Report on the IPR activities

Deliverable 7.3

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0	07/03/2024	Helena Vilaça	Template for the report
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Table of Contents

List of Tables

List of Abbreviations

Acronyms	Description
D	Deliverable
DMP	Data Management Plan
DoA	Description of Action
DOI	Digital Object Identifier
GA	Grant Agreement
IPR	Intellectual Property Rights
n.a.	Not applicable
PES	Polyester
PHA	Polyhydroxyalkanoate
W2BC	**Waste2BioComp**

1. Introduction

This report represents the result of Task 7.4 - Innovation and IPR management, namely regarding the activities related with IPR management. The main objective of this task was to ensure the appropriate protection, management, and strategic exploitation of the intellectual property generated during the project, ensuring both its commercial potential and alignment with the project's goals.

While the pre-existing knowledge of the project partners (background IP) was defined in the Consortium Agreement, new knowledge was generated during the project (foreground IP), for which the properties' division of the generated IPR among the partners, the articulation of the IPR with the exploitation, dissemination and business plans, and the proposal of optimal IPR protection options (e.g., patent, copyright, trademark, confidentiality) in line with the selected business model options and taking into account possible co-ownership, as well as implementation of proper IPR protection measures were carried out.

The IPR management strategy was implemented following the guidelines set out in the Consortium Agreement and Grant Agreement, with clear protocols established for the management and protection of both background and foreground intellectual property. IPR protection and strategy activities were conducted from the early stages of the project, ensuring that the necessary actions were taken to safeguard the knowledge and technologies developed, while also ensuring the free exploitation of results and the sharing of resources among consortium members.

To ensure compliance with Open Science practices and guarantee that all beneficiaries were aligned with the project's IPR guideline, the deployment of the Open Science practices described in the Description of Action (DoA) were mandatory for all beneficiaries (see DMP – deliverables D7.2, D7.8, D7.11).

This task is part if WP7 - Dissemination, Communication, Training, Exploitation, and Innovation Management.

2. Work carried out in Task 7.4

This section presents the patent search conducted during the **W2BC** project as part of Task 7.4, aimed at evaluating the potential IP related to the innovations generated by the project. The search was conducted to assess the patentability of the technologies developed, ensuring that the **W2BC** consortium maintains a competitive edge in the bio-based materials sector. This task was crucial to identify existing patents that might overlap with the innovations generated by the project and to determine the novelty of the approaches being developed. Is also presents IPR generated within the project and how it was protected, or shared, according to the consortium partner's option.

2.1. Patent search

IPR management is a key tool to maximize the impact of **W2BC**. Aligned with the objectives of Task 7.4, a worldwide patent search was performed to verify and validate the patentability protection of possible developed innovations related with this project. This section summarizes the "state of art" information about the patents which are directly or indirectly related with **W2BC**.

Following the guidelines inherent to a future intellectual property application process, a patent search was carried out in different databases, considered the most pertinent for the purpose, to assess the novelty of the **W2BC** approach. The selected databases were European Patent Office, Wipo, and GOOGLE PATENTS. After identifying the databases to access, the technological fields and specific keywords have been defined to maximize the output of the patent search process. The keywords used are related to the main areas of the project, including the use of bio-based materials/PHAs in textiles, plastic packaging, or shoe foams; inkjet inks, and the chemical or microwave recycling of bio-PES/PES. The most relevant patents obtained from the mentioned databases are reported below, categorized according to the previously mentioned areas.

2.1.1. Bio-based materials/ PHAs in textiles

- Biodegradable resin composition, biodegradable nonwoven fabric, and method for producing same (WO2024096181A1)[1]

Publication year: 2024

Purpose: Biodegradable resin composition, a biodegradable nonwoven fabric, and a method for producing same.

Advantages: The biodegradable resin (PHA) composition offers excellent biodegradability, biocompatibility, and environmental friendliness, along with superior processability and productivity. This enables the manufacturing of high-quality spunbond or short-fibre nonwoven fabrics with easily controllable viscosity, thereby enhancing overall productivity and process efficiency.

- Process for the production of a biodegradable polyester (co)polymer (WO2024094614A1)[2]

Publication year: 2024

Purpose: Process for the production of a biodegradable polyester (co)polymer, in particular of a (catalyst free) oxalate containing polyester (co)polymer, and to a polyester (co)polymer obtainable by, or obtained by, said process.

[1] WO2024096181A1: https://worldwide.espacenet.com/patent/search/family/090930837/publication/WO2024096181A1?q=pn%3DWO2024096181A1

[2] WO2024094614A1: https://worldwide.espacenet.com/patent/search/family/084047709/publication/WO2024094614A1?q=pn%3DWO2024094614A1

Advantages: The process efficiently produces novel and existing oxalate polyester (co)polymers, including those with high molecular weight, optionally without the need for adding a metal catalyst.

- Composition for biodegradable meltblown nonwoven fabric, and biodegradable meltblown nonwoven fabric manufactured using same (WO2024085302A1)[3]

Publication year: 2024

Purpose: The present invention concerns a composition for a biodegradable meltblown nonwoven fabric, as well as a biodegradable meltblown nonwoven fabric manufactured using this composition.

Advantages: The composition for biodegradable meltblown nonwoven fabric is eco-friendly, with excellent biodegradability and biocompatibility. It enhances properties like filtration, breathability, flexibility, and fibre diameter uniformity during high-temperature, high-pressure processes such as meltblowing.

- Additive manufacturing of tunable polymeric 3d architectures for multifunctional applications (WO2023023577)[4]

Publication year: 2023

Purpose: Process for additive manufacturing of polymeric nano-micron sized fibre-based material, utilising eco-friendly biopolymers.

Advantages: This can be used as a standalone structure for structural uses, where biodegradation or biocompatibility can be implemented, or as a template to enable formations of multiphasic composite structures.

- Composition and method for production of a highly flexible PHA sheet (WO2022173465A1)[5]

Publication year: 2022

Purpose: Manufacturing a highly flexible PHA sheet for use as artificial leather substrate

Advantages: Includes PHA, EVA copolymer resin, and citrate acid plasticizer; melt extrusion, heating, and orientation for textile production; yields a highly flexible PHA sheet suitable for artificial leather

- Use of a dispersion for textile coating (EP3875545A1)[6]

Publication year: 2020

Purpose: Centexbel developed a formulation based on thermoplastic biopolymers for textile coatings, addressing previous limitations and enhancing the sustainability of textile products

- Biodegradable film and laminate (US2015337094A1)[7]

Publication year: 2015

Purpose: Biodegradable film and enhanced biodegradable fabric/laminate

Advantages: Strong biodegradability, good shelf life, strength, agility, and flexibility

[3] WO2024085302A1: https://worldwide.espacenet.com/patent/search/family/090737981/publication/WO2024085302A1?q=pn%3DWO2024085302A1
[4] WO2023023577: https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2023023577
[5] WO2022173465A1: https://patents.google.com/patent/WO2022173465A1/en
[6] EP3875545A1: https://patents.google.com/patent/EP3875545A1/en
[7] US2015337094A1: https://patents.google.com/patent/US20150337094A1/en

- Polyhydroxyalkanoate medical textiles and fibers (US2013300018A1)[8]

Publication year: 2013

Purpose: Polyhydroxyalkanoate medical textiles and fibres

Advantages: Prolonged strength retention, anti-adhesion properties, reduced risks of infection/ other post-operative problems, competitive cost, and suitable for paediatric populations

- Biological degradable film and laminated material (CN102675839A)[9]

Publication year: 2012

Purpose: Biological degradable film, enhanced fabrics, and laminates

Advantages: biodegradability (strong performance in microbial environments), good quality guarantee period, flexibility, and toughness

- Biodegradable recycling material (CN102219988A)[10]

Publication year: 2011

Purpose: Biodegradable material for films, containers, fabrics, and composite products

Advantages: Rapid biodegradation, extended quality guarantee period

- Full biodegradable high-elasticity fibre material, high-elasticity fibre and application thereof (CN102051707A)[11]

Publication year: 2011

Purpose: Full biodegradable high-elasticity fibre material

Advantages: mainly comprises P3HB4HB; exhibits good elasticity and high strength; high-elasticity fibre with excellent memory function; can be fully biodegraded

- Biodegradable coated substrates (US2003113564A1)[12]

Publication year: 2003

Purpose: Coated substrates for paper, fabric, thread, and yarn

Advantages: biodegradable coating; varied structure for enhanced properties; applicable in diverse substrates

- Nonwoven materials comprising biodegradable copolymers (US5685756A)[13]

Publication year: 1997

Purpose: Nonwoven material with adhesive comprising Polyhydroxyalkanoate (PHA)

Advantages: includes PHA and a surfactant; suitable for absorbent articles; applicable in various nonwoven materials

[8] US2013300018A1: https://patents.google.com/patent/US20130300018A1/en
[9] CN102675839A: https://patents.google.com/patent/CN102675839A/en
[10] CN102219988A: https://patents.google.com/patent/CN102219988A/en
[11] CN102051707A: https://patents.google.com/patent/CN102051707A/en
[12] US2003113564A1: https://patents.google.com/patent/US20030113564A1/en
[13] US5685756A: https://patents.google.com/patent/US5685756A/en

2.1.2. PHAs on plastic packaging

- Biodegradable thermoplastic polymer composition and methods for its manufacture (WO2024102010A1)[14]

Publication year: 2024

Purpose: Obtain, based on the components used, which are of natural origin or obtained from natural raw materials, a thermoplastic starch showing high barrier to water access and high resistance to dissolution in water.

Advantages: The use of PHA in the composition according to the invention has a significant effect on achieving its high mechanical strength, while starch reinforced and hydrophobized with natural compounds (rhTPS) is expected to improve the processing parameters, flexibility, functional properties and accelerate the biodegradation of the rhTPS/PHA composition.

- Biodegradable thermoplastic polymer materials, biodegradable products and methods of manufacture and use thereof (US2024093023A1)[15]

Publication year: 2024

Purpose: The invention encompasses biodegradable compositions and methods of preparation and use thereof, and disposable products made from the claimed compositions.

Advantages: A method for preparing the biodegradable plastic with good mechanical properties and a low manufacturing cost and a disposable product with good mechanical properties and a low manufacturing cost.

- PHA-based container and method for manufacturing such container (WO2023046580A1)[16]

Publication year: 2023

Purpose: To optimize plastic containers, particularly bottles, with the aim of enhancing their complete biodegradability.

Advantages: Because conventional plastic containers are made of non-biodegradable plastic, they are not optimized for degradation. In a container according to the invention, the neck portion is optimized, in particular in that it is formed by a wall of biodegradable plastics having the lowest possible thickness providing sufficient stiffness.

- Polyhydroxyalkanoate-based packaging films and articles made therewith (WO2023245036A2)[17]

Publication year: 2023

Purpose: Aqueous based compositions of PHA and polymer blends of PHA for use with food contact items and similar packaging films.

Advantages: Composition for the manufacture of bio-degradable, bio-compostable, ocean degradable, biocompatible articles that contain a bio-based thermopolymer component applied on the surface of a substrate.

[14] WO2024102010A1: https://worldwide.espacenet.com/patent/search/family/089707850/publication/WO2024102010A1?q=pn%3DWO2024102010A1
[15] US2024093023A1: https://worldwide.espacenet.com/patent/search/family/090245534/publication/US2024093023A1?q=pn%3DUS2024093023A1
[16] WO2023046580A1: https://patents.google.com/patent/WO2023046580A1/en
[17] WO2023245036A2: https://worldwide.espacenet.com/patent/search/family/089191930/publication/WO2023245036A2?q=pn%3DWO2023245036A2

- Packaging material (WO2022219183A1)[18]

Publication year: 2022

Purpose: Packaging material with an active agent-releasing layer and nanocellulose coating

Composition: Multi-layer structure with various functional layers

- Rigid biodegradable food container (EP4175827A1)[19]

Publication year: 2021

Purpose: Describes a food container with an outer layer of cellulose and an inner layer of PHA. The inner PHA layer can be applied through thermoforming or spray-coating, resulting in a biodegradable container suitable for food storage

- Biodegradable container closure and resin therefor (US20220089862A1)[20]

Publication year: 2021

Purpose: Details a biodegradable container closure made primarily from PHA copolymers. The closure is designed to degrade rapidly under specific conditions and is intended to be used with PHA-based containers and labels, creating a fully biodegradable packaging solution

- Biodegradable packaging, its procedure for obtaining and its use for contact, transport and/or storage of perishable products (ES2770151A1)[21]

Publication year: 2020

Purpose: Biodegradable packaging for contact, transport, and storage of perishable products

Advantages: a low-cost and tear-resistant thermoformable structural layer; structural layer and optional layers based on biodegradable polymers; various perishable products and applications

- A flexible package for packing fresh produce made from a biodegradable flexible film (EP3215439B1)[22]

Publication year: 2017

Purpose: Flexible package for packaging fresh produce made from biodegradable film

Features: Modified atmosphere packaging, controlled gas exchange

- PHA compositions and methods for their use in the production of PHA films (US7208535B2)[23]

Publication year: 2007

Purpose: PHA compositions for the production of blown and cast free-standing films

Advantages: PHA pellets with high Molecular Weight; films with desirable elongational and tensile properties; designed for easy processing into films.

[18] WO2022219183A1: https://patents.google.com/patent/WO2022219183A1/en
[19] EP4175827A1: https://patents.google.com/patent/EP4175827A1/en
[20] US20220089862A1: https://patents.google.com/patent/US20220089862A1/en
[21] ES2770151A1: https://patents.google.com/patent/ES2770151A1/en
[22] EP3215439B1: https://worldwide.espacenet.com/patent/search/family/055022643/publication/EP3215439B1?q=pn%3DEP3215439B1%3F
[23] US7208535B2: https://patents.google.com/patent/US7208535B2/en

- Polyhydroxylkanoates as well as blending modification for copolymer thereof and polylactic acid (CN101205356A)[24]

Publication year: 2008

Purpose: PHBV and PLA copolymers for biodegradable packaging

Advantages: Suitable for various products, providing excellent mechanical properties; replacing petroleum-based plastics.

2.1.3. PHAs on shoe foams

- Recyclable, biodegradable, and industrially compostable extruded foams, and methods of manufacturing the same (US11912843B2)[25]

Publication year: 2024

Purpose/ advantages: The present disclosure provides flexible foams and manufacturing processes for producing end products that are recyclable, biodegradable, compostable, sustainable, and environmentally accountable. In some embodiments, the foam materials and end products are designed for sustained use without breaking down but are easily recyclable and/or compostable at the end of their life.

- Biodegradable, industrially compostable and recoverable injection molded microporous soft foams (CN116745090A)[26]

Publication year: 2023

Purpose: The present disclosure involves an injection-moulded microcellular foam made from a recyclable or biodegradable, industrially compostable biologically derived thermoplastic polymer, suitable for use in footwear components, etc.

Advantages: The foamed material confers many added values, such as soft cushioning, comfort and impact protection.

- Biodegradable industrially compostable and recyclable injection molded microcellular flexible foams (KR20230170133A)[27]

Publication year: 2023

Purpose: The present disclosure provides a variety of flexible foams from recyclable or biodegradable, industrially compostable bio-derived thermoplastic polymers for use in, for example, footwear components.

[24] CN101205356A: https://patents.google.com/patent/CN101205356A/en
[25] JP2023549018A: https://worldwide.espacenet.com/patent/search/family/081601796/publication/US11912843B2?q=pn%3DJP2023549018A
[26] CN116745090A: https://worldwide.espacenet.com/patent/search/family/081854194/publication/CN116745090A?q=pn%3DCN116745090A
[27] KR20230170133A: https://worldwide.espacenet.com/patent/search/family/073459532/publication/KR20230170133A?q=pn%3DKR20230170133A

- Method for manufacturing a flexible foam molded product, flexible foam produced by the method and article comprising the flexible foam (TW202228980A)[28]

Publication year: 2022

Purpose: Recyclable injection-molded microcellular foams for footwear components

Features: Thermoplastic polymer from depolymerized post-consumer plastic

- Production of polyhydroxyalkanoate foam (WO2010065053A1)[29]

Publication year: 2010

Purpose: This patent outlines methods for producing PHA polymer foams with significant expansion ratios. The process involves combining PHA polymers with epoxy-functional compounds and foam cell nucleating agents, followed by foaming agents to create the foam.

- Fully biodegradable foaming material and application thereof (CN102051031A)[30]

Publication year: 2011

Purpose: Fully biodegradable foaming material

Characteristics: High ductility, elasticity, and wear resistance

2.1.4. Inks for inkjet printing with bio-based pigments or dyes

- Textile inkjet printing ink (WO2020006022A1)[31]

Publication year: 2020

Purpose: The present invention describes an aqueous inkjet ink for textile printing. The ink comprises a non-aqueous dispersed liquid phase, a continuous aqueous phase, and a colorant. The continuous aqueous phase includes water, a water-miscible organic solvent, and a surfactant. The non-aqueous liquid phase contains a prepolymer liquid that solidifies upon electron beam irradiation, enhancing the durability of prints on textiles.

- Biopolymer-based inks and use thereof (US10731046B2)[32]

Publication year: 2020

Purpose: This patent discloses biopolymer-based ink formulations suitable for inkjet printing. The inks are derived from renewable biopolymers, providing a sustainable option for various printing applications.

- Manufacturing method of eco-friendly ink for digital printing using natural pigment (KR102116078B1)[33]

Publication year: 2020

[28] TW202228980A: https://worldwide.espacenet.com/patent/search/family/081854194/publication/TW202228980A?q=PHAs%20on%20shoe%20foams
[29] WO2010065053A1: https://patents.google.com/patent/WO2010065053A1/en
[30] CN102051031A: https://patents.google.com/patent/CN102051031A/en
[31] WO2020006022A1: https://patents.google.com/patent/WO2020006022A1/en
[32] US10731046B2: https://patents.google.com/patent/US10731046B2/en
[33] KR102116078B1: https://patents.google.com/patent/KR102116078B1/en

Purpose: Describes a method for producing eco-friendly digital printing ink using enzymatically treated natural dyes, resulting in high-purity extracts for ink formulations.

2.1.5. Chemical or microwave recycling of bio-based PES/PES

- Chemical and biological integrated degradation process for polyethylene terephthalate (PET), for recycling PET (KR20240028984A)[34]

Publication year: 2024

Purpose: Introduces a process combining chemical pretreatment and enzymatic degradation to recycle PET into high-value products.

- A process for degrading plastic products (KR102498219B1)[35]

Publication year: 2023

Purpose: The present invention relates to methods and their uses for degrading plastic products. The process specifically includes a depolymerization step following the amorphization of the plastic product.

Advantages: By combining amorphization and depolymerization, a high degree of degradation is obtained without fractionation and under industrial conditions.

- Method for preparing regenerated polyester by means of closed-loop recovery of waste polyester with typical green and low-carbon characteristics (WO2023060768A1)[36]

Publication year: 2023

Purpose: The present invention provides a green method for closed-loop recovery of waste polyester to prepare regenerated polyester in order to overcome the defects of non-closed-loop recovery of waste polyester and high content of by-products.

Advantages: The closed-loop recovery of a waste polyester can be achieved.

- Chemical recycling of polyethylene terephthalate by microwave irradiation (US10508186B2)[37]

Publication year: 2019

Purpose: A process for chemically recycling polyethylene terephthalate (PET) which utilizes a microwave absorber to optimize glycolytic depolymerization of PET via microwave irradiation.

- Process for recycling polyester (US5395858A)[38]

Publication year: 2019

Purpose: Recycling for converting polyester from waste material into its original chemical components: ethylene glycol and terephthalic acid

[34] KR20240028984A: https://patents.google.com/patent/EP4299657A1/en
[35] KR102498219B1: https://patents.google.com/patent/KR102498219B1/fr
[36] WO2023060768A1: https://worldwide.espacenet.com/patent/search/family/080141356/publication/WO2023060768A1?q=pn%3DWO2023060768A1
[37] US10508186B2: https://patents.google.com/patent/US10508186B2/en
[38] US5395858: https://patents.google.com/patent/US5395858A/en

- Process for recycling polyester materials (US7192988B2)[39]

Publication year: 2007

Purpose: The present invention is a process for recycling coloured polyester

2.2. Patents submitted

As part of the **W2BC** project, HSKL has submitted a patent for a novel production method for PHAs, and the polymers produced thereof. This patent submission represents a critical milestone in the project efforts to protect and commercialize its innovative technologies. And is a key component of the IP strategy for the **W2BC** project. By securing patent protection for this novel production method, HSKL and the **W2BC** consortium ensure that they maintain a competitive edge in the emerging field of bio-based materials.

2.3. Scientific articles and communications in conferences

As part of the dissemination strategy, several results from the project were published in open access papers (Table 1) and communicated in conferences (Table 2). These contributions have played a key role in sharing knowledge, fostering collaboration, and advancing scientific discussion in the field. Below is an overview of the main output from the project. All the results shared within these publications and communications were not deemed as needing IPR protection, after a carefully analyses by each partner involved. In the cases where some initially planned publication contained any information deemed as IPR by some of the partners, there was a discussion among the partners involved and the coordinator and it was possible to reach an understanding of what information could be shared in the publication without further constraints.

These publications and presentations have contributed to the broader dissemination of the project's findings, reinforcing its impact within the scientific and industrial communities.

[39] US7192988B2: https://patents.google.com/patent/US7192988B2/en

*Table 1 Project Publications of **W2BC***

Type	Title	Authors	Journal/ Conference	Publication date	DOI/Link
Journal Paper	Dark blue-green: Cave-inhabiting cyanobacteria as a model for astrobiology	Jung P, Harion F, Wu S, Nürnberg DJ, Bellamoli F, Guillen A, Leira M and Lakatos M	Frontiers in Space Science	13/02/2023	DOI:10.3389/fspas.2023.1107371
Journal Paper	Rare earths stick to rare cyanobacteria: Future potential for bioremediation and recovery of rare earth elements	Paper M, Koch M, Jung P, Lakatos M, Nilges T and Brück TB	Frontiers in Bioengineering and Biotechnology	28/02/2023	DOI:10.3389/fbioe.2023.1130939
Journal Paper	Chemical Synthesis of Atactic Poly-3-hydroxybutyrate (a-P3HB) by Self-Polycondensation: Catalyst Screening and Characterization	Almustafa W, Schubert DW, Grishchuk S, Sebastian J, Grun G	Polymers	11/06/2024	DOI:10.3390/polym16121655
Journal Paper	The dark side of orange: Multiorganismic continuum dynamics within a lichen of the Atacama Desert	Jung, P., Baumann, K., Emrich, D., Schermer, M., Eckhardt, K. U., Jandl, G., et al.	Mycologia	13/11/2023	DOI:10.1080/00275514.2023.2263148
Conference Presentation	Waste as valuable feedstock for sustainable future packaging	Mortera R, Coicna D, Schmidt A, Villalobos D R M, Rodriguez M B M, Adler S, Guetler BE, Davide	S24th IAPRI World Packaging Conference	21/06/2024	ISBN:9788409625970
Journal Paper	Self-Reinforced Biocomposites Made from Poly(3-hydroxybutyrate-co-3-hydroxyvalerate) (PHBV): An Innovative Approach to Sustainable Packaging Production through Melt Processing	Schmidt, A., Bittmann-Hennes, B., Moncada, D., & Montero, B.	ACS Omega	17/12/2024	DOI:10.1021/acsomega.4c05957
Journal Paper	Improving i-P3HB Processing Window: Solution-Casting Blends with a-P3HB and P34HB	Almustafa, W., Grishchuk, S., Sebastian, J., Schubert, D. W., & Grun, G.	Journal of Applied Polymer Science	15/01/2025	DOI: 10.1002/app.56805

*Table 2 Dissemination and Communication Events for the **W2BC** project*

Event	Type	Date	Location	Participant	Additional Notes
K2022	International Trade Fair	19–26 Oct 2022	Düsseldorf, Germany	HSKL	n.a.
2nd Webinar of the Textile Circularity Multiplier Initiative	Webinar	7 Dec 2022	Online	CITEVE	n.a.
Biopolymers and Sustainable Composites	International Seminar	1-2 Mar 2023	Spain, Valencia, Aimplas	UDC	n.a.
Hannover Messe 2023	International Fair - Industrial Transformation	16-21 Apr 2023	Hannover, Germany	HSKL	n.a.
Work package on biodegradable materials session	National dissemination event on biodegradable materials	9 May 2023	Online	UDC	n.a.
iTechStyle Summit	Scientific conference	10-12 May 2023	Oporto, Portugal	CITEVE	Poster presentation of the project
ACHEMA 2023	International Trade Fair	11 - 12 May 2023	Frankfurt, Germany	HSKL	n.a.
IX Congreso de Jóvenes Investigadores en Polímeros	Scientific conference	2 - 5 Oct 2023	Alicante, Spain	UDC	n.a.
Kreativvitty	Trade Fair	10 - 12 Nov 2023	Pirmasens	HSKL	n.a.
Techtextil 2024	International Trade Fair	23 - 26 Apr 2024	Frankfurt, Germany	CITEVE	Oral presentation: New bio-based pigment inks for digital textile printing applications
iTechStyle Summit	Scientific conference	20-22 May 2024	Oporto, Portugal	CITEVE	Poster presentation of the project
Polymers 2024 - Polymers for a Safe and Sustainable Future	Scientific conference	28-31 May 2024	Athens, Greece	IVW, HSKL	Oral presentations of the project
Polymers 2024 - Polymers for a Safe and Sustainable Future	Scientific conference	28-31 May 2024	Athens, Greece	HSKL	Oral presentation of the project
24th IAPRI World Packaging Conference	Scientific conference	17-21 Jun 2024	Valencia, Spain	PROPAGROUP	Oral presentation of the project related to packaging

Event	Type	Date	Location	Participant	Additional Notes
Circular Value Chains for Bio-Based Products - Bio-MATTERS cluster event	EUBCE conference	26 Jun 2024	Marseille, France	CITEVE	Oral presentation of the project
International scientific Events (Materials, Methods & Technologies)	Scientific conference	15-18 Aug 2024	Burgas, Bulgaria	HSKL	Presentation of chemical synthesis of PHAs
5th International Conference on Bio-Based Polymers and Composites	Scientific conference	1-5 Sep 2024	Esztergom-Hungary	UDC	Oral presentation and Poster of the project
XVII Reunión del Grupo Especializado de Polímeros GEP 2024	Scientific conference	16-19 Sep 2024	Madrid, Spain	UDC	Oral presentation and Poster of the project
S3 Congress - 6th European Congress on Eco-plasturgy and Sustainable, Intelligent and Safe Plastic Materials - Bio-MATTERS cluster event	Scientific conference	2-3 Oct 2024	Alessandria, Italy	PROPAGROUP	Oral presentation of the project
Strentex	Scientific conference	2-3 Oct 2024	Novi Sad, Serbia	INESC TEC	Oral presentation of the project
Modtissimo	Trade Fair	12-13 Oct 2024	Oporto, Portugal	CITEVE	Communication of project (ppt with overall information of W2BC)
Ecomondo - The Green Technology Expo	Scientific conference	5-8 Nov 2024	Rimini, Italy	PROPAGROUP	Oral presentation of the project
SmartX Innovation Hub	Webinar	6 Nov 2024	Online	CITEVE	Oral presentation of the project
Webinars on Redesign for Circularity: Upstream Solutions for Critical Plastic Applications	Webinar	18 Nov 2024	Online	CITEVE	Oral presentatio: Biodegradable materials for footwear and textiles
Composites United Conference	Scientific conference	20-21 Nov 2024	Berlin, Germany	IVW	n.a.

Event	Type	Date	Location	Participant	Additional Notes
Aachen Dresden Denkendorf International Textile Conference	Scientific conference	21-22 Nov 2024	Stuttgart, Germany	CITEVE	Oral presentation: Production of fibers, coatings and/or non-woven fabrics based on PHAs through alternative technologies
MOD'ÚNICA Talks 2025	Fair	26-27 Feb 2025	Oporto, Portugal	CITEVE	Oral presentation: Waste2BioComp: Transformação de Resíduos Orgânicos em Componentes de Base Biológica para a Indústria Têxtil e Outras
European Coating show and conference 2025	Show and Conference	24-26 Mar 2025	Nuremberg, Germany	CITEVE	Oral presentation: Bio-based pigment inks for inkjet printing applications
GoPHA seminar	Seminar	19 March 2025	Online	GoPHA seminar	Oral presentation: Production of fibers and textile coatings based on PHAs through alternative technologies
ECOSYSTEX Insights Series #14	Webinar	19 May 2025	Online	CITEVE	Oral presentation: Waste2BioComp final results: Shaping the future with bio-based materials
iTechStyle summit	Scientific conference	26-28 May 2025	Oporto, Portugal	CITEVE	Oral presentation: Production of Coated Fabrics Using PHAs via Innovative Technologies
iTechStyle summit	Scientific conference	26-28 May 2025	Oporto, Portugal	CITEVE	Poster presentation: Innovative Solutions for Textile End-of-Life: Environmental Challenges, Colour Removal Techniques and Reprinting

3. Conclusions

Based on the analysis conducted during the **W2BC** project, no significant impediment has been found to patent the developments and materials generated within the project.

This includes the recent patent submission by HSKL for the novel production method of PHAs and polymers produced thereof, which is a significant achievement for the **W2BC** project, reflecting its commitment to advancing the development of bio-based, sustainable materials. It provides the project with legal protection and enhances its commercial prospects, while also contributing to the broader goal of reducing reliance on fossil fuels and promoting circular economy practices.

However, it is important to highlight that careful consideration of the identified patents should be made, especially when partners plan to file for patent protection. This is to ensure that any potential overlap or conflicts with previously existing patents are avoided. It is recommended that further thorough analysis and monitoring of the patent landscape be conducted to mitigate the risk of infringement when moving forward with the commercialization and protection of the project's intellectual property.

Even for those results where commercialization may not be the primary exploitation route chosen by the partner (see Deliverable D7.10 where the exploitation strategy is delineated), it is still crucial to consider protecting the results. Open-source licenses, such as copyleft or permissive copyright (like Creative Commons licenses), can offer a layer of protection, preventing others from commercializing the work or its derivatives without permission. When speaking about open-source results, the most important part for many creators/authors is that their works remain open-source (free of cost) for as long as possible.

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