation goes as planned.

Responsibilities: The exploitation managers safeguard the valorisation potential of their technology or product platform. They evaluate patentability, the techno-economic viability of the technological innovations and legal aspects of the technology, and scout for new business opportunities. This includes attending networking events and establishing durable business contacts, scouting for funding opportunities, etc. The exploitation managers have access to the market knowledge of the involved end-users. They bring the exploitation plan, elaborated in this deliverable, to practice.

Name & expertise: Sophie Roelants (Innovation Manager Biosurfactants BBEPP), Sofie De Maeseneire (Postdoctoral researcher Inbio.be, Ghent University), Amir Oranim (Co-Founder TripleW), Carol Lin (Professor City University Hong Kong), Roel Bosschaerts (Global Platforms Researcher Ecover Coordination Center BV), Timothy Miller (R&D Manager Croda), Alexandra Trambitas (Head of Innovation Management Evonik), Célestin Demuytere (Manager Sustainability Assessment Services at OWS), Maxime Eliat-Eliat (Project Manager at Arche Consulting), Lucy Montgomery (Senior Bioeconomy Consultant at NNFCC), Nele Loenders (Innovationconsultant at Innovatiesteunpunt voor Landbouw en Platteland), Thomas Anné (Outlet Manager at Group Opdebeeck)

Communication procedures:

- The exploitation managers regularly update the task leader of WP7(BBEPP) and the WP leaders on the technological developments and results obtained in the project.

• The exploitation managers report in 6-monthly progress reporting to BBEPP (task leader and Project Coordinator).

• The exploitation managers compose “Plan for Dissemination, communication and exploitation of results: revision”, in close cooperation with the leader of WP6, 7 (NNFCC, BBEPP), WASET2FUNC exploitation manager and Project Coordinator team.

10 Exploitable results

10.1 Characterization of exploitable results

The exploitation strategy of WASTE2FUNC results will focus on preparing the market entry of WASTE2FUNC biochemicals: second generation lactic acid (2G LA) and second generation biosurfactants (2G BSs). Next to this an app/website will be on point for registratuin of agricultural waste streams, including an optimized logictics system/supply chain. The technical innovations that will come out of the project are:

1. BS production from 2G feedstocks
2. LA production from 2G feedstocks
3. App/website on point for registration of waste streams
4. Prototype consumer products designed with functional LA and/or microbial BS ingredients

The necessary framework conditions for this new innovations will also be investigated (regulation, LCA).

10.1.1 BS production from 2G feedstocks

WASTE2FUNC project partners UGent and BBEPP have together generated a proprietary portfolio of very innovative and novel microbial biosurfactants with varying properties amongst others during the BBI JU project Carbosurf [1]. This portfolio of compounds with associated processes developed can be a real gamechanger in the field and attract the interest of important market actors such as EVONIK and CRODA. The portfolio of microbial biosurfactants offers some clear opportunities. UGent has built up ample experience in the tool development and strain optimization of the yeast *Starmerella bombicola* towards the production of these novel biosurfactants and BBEPP has developed proprietary processes for their production (fermentation and purification). The joint technology platform is protected by a number of (un)published patents [2–4] and UGent/BBEPP aimed to set up a spin off company combining the joint technology in a new entity towards its valorization, this spin off company, Amphistar, has recently (July 2021) started up.

Although the use of renewable resources towards the production of biochemicals such as microbial biosurfactants is generally stated to have a better environmental profile as compared to fossil derived resources, as mentioned above for lactic acid the use of 1G feedstocks is associated with substantial environmental impacts. This is not different for microbial biosurfactants: an LCA study performed in the framework of the FP7 project Biosurfing [5] showed that although the fermentative production process to produce SLs is indeed more sustainable compared to SOTA fossil- or biomass derived chemical processes, the use of such 1G renewable feedstocks actually has a huge impact on the overall environmental impact of the 1G SLs. This impact is generated through the environmental impact of the agricultural practices (fertilization, water use, resources used, etc) associated with the production of the 1G biomass feedstocks. UGent/BBEPP in collaboration with CityUHK recently provided proof of concept for the efficient conversion of food waste into wild type SLs [6–8]. This is highly interesting to the WASTE2FUNC companies already producing or applying 1G SLs, as this clearly improves their environmental profile [6–8] and companies such as EVONIK, CRODA and ECOVER all focus on increasing sustainability of their products.

WASTE2FUNC aims to demonstrate optimized cost-efficient production of microbial from regional food waste at 1-10 m^3 scale and determine and resolve remaining hurdles towards market introduction as functional ingredients for new biobased formulations in home- and personal care consumer products thus creating new and integrated value chains within Europe.

The developed 2G processes will be considered as an exploitable result and also the optimized strains within this project. Results will be exploited in patents or as trade secrets, they will contribute to the business plan development and will be published in scientific publications.

10.1.2 LA production from 2G feedstocks

WASTE2FUNC project partner TripleW has developed a breakthrough solution for the current high price of PLA due to the high feedstock cost (food crops such as corn and cane sugar). This young Israeli company has developed a novel process that converts food waste into a fermentable substrate for production of lactic acid. The low production cost and independence of first-generation sugar and oil creates significant opportunities for market penetration and for long-term stability. Furthermore, the TripleW technology boasts an extremely low carbon footprint, due to the nature of the feedstock as well as the ability to establish a facility anywhere in the world where food waste exists locally converting it into lactic acid. These abilities attract the interest of many companies applying lactic acid in their products/formulations as increasing sustainability has become a driver for every company taking itself seriously.

WASTE2FUNC aims to demonstrate optimized and cost-efficient production of lactic acid from food (crop) waste at 1-10 m3 scale and to determine and resolve remaining hurdles towards market introduction in consumer products such as laundry detergents.

The developed 2G processes will be considered as an exploitable result and also the optimized strains within this project. Results will be exploited in patents or as trade secrets and will be published in scientific publications.

10.1.3 App/website on point for registration of waste streams

The Belgian company Biogas Solutions, as part of Group Op de Beeck Materials & Treatment (GODBM&T) located in the Port of Antwerp (Kallo) has successfully set up a sustainable and continuous biomass waste feedstock supply chain offering solutions for the processing of food and other organic waste from various sources in the agri-food industry and agriculture through conversion into heat and biogas and subsequent conversion of biogas into green electricity. As technical possibilities increase and as the interest in recovered resources increases, GODBM&T is convinced that the production of biogas is just one of the potential steps in a cascade of processing techniques for its waste products but today happens to be the most techno-economic efficient way. Since a few years GOBM&T has thus increased its R&D activities with as goal the transition of the processing plant into a biorefinery that uses the best available technologies to produce functional market applications that can directly be used in agriculture and (bio)industry as such increasing value GOBM&T aims to invest in the development/implementation of renewable technologies and provide space and assistance as a demonstration facility. Therefore, WASTE2FUNC perfectly fits GODBM&T's vision and long-term strategy.

WASTE2FUNC aims to resolve the (supply chain) hurdles blocking the use and valorisation of (erratic) agricultural food crop waste and food processing waste by designing a straightforward biomass waste registration and collection system with value- and employment creation for the primary sector. Integration of this new supply chain with (an) existing supply chain(s) of industrial/retail/restaurant biomass waste streams such as the GODBM&T waste will ensure to build solid business cases and result in substantial reduction of CO2 emissions (20 % minimum) and increasing value extraction from waste 2-10 fold compared to the SOTA.

This will be exploited in the form of the launch of the app and website.

10.1.4 Prototype consumer products designed with functional LA and/or microbial BS ingredients

10.1.4.1 Lactic acid containing prototypes

B2C company ECOVER has lab to m³ scale formulation equipment. They will further evaluate and compare the 2G LA with 1G LA and demonstrate prototype consumer formulations containing 2G LA to the market aiming to commercialize TripleWs landless LA in many of their B2C consumer products.

The results will be exploited as formulation application patents and there will be agreements to commercialize the formulations.

10.1.4.2 Microbial BSs containing prototypes

B2B companies CRODA and EVONIK have lab and m³ scale formulation equipment, which will be employed for the comparison of 2G SLs to 1G SLs and the generation of prototypes for market testing. Both companies have been active in the field of wild type SLs for many years and EVONIK launched a 1G wild type SL product (REWOFERM) on the B2B market in 2015, which won a number of prizes [9,10]. B2C company ECOVER has lab and m³ scale formulation equipment in house which will be employed for the comparison of 2G SLs to 1G SLs and the generation of prototypes for market testing. ECOVER and was one of the first B2C companies applying wild type SLs in their products using a process which was co-developed by ECOVER and UGent and later transferred to EVONIK, now producing SLs for ECOVER. ECOVER/METHOD to commercialize B2C home care consumer products containing 2G SLs. Furthermore ECOVER is committed to switching to the use of so-called 'landless' products.

The results will be exploited as formulation application patents and there will be agreements to commercialize the formulations.

Regulatory conditions for 2G derived LA and microbial BSs

One of the main objectives of WASTE2FUNC is to bring 2G LA and 2G (new) microbial BSs produced from regional and sustainable biomass feedstocks, to the home- and personal care markets in Europe. These completely new value chains will be characterized by some important hurdles/bottlenecks, but also opportunities. The WASTE2FUNC techno-economic, environmental and regulatory hurdles will be inventoried and debottlenecked which will involve several aspects (1) Any new (non-polymeric) (bio)chemical for commercialization in Europa needs to be registered by ECHA. The WASTE2FUNC biochemicals consist of drop ins with existing REACH dossier (LA and wild type SLs) and completely novel biochemicals (alkyl- and bola SSs). A gap analysis will be performed by ARCHE to identify required studies related to functionality and safety (such as toxicity, eco-toxicology, biodegradability, etc.), which will be performed by a GLP lab (e.g. Charles River) under coordination of UGENT/TRIPLEW IS/ARCHE. Moreover, specific legislation (e.g. transport/processing of animal by-products, cosmetics- and detergent legislation) related to WASTE2FUNC value chains will be mapped by ARCHE (2) Environmental, social and techno economical aspects (LCSA and TEA analyses) will be modelled by OWS and NNFCC and hot spot analysis will allow to pinpoint points for improvement and optimization of the developed processes.

10.2 IP landscape

10.2.1 Background IP

WASTE2FUNC is tightly linked to many other publicly funded projects through its partners, where specific know-how and experience was/is built up, that is of relevance to the WASTE2FUNC project. More details

regarding these complementary projects can be found already in the Excellence section (Section 1.3, p. 24) of Annex 1 of the Grant Agreement.

Ugent/BBEPP has filed several patents on the microbial biosurfactants technology and they will be considered as background IP.

- W. Soetaert, I. Van Bogaert, and S. Roelants, "Methods to produce bolaamphiphilic glycolipids. WO 2015028278 A1. 50p," 2013.
- W. Soetaert, S. L. De Maeseneire, K. M. J. Saerens, S. L. K. W. Roelants, and I. N. A. Van Bogaert, "Yeast strains modified in their sophorolipid production and uses thereof" WO2011154523 A1, 2010.
- I.N. A. Van Bogaert, K. Ciesielska, B. Devreese, W. Soetaert, and S. Roelants, "A lactonase derived from Candida bombicola and uses thereof. WO 2013092421 A1," 2012.
- S. Roelants, L. Van Renterghem, W. Soetaert, J. Remmery, "Improved production of symmetrical bolaform sophorosides." WO2020104582A1, 2020.
- W. Soetaert, S. Roelants, C. Stevens, E. Delbeke, G. Luyten, M. Pala, J.Remmery, "Efficient synthesis of omega-glycosides and alkyl glycosides." WO2021229017A1, 2021.

TripleW has filed several patents on the lactic acid technology and they will be considered as background IP.

- T. Shapira and A. Oranim, "LACTIC ACID-UTILIZING BACTERIA GENETICALLY MODIFIED TO SECRETE POLYSACCHARIDE-DEGRADING ENZYMES," US20190169586, 2017.
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- T. Shapira and A. Oranim, "SYSTEMS AND METHODS FOR PROCESSING ORGANIC WASTE USING ENZYMES," 62/276986, 2019.
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10.2.2 Competing technologies and projects

WASTE2FUNC technology/ processes/ products development will need to compete with other patents and or running projects. Therefore it is of utmost interest to know how these competing landscape look like and where other development directions are leading to.

10.2.2.1 Microbial biosurfactants

J. B. Winterburn, B.M. Dolman, "Method for producing and separating lipids", WO2017220957A1, 2017.

No obstruction of FTO since the methods for production and separation are different.

10.2.2.2 Lactic acid

None known currently but full landscape will be explored.

11 Exploitation routes

Due to the fact that this is a public deliverable the long term exploitation routes for all research lines cannot be disclosed in detail..

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