

Transnational testing of innovative bio-based products
with the Living Lab approach



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BIOECO-UP



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SUCCESS STORIES

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Bioeconomy tested

The BIOECO-UP project takes the circular bioeconomy forward by designing new value chains, encouraging sustainable consumer behaviour and supporting policy change. With the aim of reducing dependence on fossil resources, it promotes the sustainable use of biological materials. The bioeconomy is both an opportunity and a challenge for companies to utilise more biomass resources and develop services derived from biomass (e.g. plants, animals, microorganisms), including by-products and waste from the processing of natural biomass. As part of our project, we actively support companies in the development and testing of their bio-based products and services and help them to improve their quality, market readiness and environmental compatibility.

This brochure presents the results of the project activity *Transnational testing of innovative bio-based products with the Living Lab approach*, which was organised by ten project partners from seven Central European countries (HU, SI, SK, CZ, IT, HR, PL). In each country, we set up Living Labs where citizens and companies tested bio-based products under real-life conditions. Living Labs illustrate the principles of open and user-centred innovation by bringing external knowledge and user experience into the product development process.

The results show 24 bio-based products and services that were tested and refined with the help of citizens and business experts. Their feedback led to improvements in usability, environmental sustainability and market readiness.

Each of these pilots shows how challenges can be turned into opportunities. Each of them is a success story as it shows how companies have adapted their solutions to market needs while increasing public awareness and enthusiasm for bio-based alternatives.

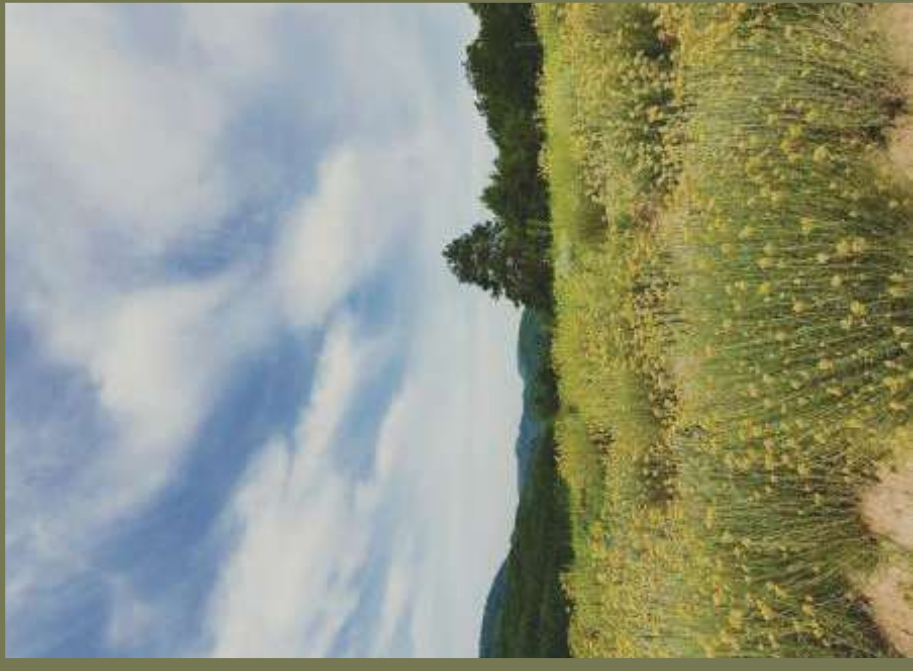
Pilots are divided into five categories:

- **Raw material extraction, collection and cultivation** explore pilots that grow or harvest raw bio-based resources.
- **Processing and transforming biomass into products** present pilots that produce food, textiles, or construction products from biomass.
- **Zero waste and bio-based alternatives to fossil products** showcase pilots that create sustainable substitutes for conventional fossil materials and reduce fossil waste.
- **Cascading resources and food upcycling** highlight pioneers that transform food by-products into healthy new products while raising consumer awareness.
- **Upcycling resources and circular systems** bring forward pilots that are redefining how circular and cross-sector opportunities are creating new bio-based solutions that meet the market.



Extraction, collection and cultivation of raw materials

Pilots focusing on growing,
cultivating or collecting biomass for
early stage bio-based products.





- **MASZK - Komposztfutár (Hungary):** community waste collection, urban composting and bio-based fertiliser



- **Micoperi Blue Growth (Italy):** naturally preserved spirulina, valorisation of algae and aquaculture in the blue bioeconomy



- **Co-operative Bela Murva (Slovenia):** silk cocoons and mulberry cultivation, agriculture with social inclusion



- **ALGASOL (Czech Republic):** algae-based biofertiliser and biostimulant, plant growth support and biofuels for renewable energy



- **The House of Magic Herbs (Croatia):** organic farming of medicinal and aromatic plants, natural cosmetics



- **Four Leaves Agro (Czech Republic):** liquid biostimulants, soil fertility, resilience building and regenerative agriculture



MASZK ASSOCIATION - KOMPOSZTFUTÁR

www.facebook.com/okotengely.komposztfutar

Position in the bioeconomy value chain

This pilot is positioned at the collection and processing stage of the bioeconomy value chain. It focuses on the collection of urban bio-waste from households, retailers, and cafés, and transforms it into compost as a bio-based fertiliser.

Our story

Komposztfutár (Compost Courier) is a voluntary community initiative founded in 2022 by a group of young people in Szeged, Hungary. Their aim is to make composting accessible in an urban environment. In 2023, they took a significant step forward by building the city's first open community composting facility. Volunteer cyclists collect kitchen waste – such as vegetable scraps and coffee grounds – from households, retailers, and cafés, and take it to small composting facilities. The compost produced is then spread locally in the gardens or returned to the partners who donated the waste. In the future, the group would like to set up open compost bins throughout Szeged, so that residents can compost themselves without having to rely solely on couriers.

Bio-based product and service

Komposztfutár offers a community service for the collection and composting of organic waste in the city. The compost produced is distributed to citizens, local businesses, and community gardens. In this way, the initiative reduces organic waste going to landfill and also provides a bio-based fertiliser that supports local food production and the greening of cities.

Collection and composting of organic waste



Test procedure

The Living Lab consisted of a workshop, lasting two hours, and including presentations, discussions, and questionnaires. Participants explored the concept of community composting, identified six types of urban biowaste suitable for separate collection (coffee grounds, eggshells, grass cuttings, wood shavings, wood ash, and cardboard), and developed practical utilisation methods for each of these wastes. The workshop gave the participants an insight into Kompostfutár's daily work and goals, while expanding their knowledge of sustainable waste management practises. The feedback was overwhelmingly positive. The participants appreciated the opportunity to develop solutions together.

Findings

The workshop strengthened the participants' commitment to a sustainable lifestyle and demonstrated the value of community composting. They highlighted both opportunities and risks: Coffee grounds, for example, need to be dried to avoid mould, eggshells need to be heat-treated for safety reasons, and ash needs to be cooled to avoid damaging the collection bins. The process led to clear plans to expand services, such as specialised collection of selected materials in separate containers for redistribution after treatment. This approach could expand the range of composting services on offer and set new standards for the management of urban green waste. The initiative led to practical solutions and fostered a sense of shared responsibility. The volunteers were eager to put the plans into daily practice.



MICOPERI BLUE GROWTH

www.micoperibg.eu

Position in the bioeconomy value chain

This pilot is positioned both in the cultivation of bio-based materials and in the production of bio-based products. It focuses on the controlled cultivation of spirulina biomass and its conversion into a novel fresh food product.

Our story

Spirulina is often sold as a powder or capsules produced by high-temperature drying methods that reduce its nutritional content. Micoperi Blue Growth (MBG) has set out to change this by developing a method that preserves spirulina in its fresh form. Drawing on its expertise in marine biotechnology, the company has developed a patented greenhouse cultivation system that produces spirulina biomass without energy-intensive drying. Already active in the dietary supplement market with dried spirulina products, MBG is now breaking new ground by launching Spicc™ VIVA, a fresh spirulina product. This innovation fulfils the growing consumer demand for natural, nutrient-rich foods while reducing environmental impact.

Bio-based product

Spicc™ VIVA is a fresh spirulina biomass product that maintains an 80% water content and keeps its cells alive. Unlike dehydrated spirulina, it retains its complete nutritional profile, and offers high levels of protein, iron, and vitamin B12, while being free from preservatives, colourings and contaminants. Its mild, neutral flavour allows for easy integration into everyday foods such as soft cheeses, vegetables, or smoothies. The product is available in various formats, including fresh biomass and frozen 'buttons', making it versatile for household and industrial use.

Spicc™ VIVA fresh spirulina



Test procedure

The Living Lab test included focus group sessions in which participants evaluated the product through tasting and comparative discussions. The focus group consisted of 9 members, including 2 evaluators for product sustainability and marketing from different companies; a pharmacist as evaluator for product characteristics in the pharmaceutical field; 2 chefs and R&D specialists in the food industry for the evaluation of product usability in the food industry; 4 representatives of users and project managers in a company for the evaluation of product packaging and logistics, usability and properties. Participants evaluated the flavour, texture, and versatility of the product while reflecting on the sustainability aspects and potential market applications. An online questionnaire complemented these activities, and collected structured feedback on consumer perceptions of spirulina as a novel fresh food and its role as a sustainable source of protein.

Findings

Testing confirmed strong consumer interest in spirulina when presented as a fresh, unbranded food. Participants appreciated the neutral flavour and versatility of spirulina, which makes it easier to incorporate into the daily diet compared to traditional dried spirulina products. They also appreciated the sustainability of MBG's greenhouse cultivation system, which reduces CO₂ emissions, nutrient discharge, and industrial heat loss. The absence of iodine – a common disadvantage of seaweed – was cited as an additional benefit. Key recommendations included emphasising the product's vegan suitability, nutrient richness, and innovative farming method in communication strategies. The results suggest that Spicc™ VIVA has the potential to redefine spirulina consumption, and position MBG as a pioneer in fresh microalgae-based foods.



COOPERATIVE BELA MURVA

www.bela-murva.com

Position in the bioeconomy value chain

This pilot is positioned in the extraction, cultivation, and collection of biological materials from nature. It is in the phase of producing bio-based raw materials through the cultivation of white mulberry trees and the breeding of silkworms for the production of silk cocoons.

Our story

In 2024, the Environmental Research Institute in Slovenske Konjice founded the Bela Murva Cooperative with the aim of reconnecting farmers of traditional silkworm breeding with local artisans and creators of homemade and natural products. The co-operative started by planting 600 seedlings of white mulberries and building partnerships with organic farmers across Slovenia. By creating a network of farmers and local producers, the co-operative is trying to revive the art of silk farming while securing livelihoods in the countryside. At the same time, it is experimenting with methods and tools for breeding silkworms and producing silk cocoons in laboratory environments.

Bio-based product

The cooperative produces 100% natural silk cocoons that contain two valuable proteins: Sericin and Fibroin. Sericin is valued in cosmetics for its moisturising properties, and helps the skin to stay hydrated and smooth, while fibroin provides elasticity and strength. Together, these natural components make silk cocoons highly attractive as bio-based ingredients for skin care products. In addition to cosmetics, the co-operative is also exploring opportunities in the textile sector, where the natural properties of silk can improve the performance and sustainability of home-made textile products.

Natural silk cocoons



Test procedure

The Living Lab comprised eight participants, including farmers, artisans, cosmetics manufacturers and representatives of a gerontological research institute. In a facilitated discussion, they explored co-operative business models and considered opportunities for joint collaboration and expansion of activities through the co-operative. This has encouraged dialogue about building a larger community around silk farming.

Participants also tested the silk cocoons at home, by using them in their daily beauty routine or in other exploratory activities with textiles. They reported on their experiences using questionnaires, which were available in both physical and digital form.

Findings

Tests of silk cocoons for skin care have confirmed their effectiveness in cleansing and moisturising the skin, with many users appreciating the natural feel and benefits. Users suggested improvements in the areas of packaging and affordability, which the company will incorporate into its product launch strategy. Participants emphasised the importance of involving vulnerable groups and local farmers in organic mulberry cultivation and silkworm rearing. As a result, the Bela Murva cooperative is now considering consultations with organic farmers, pensioners, and social organisations to strengthen its inclusive approach.



ORGANICFARM- INTERNATIONAL

<http://organicfarminternational.com>

Position in the bioeconomy value chain

This pilot is positioned in the phase of extraction and cultivation of bio-based raw materials, as well as in the production of bioenergy. It develops algae-based solutions for agriculture, soil remediation, and renewable energy.

Our story

Organicfarm International has developed ALGASOL, an algae-based biofuel with multiple applications in agriculture and environmental protection. ALGASOL not only supports plant growth, but also contributes to soil regeneration, wastewater treatment, and the optimisation of biogas processes. By diversifying its applications in different sectors, the company has built a flexible business model based on sustainability. With ALGASOL PS ready for field testing, the company is focussing on combining environmental benefits with economic feasibility, closely following feedback from users and partners.

Bio-based product

ALGASOL PS is a natural concentrate of polyuronic acids, amino acids, phytohormones, and trace elements that activate biological processes in plants. It boosts photosynthesis, accelerates nutrient uptake, and strengthens root systems, resulting in higher yields and greater resistance to water stress, pests, and diseases. The product can be used in organic farming under EU Regulation (EC) No 834/2007, and offers farmers a bio-based, natural alternative to synthetic inputs.

ALGASOL PS



Test procedure

The Living Lab explored new applications for ALGASOL PS beyond crop improvement. The tests focussed on accelerating composting, improving the degradation of organic waste, and stimulating methanogenesis in biogas plants to increase the efficiency of renewable energy. These opportunities are now being further developed within the company by initiating specific tests in collaboration with waste management companies and biogas producers, tailoring product formulations to these specific sectors.

Findings

The pilot project has confirmed that ALGASOL PS reduces the need for synthetic fertilisers and helps to protect soil and water from contamination. Its ability to improve soil health and resilience is closely linked to regenerative agriculture practises. Participants emphasised the importance of clearly communicating these benefits, as they speak directly to farmers seeking sustainable solutions. In response, the company is preparing comparative studies to demonstrate the environmental benefits and is looking into additional organic certifications to strengthen its market positioning. By combining agricultural productivity and environmental responsibility, ALGASOL PS shows strong potential as an agricultural input and as a contribution to circular solutions in the bioeconomy.



THE HOUSE OF MAGIC HERBS

www.kucamagicnetrave.com

Position in the bioeconomy value chain

This pilot is positioned at the cultivation and processing stage of the bioeconomy value chain. It focuses on the organic farming of medicinal and aromatic plants and their processing into bio-based cosmetic products.

Our story

OPG Jakopović is a family business known as “The House of Magic Herbs”. The company began as a pioneer of organic cosmetics in Croatia with the idea of growing medicinal herbs for lemon balm. Inspired by the biodiversity of nature, they developed into a creative company that utilises the potential of medicinal and aromatic plants through sustainable farming. Today, they produce a range of natural cosmetics and wellness products, that combine natural ingredients with local traditions and values.

Bio-based product

Lemon balm hydrosol is made from the by-product of essential oil distillation. This product is valued for its soothing and refreshing properties, and is therefore suitable for both children and adults. To emphasise its value, they used a clear message and positioned the product as a natural cosmetic alternative for health-conscious consumers.

Lemon balm



Test procedure

The Living Lab was organised as a participatory workshop to gather feedback from different stakeholders. Participants were divided into groups to discuss the usability, environmental aspects, and marketing potential of the product. An open dialogue was encouraged to allow a free exchange of ideas, concerns, and solutions. At the end of the session, each group leader presented their key findings, and participants completed questionnaires to provide structured feedback.

Findings

The Living Lab provided diverse and actionable feedback. Users suggested practical product improvements, such as developing smaller, travel-friendly versions and improving packaging with recycled plastic. Business representatives identified new market opportunities, such as positioning the hydrosol as a multi-purpose product for men's aftershave or for children with skin problems. The feedback also emphasised the crucial role of online reviews and word-of-mouth in consumer decision-making. As a result, OPG Jakopović plans to adapt its marketing strategy, by utilising storytelling and customer reviews to attract new customers and improve visibility.



HEALTHY SOIL, HEALTHY FARM

www.fourleaves.cz

Position in the bioeconomy value chain

This pilot operates at the brokerage and logistics level, distributing bio-based agricultural fertilisers or biostimulants and connecting them with digital tools, advisory services, and new application markets.

Our story

Four Leaves Agro®, founded by engineer Radovan Hanzl in 2020, is dedicated to restoring soil health through innovative biostimulants and solutions for precision agriculture. The company distributes products that bring agronomic, economic, and environmental benefits, while building partnerships with universities and agricultural experts. By combining research, digital tools, and on-site advisory services, Four Leaves Agro aims to reduce the use of conventional mineral fertilisers and fuel and promote more resilient farming methods.

Bio-based product

The company sells liquid biostimulants under the microfertile® brand, which are produced using the patented and EU/ETV-certified ecological bioleaching method InnoBioTech®. These concentrates, which are rich in bacteria, organic acids, phytohormones, and trace elements, nourish the plants, improve soil structure, and increase water retention. The product strengthens the resilience of the plants against abiotic stress and diseases such as oidium by increasing plant immunity. It is suitable for both conventional and organic farming as well as for sports turf, municipal green spaces and home gardens. The products boost plant vigour, reduce the need for agrochemicals, and quickly improve soil properties, to support regenerative and sustainable practises.

Liquid biostimulants Microfertilile



Test procedure

Three partners were involved in the Living Lab, which tested various aspects of the business model:

- I. Ag Data, a Czech agricultural software company, helped integrate microfertilile® into digital platforms, and linked the products to crop profitability tools.
- II. Jan Polák, an experienced agricultural banker, reviewed the communication and marketing tools, and added financial and agronomic perspectives to make the materials more transparent and farmer-friendly.
- III. CleverFarm, another agricultural software company, explored non-farming applications, testing the product's potential for sports turf and municipal green spaces and integrating real-time pricing into profitability tools.

Findings

The tests revealed that communication with farmers needs to focus heavily on efficiency and profitability to overcome hesitation to change. Improved marketing materials and the user personas developed in the Living Lab helped to customise messages to farmers' needs. Collaboration with partners confirmed theoretical diversification potential: microfertilile® can be positioned not only in conventional and organic agriculture, but also in sports turf, urban greening and water-efficient landscaping, - markets with higher profit margins. The pilot project also confirmed the growing need for visual presence at agri-events, stronger marketing, and organising events under the new motto, "healthy soil, healthy farm." Four Leaves Agro is now capitalising on these findings and strengthening its position as a provider focused on gathering and sharing know-how to improve the healthy soils of its customers.

Processing and converting biomass into products

Pilots producing bio-based materials, food, textiles, cosmetics, and other high-value goods.





- **HAPPYLIFE** (Slovakia): coconut-based snacks, gluten-free, lactose-free, and no added sugar, healthy lifestyle

- **Fermentarnica** (Slovenia): vegan food, natural fermentation, local raw materials



- **Bohempia** (Czech Republic): hemp-based shoes, clothing and accessories, sustainable fashion innovations



- **Food Incubator SUA in Nitra** (Slovakia): innovation food hub and testbed, snacks with bioactive compounds

HAPPYLIFE

www.happylife.eu
www.facebook.com/HappylifeSR
www.instagram.com/happylife_slovakia

Position in the bioeconomy value chain

This pilot is positioned in the production of goods from bio-based raw materials that are processed into food. The focus is on the production of healthy snacks that meet the growing demand for “free from” options.

Our story

HAPPYLIFE is a Slovak company that produces healthy snacks made mainly from coconut and other high-quality bio-based ingredients. The company was founded with the aim of offering healthy alternatives, and focuses on the “Free From” category – products that are gluten-free, lactose-free, and have no added sugar. The production facility is certified for organic production and holds the internationally recognised IFS Food certificate. By combining nutritional value and indulgence, HAPPYLIFE positions its products as a reliable, tasty, and guilt-free snack option.

Bio-based product

The product line includes coconut-based snacks that are both healthy and affordable. All products are gluten, and lactose free, and are made without added sugar. They fulfil the needs of health-conscious consumers, people with dietary restrictions, and people who want to try out new eating habits.



Coconut-based snack

Test procedure

During the Living Lab workshop, participants were invited to evaluate six different snack products. The sensory analysis was conducted in a structured setting, where participants blind-tested the products to ensure an unbiased evaluation of taste, texture, flavour and overall appeal. Anonymous surveys and guided discussions provided both quantitative and qualitative feedback. To complement the testing methodology, an additional workshop was organised together with a home testing phase, supported by online questionnaires. Participants were provided with information about the company, its philosophy, and the testing methodology in advance, to ensure they were well prepared to critically evaluate the coconut bars.

Findings

The tests revealed differences in consumer preferences, and showed that expectations vary between target groups in terms of flavour, texture, and motivation to buy. The feedback also helped the company to directly access the information regarding the brand recognition and awareness about individual products. Participants confirmed a strong interest in healthy, free-from products, but also emphasised the importance of clear branding and good communication strategy. By combining the workshop discussions with the findings from the home tests, HAPPYLIFE gained valuable insights for both product development and market positioning, strengthening its competitiveness in the growing health-orientated snacks sector.



FERMENTARNICA

www.fermentarnica.com

Position in the bioeconomy value chain

This pilot is positioned in the bioeconomy value chain as the production of plant-based alternatives to dairy products. It uses bio-based raw materials, whereby plant-based ingredients are processed into innovative foods through fermentation.

Our story

Fermentarnica is a Slovenian company dedicated to the development of plant-based alternatives to traditional dairy products. By combining science, technology, and food research, the company uses fermentation to improve flavour, nutritional value and digestibility. Founder Erika, shares her knowledge through workshops, publications, and social media, inspiring people to try fermented foods at home. The company's flagship product, Chizo, specialises in cashew-based cheese, vegan butter, spreads, and fermented vegetables. In 2024, Fermentarnica added a new prototype to its portfolio: a fermented soya-based spread made from local ingredients.

Bio-based product

The new soya spread is a plant-based alternative to dairy products, and has been developed to complement Fermentarnica's existing cashew product line. It comes in two flavours — neutral and chive — and is available in glass packaging. The product is rich in probiotics and bioactive compounds and promotes gut health while providing a tasty and sustainable option for consumers looking for a dairy-free alternative. The prototype reflects the company's focus on local sourcing and environmentally friendly packaging.

Soya spread



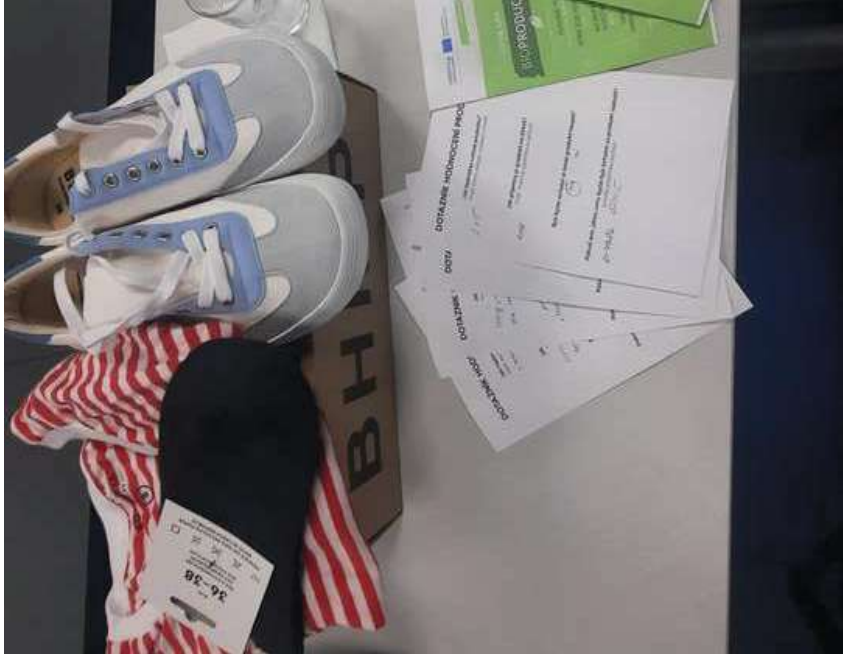
Test procedure

The soya spread was tested during Slovenia's largest vegan festival, Vegafest, which brought together a diverse audience including vegans, people reducing their dairy consumption and omnivores interested in plant-based foods.

Visitors were invited to sample the product at the stand, engage in informal conversations and provide feedback. To capture a wide range of perspectives, Fermentarnica provided both short and detailed questionnaires in physical and digital form. These tools were used to gather impressions on flavour, texture, salt content, packaging, and overall product appeal, while uncovering consumer habits and motivations.

Findings

The soya spread received very positive feedback, particularly in terms of flavour and texture, confirming its market potential. Consumers suggested minor adjustments, such as reducing the salt content and fine-tuning the consistency, which the company will take into account in future development. Glass packaging was recognised as a sustainable and preferred choice. The tests also showed that consumers favour taste and health benefits over environmental claims, although environmentally friendly packaging remains important. The testing process helped to establish a realistic price point and provided guidance for positioning the product in the growing Slovenian plant-based food market.



BOHEMPIA

www.bohempia.com
www.instagram.com/bohempia_official

Position in the bioeconomy value chain

This pilot is positioned in the manufacturing phase and replaces fossil materials with bio-based hemp fibres in footwear, clothing, and accessories.

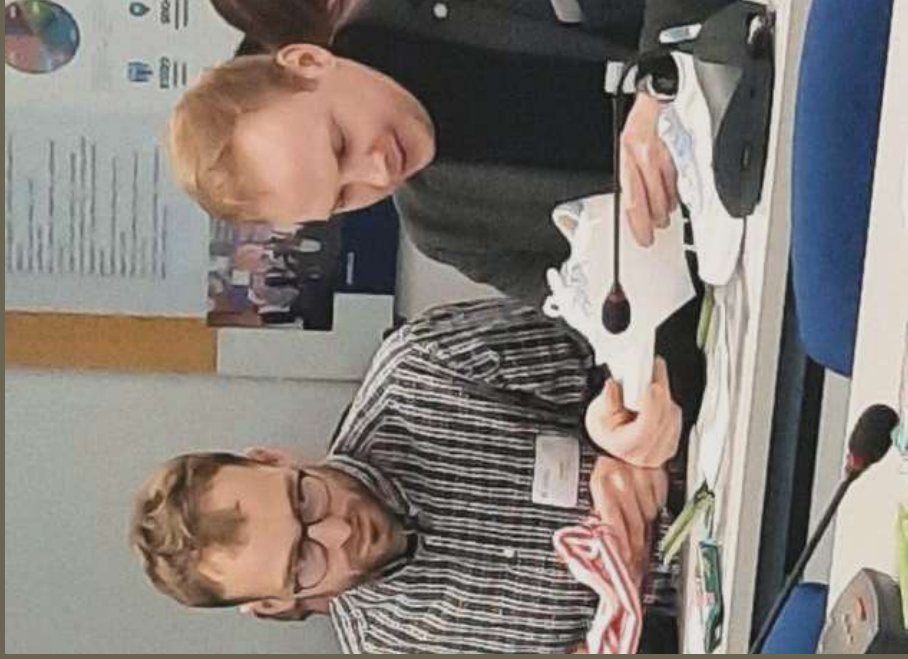
Our story

Bohempia is a young and fast-growing company dedicated to sustainable fashion. It has set itself the task of designing and producing vegan barefoot shoes, clothing, and accessories made from hemp, a natural fibre with strong ecological and functional properties. By sourcing hemp from European suppliers and carrying out production processes such as weaving, dyeing, and knitting in the Czech Republic, Bohempia ensures local value creation while minimising its ecological footprint.

Bio-based product

The company makes sneakers from hemp linen (sourced from Romania, and processed in the Czech Republic), and socks and T-shirts from hemp-cotton blends (hemp from France). Hemp gives these products natural sweat absorption and antimicrobial properties, reducing odours and improving durability. These properties make hemp textiles functional and sustainable alternatives to conventional fabrics.

Hemp sneakers, socks and T-shirts



Test procedure

The Living Lab applied a design thinking approach, asking participants to take the perspective of buyers and understand their purchasing decisions. The evaluation focussed on three aspects: usability (comfort, touch, and appearance), marketing (willingness to buy and acceptable price range), and environment (the role of sustainability in purchasing decisions and willingness to pay more for environmentally friendly products).

Findings

Participants rated the hemp sneakers particularly highly, praising their lightness, flexibility, design, and comfortable feel. The socks were seen as practical and affordable, while opinions on the hemp T-shirts were mixed – most participants found conventional cotton softer and favoured it in their purchasing decisions. Expectations of coarseness were proven wrong, but softness remains an important factor for consumers. Importantly, Bohempia has taken the feedback seriously, and will focus future product improvements on barefoot footwear trends such as wider toe boxes and improved sole flexibility. The company has proven an example for the fashion industry's transition to bio-based materials.



FOOD INCUBATOR SUA IN NITRA

www.potravinovyinkubator.sk/en

Position in the bioeconomy value chain

In the bioeconomy value chain, this pilot is positioned in a phase in which bio-based raw materials are converted into functional food products. It focuses on the development of health-oriented snacks that are enriched with bioactive substances.

Our story

The Food Incubator is a spin-off of the Research Centre AgroBioTech in Nitra, Slovakia. Its mission is to promote innovation in the food industry by developing products that are in line with healthier eating trends and EU food regulations. The first success was vegetable crisps, which are produced using an innovative drying technology that preserves all the nutritional values of fresh vegetables without unnecessary chemical additives. The incubator specialises in integrating functional ingredients into familiar foods, to create alternatives that promote the well-being of health-vulnerable groups. The team endeavours to bridge the gap between laboratory innovations and consumer-ready products.

Bio-based product

The incubator has developed sweet and salty biscuits enriched with selenium-fortified oyster mushrooms and active beta-glucan. In sweet biscuits, the addition of oyster mushrooms replaces part of the sugar, while in salty biscuits it reduces the amount of salt. These bio-based snacks offer nutritional benefits for people with elevated blood glucose and cholesterol levels, especially patients with type 2 diabetes. By improving the nutritional profile of everyday foods, the biscuits are designed to contribute to a healthier diet while providing an appealing flavour and texture.

Sweet and salty biscuits

Test procedure

The Living Lab testing combined guided sensory analysis with structured discussions. Participants evaluated the biscuits' flavour, texture, and appearance through anonymous surveys, ensuring honest and uninfluenced feedback. This process minimized bias and allowed testers to focus solely on sensory attributes such as taste, aroma, and overall appeal. Open discussion followed the surveys, giving participants an opportunity to share deeper insights and suggest improvements. This combination of quantitative and qualitative data provided the company with a holistic view of consumer perceptions.

Findings

The testing confirmed strong potential for positioning the biscuits as a healthier snack alternative. Participants valued the balance between taste and nutritional benefits but suggested refinements to improve texture and flavour appeal. Feedback also provided clarity on marketing strategies, highlighting the importance of transparent communication around health benefits and clear product labeling. The Living Lab helped to identify consumer expectations, from taste profiles to communication needs, giving the company actionable guidance to refine both the product and its market strategy. By incorporating these insights, the incubator is better prepared to introduce functional biscuits that meet consumer needs while promoting healthier eating habits.



Bio-based alternatives to fossil fuel products

Pilot projects to develop sustainable substitutes for conventional fossil-based products or products that reduce waste from fossil fuels.





- **TomaPaint (Italy):** bio-based coating made from tomato peels, sustainable alternative to fossil-based packaging materials
- **KOBE-cz (Czech Republic):** hemp insulation panels, green building, bio-based alternative building materials
- **Slappa (Poland):** environmentally friendly cleaning products, concentrated cleaning tablets, zero-waste approach
- **StarchBag (Poland):** compostable starch-based bags for household and dog waste, replacement for single-use plastic



TomaPaint

www.tomapaint.com

Position in the bioeconomy value chain

This pilot is focussed on the extraction of bio-based materials from agriculture and the manufacture of products that are a substitute for products made from fossil raw materials. The focus is on the extraction of by-products from tomato processing for high-quality can coatings.

Our story

TomaPaint was founded with a bold idea: to transform tomato peels, an abundant by-product of the Italian tomato processing industry, into a sustainable bio-lacquer for the interior and exterior surfaces of metal food containers. The company began with small-scale production, but quickly identified a broader potential—expanding its lacquer coatings technology beyond food cans to other areas of food packaging, paper coatings, plastics, and even future applications in cosmetics, textiles, garden products and wood coatings. TomaPaint's vision is rooted in Italy's agricultural heritage, where waste streams are seen as valuable resources, to create a circular solution that combines agriculture with advanced material innovation.

Bio-based product

The innovation is a bio-based lacquer designed for the internal coating of metal food cans. The coating is mainly made from resins extracted from tomato skins and replaces conventional petroleum-based coatings. It offers comparable protective and functional properties while being safer for consumers and the environment. The coating complies with European regulations for materials that come into contact with food and opens up the possibility of using ecological alternatives to synthetic coatings with environmental and health benefits in numerous industries.

Bio-based lacquer



Test procedure

The Living Lab tests combined technical validation with market exploration. Laboratory technicians tested the lacquer to confirm its physical and chemical performance, and ensure that it met durability and safety standards. At the same time, focus group discussions brought together company representatives, associations, and academic partners to assess usability, environmental impact, and market prospects. Questionnaires also analysed consumer awareness, marketing strategies, and possible product positioning. This dual approach combined hard science with the insights of users who interacted directly with the product.

Findings

Lab tests confirmed the lacquer's durability, food safety, and resilience under a range of conditions, validating its credibility as a sustainable alternative. Participants praised the smooth surface, neutral smell, and golden colour, while stressing the importance of clear communication about the product's natural origin and safety. It was found that consumers respond well to messages that emphasise circularity, tomato-based innovation, and environmental benefits. Comparative tests with metal cans have also shown that cans coated with TomaPaint's lacquer pose no risk to the contents under different environmental conditions (acidic, alkaline, ethanol, water) and have the same shelf life of the product.



KOBE-CZ

www.kobe-cz.eu

Position in the bioeconomy value chain

This pilot is positioned in the production phase of replacing fossil raw materials with renewable, bio-based alternatives. It focuses on hemp fibres as a renewable raw material for building materials and on the refinement of bio-based insulation products for the market.

Our story

KOBE specialises in the production of hemp fibre insulation materials for sustainable construction on a large scale. With the growing demand for low-carbon building solutions, the company aims to provide high-performance thermal and acoustic insulation panels made from natural fibres. Their aim is to compete with conventional materials while reducing environmental impact, particularly CO₂ emissions. The challenge is to raise awareness of these benefits and communicate them to a market that is still dominated by conventional insulation materials, where price and specifications often outweigh environmental considerations.

Bio-based product

The company manufactures KOBE Eco Hemp Flex panels, bio-based insulation boards with strong thermal and acoustic performance, moisture control and resistance to mould. These boards compete with synthetic materials such as glass wool and rock wool, but offer additional benefits, such as safer handling and a significantly lower environmental footprint. By targeting customers who value both sustainability and technical reliability, KOBE is positioning its hemp panels as a credible alternative in the construction sector.

Eco Hemp Flex

Test procedure

The Living Lab combined product demonstrations, focus groups, and co-creation sessions. Clients and industry partners analysed and manipulated samples of hemp insulation, materials and compared them with conventional options. Participants evaluated usability, sensory qualities (touch, texture, odour), and installation potential. Questionnaires and structured discussions explored preferred insulation thicknesses, potential applications, and willingness to use hemp-based materials. KOBE also tested its business model by introducing the idea of expanding into green building stores specialising in environmentally friendly materials, and targeting customers who prefer a sustainable choice.

Findings

The tests revealed both strengths and challenges. Compared to glass wool and rock wool, hemp insulation was found to be lighter, easier to handle, and safer to touch, although some found it to be less mechanically resistant. The building owners found that installation did not cause any problems with the right instructions. Laboratory validation confirmed the technical performance ($\lambda = 0.0432 \text{ W/m-K}$), and helped to boost the confidence of professionals. Participants who were unfamiliar with hemp insulation were pleasantly surprised by its natural feel and sustainability. Many were willing to recommend hemp as an environmentally friendly premium option if they were convinced of its durability. The workshops also showed that awareness of hemp insulation materials is still low, which emphasises the need for stronger communication. Therefore, KOBE is refining its marketing to emphasise CO₂ reduction, indoor air quality, and health benefits, while improving packaging, installation instructions and in-store training material.





SLAPPA

www.slappa.co

Position in the bioeconomy value chain

This pilot is positioned in the production stage of the bioeconomy value chain. It converts bio-based raw materials into a consumer product that minimises single-use plastic waste.

Our story

Slappa is a pioneering brand in the field of environmentally friendly home care products. The company started with the mission to eliminate single-use plastic bottles for cleaning products. The company offers concentrated cleaning tablets that dissolve in water, providing a zero-waste solution for environmentally conscious households. Customers can reuse their own bottles, significantly reducing plastic consumption and CO2 emissions, caused by shipping and turning a simple cleaning process into a sustainable choice.

Bio-based product

The line of eco-friendly cleaning products in the form of small, effervescent tablets that dissolve in tap water. These tablets are 99% biodegradable, effective, and gentle. There are special formulations for kitchens, mirrors, glass, and bathrooms. The compact, tablet format offers a significant environmental benefit, as shipping a small, 2-gramme tablet instead of a heavy liquid bottle drastically reduces CO2 emissions and minimises the use of single-use plastic.

Eco- friendly cleaning tablets



Test procedure

The pilot was conducted in a single Living Lab, testing the products from Släppa, StarchBag and Rebread together. The process began with an inaugural workshop in which several organic products from Polish companies were presented. A group of 20 testers was selected from participants of previous project workshops and applicants who responded to an online announcement. The event included a comprehensive lecture on organic products by a professional pharmacist and product presentations by company representatives, followed by a lively Q&A session. At the end of the workshop, participants received detailed instructions and the products to begin a 10-14 day trial period in their home or office environment. This allowed participants to interact with the products in their familiar environment. During one of the test phases, participants were sent text message reminders about the products to facilitate their experience.

Findings

Thanks to the co-creation process, Släppa was able to identify critical areas for improvement, and refine its product formulations, particularly for the bathroom cleaner, which needed a stronger, limescale-resistant formula to tackle hard water stains. New product categories were also explored, including dishwasher and laundry detergent tablets, in response to growing consumer demand for sustainable home care solutions. In addition, feedback led to improvements in labelling and usability, such as the use of larger font and colour-coded markings to make products easier to use.



STARCHBAG

<https://starchbag.com>

Position in the bioeconomy value chain

This pilot is positioned at the manufacturing phase of product alternatives that focus on replacing fossil raw materials with bio-based raw materials.

Our story

StarchBag is a pioneering brand tackling the problem of plastic pollution with a simple, yet innovative, solution. The company specialises in the production of biodegradable bags for general waste and pet waste, using polymers derived from corn starch. By offering a fully compostable alternative to conventional plastic, StarchBag enables environmentally conscious consumers and sustainability-minded retailers to make a positive impact on the environment.

Bio-based product

The main bio-based solutions are the BIOworki bags for household waste and dog waste. They are made from starch-based biopolymers, and replace fossil fuels with a plant-based material. A major benefit is that they are fully compostable, and biodegrade in nature and even in landfill sites. This not only prevents unwanted pollution in the event of incineration, but also facilitates the sorting of organic waste, making it easier for users to contribute to the circular economy.

BlOworki bags



Test procedure

The pilot was conducted in a single Living Lab, testing the products from StarchBag, Slappa, and Rebread together. The process began with an inaugural workshop in which several organic products from Polish companies were presented. A group of 20 testers was selected from participants of previous project workshops and applicants who responded to an online announcement. The event included a comprehensive lecture on organic products by a professional pharmacist and product presentations by company representatives, followed by a lively Q&A session. At the end of the workshop, participants received detailed instructions and the products to begin a 10-14 day trial period in their home or office environment. This allowed participants to interact with the products in their familiar environment. During one of the test phases, participants were sent text message reminders about the products to facilitate their experience.

Findings

The Living Lab trial validated the strong market demand for biodegradable products and confirmed that StarchBag's value proposition met consumer expectations for functionality and sustainability. Feedback showed that the packaging needs to be communicated more clearly to emphasise the products' complete biodegradability, as some consumers were not aware of this important benefit. StarchBag also received some valuable suggestions for product development, such as adding handles to the bags for more convenience and a more user-friendly experience.

Cascading resources and upcycled food

Pilots valorising food industrial and by-products into nutritious upcycled food, engaging communities and raising awareness.





- **Secontaste (Hungary):** granola and snacks made from brewer's spent grain (BSG), upcycled nutrition, food counselling



- **Grapoila (Hungary):** cold-pressed oils and seed flours, upcycled food production
- **Poljoprivredna, prehrambena i veterinarska škola Stanka Ožanića (Croatia):** energy bars, educational Living Lab with students, upcycling of food waste



- **Majomkenyer (Hungary):** gluten-free and allergen-free biscuits, upcycled biscuit crumbs
- **Zero Guilt (Hungary):** plant-based tortillas, gluten-free, low-carb and upcycled beet pulp





SECONTASTE

www.secontaste.com

www.instagram.com/secontaste

www.facebook.com/secontaste

Position in the bioeconomy value chain

This pilot is positioned in the production stage, as it focuses on the transformation of by-products from the food industry into innovative food products.

Our story

TransFoodMission Kft. founded the Secontaste brand to make upcycled food attractive and accessible. Their goal is to transform overlooked by-products – such as brewer's spent grains (BSG) – into tasty, nutritious products that fit into a modern diet. The team combines creativity with sustainability, and shows how ingredients that were once considered as waste can become valuable components of a healthy lifestyle. They also offer consulting services for product development based on upcycling and zero-waste approaches, and design novel foods by utilising new raw materials such as leftovers.

Bio-based product

Secontaste has developed a range of granola products and savoury crackers made from BSG, the main by-product of beer brewing. These products are rich in protein, have a high fibre content and contain fewer carbohydrates, making them a healthier alternative to traditional snacks. In addition, the company has also developed prototypes for new snacks as well as porridge and baking mixes to test consumer acceptance of ingredients such as plant fibres, cocoa husks, and different seed flours.

Cookies from upcycled ingredients



Test procedure

They prepared two different methods for the Living Lab. The first was a co-creation workshop and the second was based on a social media campaign, followed by a home test of the products. Participants took part in interactive sessions, received product samples and completed questionnaires that examined both the preparation process and the final taste experience. Recipe booklets and ingredient packs were provided to help testers integrate the Secontaste products into real-life cooking situations, while participants were encouraged to share photos and creative recipes. This hands-on approach provided valuable insights into product usability and consumer expectations.

Findings

Feedback confirmed that consumers appreciated the flavour and novelty of BSG-based flours. Testers appreciated the sustainable concept and the packaging sizes designed for sampling. Some expressed uncertainty about combining BSG flour with other ingredients, and pointed out that more guidance would be helpful. In general, the workshops aimed to reduce misconceptions among the public that by-products or upcycled products are not as valuable and delicious as other products on the market. Overall, the pilot demonstrated strong potential for upcycled foods have great potential, provided that communication focuses on clearer labelling, transparency, consumer education, and product usability (including for gluten-free versions).



GRAPOILA

<https://grapoila.hu>

www.instagram.com/grapoila

Position in the bioeconomy value chain

This pilot is positioned in the production phase. It focuses on the valorisation of oilseed residues into new foods and functional ingredients.

Our story

Grapoila, part of Virgin Oil Press Kft, is known for producing cold-pressed oils from grape and other seeds. Instead of disposing of the press residues, the company processes them into nutrient-rich seed flours and meals. The company's philosophy is based on zero waste: every part of the raw material should be used, whether in food, cosmetics, or new functional ingredients. They also offer consultancy services to help other companies develop upcycling food innovations.

Bio-based product

The company tested porridge mixes, baking flours, and biscuits made from sunflower and pumpkin seed flours, vegetable juice fibres, and cocoa bean husks. These defatted seed flours are easier to integrate into everyday cooking and offer versatility for both sweet and savoury dishes. By combining by-products of oil production with other food scraps, Grapoila demonstrates how upcycling can lead to a wide range of innovative and nutritious foods.

Upcycled seed flours



Test procedure

Grapoila engaged participants through co-creation workshops and a social media campaign, followed by product testing at home. Testers received recipe booklets and ingredient kits to find out how the flours and mixes could be used in their kitchen. The questionnaires focused on preparation methods, usability and consumer impressions, while photos and shared recipes provided additional creative insights into how these recycled ingredients fit into everyday cooking.

Findings

Consumers appreciated the nutritional benefits and versatility of seed dishes, as they can be easily incorporated into a variety of meals. The workshops helped overcome the perception that by-products are of lower quality, and instead showed that they enrich flavour and texture. Participants also highlighted the need for clear labelling, particularly in relation to gluten and the safe handling of raw residues. Education and transparent communication were cited as key to building consumer confidence. Overall, the Grapoila pilot confirmed that seed-based upcycling ingredients have great potential for wider adoption, as they offer both sustainability and high nutritional value.



Position in the bioeconomy value chain

This pilot is positioned in the production phase and focuses on the upcycling of food waste into a new product with added value.

Our story

The Secondary School of Agriculture, Food, and Veterinary in Zadar has decided to face an everyday problem: students were no longer eating apple crisps that had lost their crispness. Instead of letting this food go to waste, the school saw it as an opportunity. They decided to challenge the students to come up with a creative solution and develop a new product using unused apple crisps as a raw material. This exercise served as a valuable lesson on the circular economy and showed how to work together to find a solution to a waste problem by creating a new, enriched product in a fun way.

Bio-based product

The new product the students designed is an energy bar made from unused apple crisps. This high-quality snack appeals to health-conscious consumers by emphasising its natural ingredients and its contribution to waste prevention. By upcycling what would otherwise be considered waste, the school has created a new and attractive product that fulfils both a nutritional and educational purpose.

ŠKOLA ŠTANKA OŽANIĆA

<https://ppvs-ozanic.hr>

Energy bars

Test procedure

Using a Living Lab approach, the energy bars were developed in a co-creation process by brainstorming and testing different product variants. The focus group consisted of students, professors, the school psychologist, and members of the local community. The testing process combined both structured and qualitative feedback methods. Questionnaires provided insights into user preferences and perceptions, while interactive discussions allowed for a deeper exploration of user needs and suggestions for product development. This co-creation process was key to gathering the ideas needed to improve the product to meet the students' tastes.

Findings

The process provided valuable insights that led to several product improvements. Participants suggested making the texture crispier, introducing a variety of flavours and using environmentally friendly, eye-catching packaging. The Living Lab also identified opportunities for targeted marketing via social media platforms such as TikTok and Instagram. This user-driven feedback not only helped the school improve the market readiness of the energy bar, but also inspired them to explore new flavours and premium versions.





MAJOMKENYÉR

www.majomkenyer.hu
www.facebook.com/majomkenyer

Position in the bioeconomy value chain

This pilot is positioned in the production phase. It focuses on the use of bio-based raw materials and food by-products in the production of allergen-free products.

Our story

Majomkenyér was founded in 2013 with the aim of producing healthier, more sustainable, and allergen-free food. In 2023, the company introduced an innovative approach to upcycling: it turns deformed or broken biscuits into biscuit crumbs as a new raw material. These crumbs are gluten-free, dairy-free, and environmentally friendly, and can be used both in the home and in catering. Guided by a strong commitment to sustainability, the company's food engineers are exploring how upcycled ingredients can be integrated into products without compromising flavour, texture, or nutritional value. In autumn 2024, Majomkenyér launched its first upcycling product line with allergen-free foods, packaged in FSC-certified boxes printed with chemical-free inks and providing consumers with clear information about upcycling.

Bio-based product

Majomkenyér's main products are vegan biscuits that are free from gluten, soya and palm oil, and are produced in various flavours. The company has tested two new raw materials for product development:

- Sea buckthorn flour - a vitamin C-rich powder made from the pulp of the fruit after it has been juiced, providing antioxidants and health benefits.
- Grape seed flour - a by-product of wine production that is rich in fibre and omega-3 fatty acids, which can improve both the taste and nutritional value of various foods.

Biscuit crumbs

Test procedure

The Living Lab comprised two different methods: a co-creation workshop and a social media campaign, followed by home testing of the company's hazelnut biscuits enriched with sea buckthorn and grapeseed flour. Questionnaires were used to gather impressions about the flavour, texture, and development potential of the product, as well as views on marketing. The social media campaign and feedback from consumers who tested the products at home allowed the company to gain direct input on satisfaction, usability and areas for improvement.

Findings

The pilot confirmed the high consumer acceptance of upcycled biscuit crumbs as versatile and valuable ingredients. Testers highlighted their use not only in cakes, but also in desserts, muesli, energy bars, and vegan recipes, and appreciated their neutral flavour and multifunctionality. Participants who were new to upcycling were open to experimenting with the product and showed interest in recipes and professional advice. Feedback also emphasised the importance of clear communication about nutritional content and ingredients, especially for allergen-free foods. The workshops reinforced Majomkenyer's core message that people with sensitivities or allergies do not have to miss out on everyday kitchen essentials. Whilst upcycling food is still a new category, the results show that targeted communication and transparency are key to building trust and widening acceptance.





ZERO GUILT

www.zeroguilt.hu

www.facebook.com/ZeroGuiltOfficial

Position in the bioeconomy value chain

This pilot is positioned in the production stage of the bioeconomy value chain. It develops food products using bio-based raw materials, including upcycled vegetable by-products.

Our story

Hello Good Food was founded in 2022, and created the Zero Guilt brand with the aim of producing allergen-free, healthy, and sustainable food for everyday life. Rather than relying on starch-based substitutes, the company uses real vegetable purees and high-quality flours to create baked goods that are naturally high in fibre, low in carbohydrates, and free from gluten, dairy, soy, and added sugar. Their first product was a pizza, but consumer research soon showed that tortillas were an extremely versatile and popular format. Based on these findings, the company decided on tortillas as the next step in product development, with a strong focus on sustainability and upcycling.

Bio-based product

Hello Good Food has developed vegetable-based tortillas in three varieties: beetroot, cauliflower, and spinach. The beetroot variant uses recycled vegetable pulp, a by-product of juice production. By combining vegetables with allergen-free flours, the tortillas offer a nutritious alternative to conventional products, and appeal to health-conscious consumers who value flavour, functionality, and sustainability.

Plant-based tortillas

Test procedure

The Living Lab organised a co-creation workshop where participants tested prototypes of the tortillas. Feedback was collected through questionnaires, focussing on taste, texture, usability and consumer perception of upcycled ingredients. The findings from these sessions were incorporated into both product improvement and future marketing strategies.

Findings

Developing a food product using upcycled ingredients and no preservatives is a daunting endeavour, and the company has shown remarkable courage in tackling this challenge. The tests have shown that there are important challenges to overcome in further development. Technologically, it proved difficult to stretch the dough thin enough for tortillas, as the high vegetable content impairs elasticity and rollability. Shelf life was another problem: although the moisture-rich dough offers nutritional benefits, it also creates favourable conditions for mould. As preservatives are out of the question, the product has to be stored and sold frozen, which presents logistical hurdles. Finally, sourcing the recycled beet pulp requires close collaboration with juice producers to ensure that the by-product is collected, stored, and processed under food-grade conditions. Despite these challenges, participants appreciated the health benefits, creativity, and sustainability of the tortillas, confirming their great potential once the technical and logistical issues are resolved.



Upcycling resources and cross-sector opportunities

Pilots innovating with upcycling resources and circular production models, opening new cross-sector opportunities.





- **Creative hub: Centre Rog - Green Lab (Slovenia):** upcycled oil crayons, urban makerspace for circular design and prototyping of sustainable products



- **Woolee (Croatia):** eco-organic fertiliser and repellent, circular use of local sheep's wool

- **Kerline (Italy):** high-value keratin from wool waste, bio-based innovation in cosmetics and biomedical applications

- **ALPI (Italy):** wooden panels for furniture, upcycling of wood scraps, large-scale circular business model



- **Rebread (Poland):** innovative food technology, licencing of unique fermentation-based formulas, upcycling of bakery bread surpluses





CENTRE ROG

www.center-rog.si

Position in the bioeconomy value chain

This pilot is providing space, equipment, facilities and expertise for independent research in biotechnology and the development of bio-based solutions. The Green Lab at Centre Rog supports research, prototyping and public engagement for sustainable design and practical outcomes in biotechnology.

Our story

Centre Rog is Europe's largest creative centre in Ljubljana dedicated to applied arts, design and architecture. Covering an area of 8,500 square metres, it houses nine production labs open to professionals, students and the public. In this lively environment, the Green Lab has launched an experiment with unconventional materials that has led to the development of sustainable crayons. The product was developed out of children's workshop for coloured pencils made from upcycled and natural materials. By combining user feedback, expert support and iterative design, the project evolved into a unique bio-based product that combines creativity, education and sustainability and is available in the shop as a souvenir or gift product.

Bio-based product

A set of oil crayons is made from purified used cooking oil from local restaurants, sustainably harvested beeswax from urban rooftop beehives and natural plant and mineral pigments and comes in six colours. In addition to the coloured crayons, you will also find recipe instructions on how to make them yourself from household cooking oil. The packaging is also made in-house from Wood Lab's sawdust waste. By upcycling local waste streams into safe, functional and aesthetically pleasing drawing tools for children, the coloured pencils demonstrate the potential of circular design in everyday objects and raise awareness of sustainable consumption from an early age.

Upcycled oil crayons



Test procedure

Children's workshops served as a living lab environment in which participants actively helped to shape product development. Through hands-on application, children, parents and educators provided feedback on the size, shape, texture, odour and usability of the crayons. Iterative prototyping led to the discovery of an optimal ratio of edible oil, beeswax and stearic acid, which ensures a balanced hardness, even application and non-stick effect. In addition, structured questionnaires were used to gather feedback from a larger group of testers. Both closed and open-ended questions allowed users to express their opinions on product performance, sustainability and market potential. Anonymous online surveys also encouraged honest feedback and made the process comprehensive and transparent.

Findings

The tests revealed that children prefer bold and vibrant colours and have little concern about colours fading over time, while adults value permanence and muted shades. This finding led to the selected coloured pencils containing a minimum of synthetic pigments to achieve a balance between vibrancy and durability. Another important observation was that children instinctively removed the paper packaging before use, which led to the decision to eliminate individual packaging and reduce material waste. Overall, the results confirmed the environmental and educational value of the product while providing clear indications for improvement. Through a combination of creative engagement, testing and user-driven feedback, the Green Lab has successfully developed a sustainable product that demonstrates how local waste can be transformed into meaningful and environmentally friendly design solutions.



FEMA

www.woolee.hr

Position in the bioeconomy value chain

This pilot is positioned in the manufacturing phase and focuses on the use of bio-based raw materials such as sheep's wool waste for the production of end products.

Our story

Fema was founded to tackle a significant environmental issue: the global problem of wool waste. In Croatia, where an estimated 3,000 tonnes of wool waste is produced annually, most of this valuable material is thrown away or incinerated. In response to this, the innovative Woolee brand was developed, which converts this waste into environmentally friendly products such as bio-based fertilisers and repellents. Woolee's business model is based on sustainability. It utilises a readily available waste material from sheep's wool, which would otherwise take 90 years to decompose, to develop valuable bio-based solutions that reduce environmental impact.

Bio-based product

Woolee's eco-organic fertiliser and an eco-repellent use raw wool as a base and are effective, sustainable alternatives that contribute to healthier soils and ecosystems. They offer clear environmental and agricultural benefits, such as improved crop yields (by 30%) and water savings (20%). The products are aimed at environmentally conscious consumers such as hobby farmers.

Woolee fertiliser and repellent



Test procedure

The Living Lab activities used a multifaceted approach to gather feedback from hobby farmers and agricultural producers. A combination of a quantitative survey and a moderated discussion provided both structured data and qualitative insights.

An additional trial was organised as a practical test phase involving six people who tested the fertiliser in pellet form and the slug repellent on their own plants. The testers were encouraged to share their experiences through visual documentation such as photos or sketches and detailed feedback forms. This allowed the team to gain real-time insights and observe innovative applications of the products.

Findings

The Living Lab sessions revealed several key opportunities for further product development. The tests confirmed the importance of clear communication about the composition of the products and the recommendations for use. Discussion with participants led to valuable suggestions, including the integration of QR codes for product education, the addition of dispensers for larger quantities and the development of biodegradable packaging. Testers pointed out the need to eliminate the unpleasant odour of both the fertiliser and repellent, and they suggested adding an applicator to the repellent packaging for more convenient application. The feedback also confirmed the importance of a strong eco-friendly image and led to the idea of incorporating marketing strategies such as working with influencers on social media and a loyalty programme to promote the wider concept of bioeconomy.



KERLINE

www.kerlinesrl.com

Position in the bioeconomy value chain

This pilot is positioned at the extraction and processing stage of the bioeconomy value chain. It focuses on the valorisation of waste from the textile and dairy industries, in particular wool from sheep farms, through the extraction of high-value keratin for use in cosmetics and biomedical applications.

Our story

Kerline is based on the idea of transforming low-grade wool waste into a resource with high economic and environmental value. In co-operation with extensive sheep farming with cruelty-free shearing, the company has developed a water-based extraction process that preserves the complete protein structure of the keratin. Unlike conventional hydrolysed proteins, this process produces high molecular weight keratin (HMW ker) with unique regenerative and biocompatible properties. The company's innovation not only solves the problem of disposing of wool waste, which farmers are legally obliged to do, but also creates new opportunities for sustainable cosmetics and modern biomedical solutions.

Bio-based product

The most important innovation is HMW-Ker, a water-soluble keratin that retains its intact amino acid chain. This structure gives it strong regenerative properties and offers scientifically proven benefits in anti-ageing skin care and wound healing. Unlike conventional keratin products on the cosmetics market, HMW-Ker can be safely used as a carrier for active ingredients or spun into nanofibres or microparticles, opening up new technological applications. It represents a sustainable, biologically active alternative to synthetic materials or hydrolysed proteins commonly used in the cosmetics industry.

High-value keratin

Test procedure

The Living Lab involved focus group sessions with experts from the pharmaceutical industry, scientific researchers, a representative from a natural cosmetics manufacturing company, a representative from a cosmetic raw materials distribution company, an expert from the pharmaceutical industry, advertising experts and users. The participants compared HMW-Ker with conventional keratin-based products in order to successfully manage the downstream valorisation of the product and potential market applications. Discussions also covered the environmental and ethical aspects of valorising waste wool, including the challenges of communicating to consumer markets.

Findings

Participants unanimously described the product as “high quality” and better than other keratin products currently available. They particularly appreciated the sustainability and ethical value of the product, although some highlighted the difficulty in communicating this to consumers as demand for animal-derived ingredients is now in decline. This concern was discussed further and it was decided that it should be emphasised that the keratin is derived from wool waste, which gives the product both ethical and environmental credibility. Some participants suggested that in addition to cosmetics, biomedical applications could be an alternative and promising market. The results confirmed that Kerline’s product is both innovative and sustainable, while emphasising the importance of clear, transparent communication to gain consumer trust.





ALPI

www.alpi.it/en

Position in the bioeconomy value chain

This pilot is positioned in the production phase of the bioeconomy value chain. It investigates how bio-based materials and waste streams can be integrated into new industrial products for the furniture sector.

Our story

ALPI is an established Italian wood processing company known for the production of wood-based materials. While studying its own production line, the company recognised the opportunity to recycle ALPIlignum waste - by-products generated during various stages of production. This waste, which consists mainly of wood but also has different glue contents and colours, is normally considered low-grade waste. Motivated by the desire to reduce its ecological footprint, ALPI began to investigate how these remnants could be converted into a new, high-quality panel. The initiative is also exploring the use of bio-based glues to further reduce the carbon footprint and increase the sustainability of the end product. This approach reflects a circular business model in practise: closing material loops, reducing waste and creating new economic value from what was previously discarded.

Bio-based product

The innovation is a new type of wooden panel made from ALPIlignum production scraps. The product is still at the prototyping stage and has the potential to be used in furniture manufacturing and interior design. It can be used as it is or improved by coating exposed surfaces with other materials (e.g. ALPIready). Importantly, the board can be recycled like conventional wood-based products so that it can be returned to the production cycle at the end of its life.

Wooden panels

Test procedure

The Living Lab tests involved a targeted collaboration with a downstream company from the furniture and design industry. The process began with a presentation of the prototype, highlighting its added value and potential applications. This was followed by a discussion between ALPI representatives and members of the focus group, which consisted of representatives from Saviola Group - one of the leading furniture and panel manufacturers with a strong commitment to sustainability. The focus group members then tested the product and completed a detailed questionnaire to assess its usability, performance compared to traditional wood-based panels (OBS, MDF, PB) and marketing potential.

Findings

Feedback confirmed that consumers appreciated the flavour and novelty of beer-based flours, particularly in crackers and granola. Testers appreciated the sustainable concept and the packaging sizes designed for sampling. Some expressed uncertainty about combining BSG flour with other ingredients, and pointed out that more guidance would be helpful. In general, the workshops aimed to reduce misconceptions among the public that by-products or upcycled products are not as valuable and delicious as other products on the market. Overall, the pilot demonstrated strong potential for upcycled foods have great potential, provided that communication focuses on clearer labelling, transparency, consumer education, and product usability (including for gluten-free versions).





REBREAD

<https://rebread.com>

Position in the bioeconomy value chain

This pilot is positioned in the production stage of the bioeconomy value chain and focuses on the conversion of a surplus bio-based raw material- unsold bread- into a new, value-added product for the food and beverage industry.

Our story

Rebread is an innovative food tech company dedicated to solving the problem of surplus bakery bread. Rather than selling a consumer product, Rebread addresses food waste by developing unique fermentation-based formulas and licencing them to other companies. Such advances emphasise the role of biotechnology in transforming food waste into valuable and sustainable solutions for the food industry and beyond.

Bio-based product

Krast is a probiotic drink fermented with lactic acid bacteria. The bacteria come from bakery by-products and lactic acid bacteria. The fermentation is similar to that of water kefir, as Krast contains five grammes of unsold bread per 100 ml. This innovative drink offers significant health benefits, including improved gut microbiota and increased levels of antioxidants. The product was prepared for testing in a convenient shot or bottle format with flavours such as ginger and lemon.

Krast fermented probiotic drink



Test procedure

The pilot was conducted in a single Living Lab, testing the products from Rebread, StarchBag and Slappa together. The process began with an inaugural workshop in which several organic products from Polish companies were presented. A group of 20 testers was selected from participants of previous project workshops and applicants who responded to an online announcement. The event included a comprehensive lecture on organic products by a professional pharmacist and product presentations by company representatives, followed by a lively Q&A session. At the end of the workshop, participants received detailed instructions and the products to begin a 14-day trial period in their home environment. During the trial period, participants received text message reminders to facilitate their experience.

Findings

The co-creation process provided Rebread with valuable insights into the real world of consumers. The feedback confirmed the importance of flavour and convenience of packaging, prompting the company to refine its fermentation methods to control the intensity of carbonation and explore new packaging formats, such as a smaller "shot" version. The Living Lab also helped them optimise their go-to-market strategy by highlighting strong consumer interest in buying the product in online shops, cafés and health food shops. This user-centred feedback reinforced Rebread's mission to combine sustainability with food innovation.



Credits

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**Bioeconomy
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