BResilient

Funded by the
European Union

RESILIENCE SKILLS HUB FOR SMES

WHAT IS THE "SKILLS HUB"?

A skills hub is created in the framework of B-Resilient project with the aim to support European Food Production SME's resilience. This skills hub is a word document tool with links to different resources, that will be made available for SMEs regularly, and that will be gathering knowledge on biomass valorisation and zero waste in general during the project lifetime; this skills hub is specifically created and will be fed by the partners themselves to help the SMEs to improve their resilience by the optimal use of their biomass.

FIVE THEMATICS PRIORITISED:

Five specific value chains have been prioritised for the scope of the project in order to help the partners to explore more deeply the challenges and opportunities in the biomass market. These value chains are cereals and wheat bran, dairy, spent grains, stone fruits and apples, and grapevine & winemaking. You will find in that skills hub specific biomass analysis as well as articles or videos dedicated to these value chains. You will also find content about other value chains in part IV.

WHAT IS B-RESILIENT PROJECT?

The B-Resilient project aims to increase the use of available raw materials and the valorisation of secondary streams into biobased ingredients. In particular, it will enable SMEs in food production and processing to become more resilient through the optimal use of biomass.

TABLE OF CONTENTS

1 CEREALS AND WHEAT BRAN

1.1 Valorisation of wheat bran: state of art

Sum up of the content: Wheat bran, consisting of bran and middlings, is the primary byproduct of the milling industry, accounting for 14 to 19% of the materials resulting from wheat crushing. It is excluded from white flour due to the negative perception linked to its dark colour. In Belgium, the main valorisations for wheat bran are in energy biomass and animal feed. It can also occasionally be reintroduced in the formulation of whole-grain bread and pasta.

Click on the link to know more about it:
https://info.wagralim.be/en/blog/durabilite-5/valorisation-of-wheat-bran-state-of-the-art-217

1.2 Exploring wheat milling by-products: an overview of 8 ways of valorisation for wheat bran

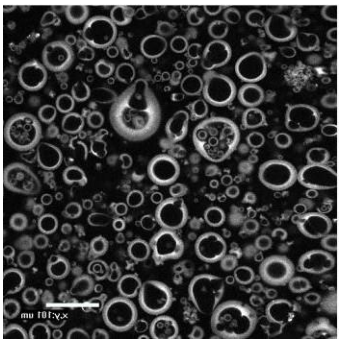
Sum up of the content: Wheat bran is a byproduct of wheat milling, which in Europe is a significant sector within the food processing industry.

Europe is the second most important producer of wheat worldwide, behind China. Indeed, the climate in the European Union is favourable to the development of cereal crops, in particular wheat, thanks to moderate temperatures (between -6 and 20 degrees Celsius), warm weather before growth and sunny conditions during the final stages before wheat harvest.

Click on the link to know more about it: https://pole-innovalliance.com/wp-content/uploads/2024/02/Article-B-REs-pour-skills-hub-wheat-bran.pdf

2 DAIRY

2.1 Doing without additives and relying on the specific properties of milk proteins!



Sum up of the content: Started in 2014, the French collaborative project PROFIL cumulates nearly 60 years of research and development, condensed into 6 years! PROFIL stands for Functionalized Milk Protein Assemblies for Innovation in the Dairy Industry. PROFIL focuses on the properties of serum milk protein assemblies to replace preservative and texturising additives in dairy products.

Click on the link to know more about it:

https://www.pole-valorial.fr/en/success_stories/profil-2/

2.2 Recent advances in whey processing and valorisation:Technological and environmental perspectives

Sum up of the content: Whey has several environmental risks if disposed of as waste in watercourses. However, there arenumerous valorisation techniques to convert it into valuable and highly nutritious.

Click on the link to know more about it:

https://onlinelibrary.wiley.com/doi/epdf/10.1111/1471-0307.12935

2.3 Dairy By-Products: A Review on the Valorization of Whey and Second Cheese Whey

Sum up of the content: The search for new food products that promote consumers health has always been of great interest. The dairy industry is perhaps the best example regarding the emergence of new products with claimed health benefits. Cheese whey (CW), the by-product resulting from cheese production, and second cheese whey (SCW), which is the by-product of whey cheese manufacture, have proven to contain potential ingredients for the development of food products with improved nutritional characteristics and other functionalities. Nowadays, due to their nutritional quality, whey products have gained a prominent position among healthy food products. However, for a long time, CW and SCW were usually treated as waste or as animal feed. Due to their

high organic content, these by-products can cause serious environmental problems if discarded without appropriate treatment. Small and medium size dairy companies do not have the equipment and structure to process whey and second cheese whey. In these cases, generally, they are used for animal feed or discarded without an appropriate treatment, being the cause of several constraints. There are several studies regarding CW valorization and there is a wide range of whey products in the market. However, in the case of SCW, there remains a lack of studies regarding its nutritional and functional properties, as well as ways to reuse this by-product in order to create economic value and reduce environmental impacts associated to its disposal.
Click on the link to know more about it: https://www.mdpi.com/2304-8158/10/5/1067

2.4 The main ways of valorisation for cheese whey in the B-Resilient partner regions

Sum up of the content: The dairy industry is significant in the European Union. Indeed, Europe is one of the world's leading milk-producing regions, accounting for 25% of world production. The majority of EU dairy production is cow's milk, accounting for 96% of all production. Significant producers include Germany and France; together with the Netherlands, Poland and Italy, these five countries represent two-thirds of EU production. The EU exports a total of 1,38 million tonnes of cheese per year.
Click on the link to know more about it: https://pole-innovalliance.com/wp-content/uploads/2024/07/Article-B-REs-pour-skills-hub-diary.pdf

2.5 Smartz4Milk

Sum up of the content: This is a tractor project with the aim of increasing the competitiveness, sustainability and resilience of the Galician dairy sector through research, development and innovation in digitalisation, sustainability and traceability.
Click on the link to know more about it: https://smartz4milk.es/

3 SPENT GRAINS

3.1 Brewery's spent grain: market situation and example of valorisation

Sum up of the content: Brewer's spent grain (BSG) is a by-product of the brewing industry that makes up 85 percent of brewing wastes. It is obtained as a mostly solid residue after wort production in the brewing process. This article describes market trends of BSG and example of valorisation.

SUBTITLES:

- Global market for spent grain based products
- Valorisation of Brewery's Spent Grain

Click on the link to know more about it**:** Brewerys-Spent-Grain-Market-situation-and-example-of-valorisation-1.pdf (pole-innovalliance.com)

3.2 Brewery's spent grain: market situation and example of valorisation

Sum up of the content: There is an urgent requirement to minimize food waste and create more sustainable food systems that address global increases in malnutrition and hunger. The nutritional value of brewers' spent grain (BSG) makes it attractive for upcycling into value-added ingredients rich in protein and fiber having a lower environmental impact than comparable plant-based ingredients. BSG is predictably available in large quantities globally and can therefore play a role in addressing hunger in the developing world via the fortification of humanitarian food aid products. Moreover, addition of BSG-derived ingredients can improve the nutritional profile of foods commonly consumed in more developed regions, which may aid in reducing the prevalence of dietary-related disease and mortality. Challenges facing the widespread utilization of upcycled BSG ingredients include regulatory status, variability of raw material composition, and consumer perception as low-value waste products; however, the rapidly growing upcycled food market suggests increasing consumer acceptability and opportunities for significant market growth via effective new product innovation and communication strategies.

Click on the link to know more about it:

https://pubs.acs.org/doi/10.1021/acs.jafc.3c02489

3.3 Possibilities for using brewer's grains as a raw material in the food industry

Sum up of the content: BSG is a side stream from beer production. It is a fibre- and protein-rich stream that is used as a raw material in animal feed. However, precisely because of its high fibre and protein content, it could also be an interesting product to use as an ingredient in the food industry. For instance, it could improve the nutritional properties of e.g. bread.

Click on the link to know more about it**:**

https://www.flandersfood.com/en/artikel/2024/possibilities-using-brewers-grains-raw- material-food-industry

3.4 Spent Grain: A Functional Ingredient for Food Applications

Sum up of the content: Spent grain is the solid fraction remaining after wort removal. It is nutritionally rich, composed of fibers-mainly hemicellulose, cellulose, and lignin-proteins, lipids, vitamins, and minerals, and must be managed properly. Spent grain is a by-product with high moisture, high protein and high fiber content and is susceptible to microbial contamination; thus, a suitable, cost-effective, and environmentally friendly valorization method of processing it is required. This by-product is used as a raw material in the production of many other food products-bakery products, pasta, cookies, muffins, wafers, snacks, yogurt or plant-based yogurt alternatives, Frankfurter sausages or fruit beverages-due to its nutritional values.

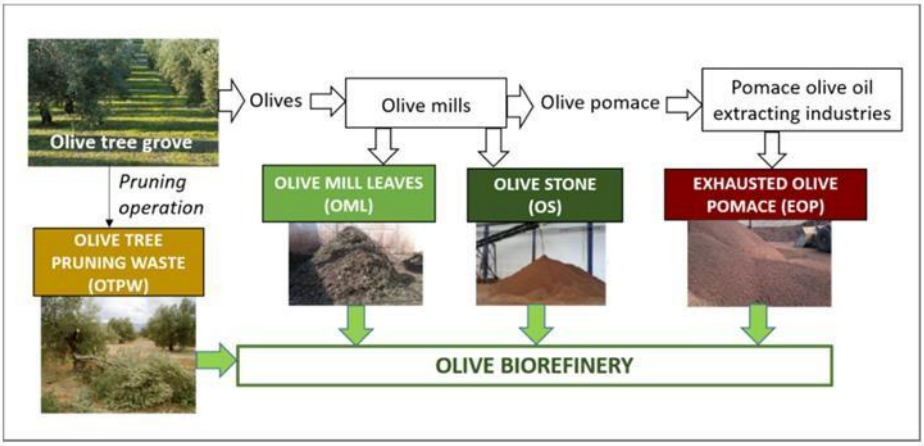
Click on the link to know more about it:

https://pmc.ncbi.nlm.nih.gov/articles/PMC10094003/

4 STONE FRUITS & APPLE

4.1 Location of Biorefineries on Olive-Derived Biomass in Andalusia, Spain

Sum up of the content: The olive biorefinery involves a multi-product process from different raw materials: olive leaves, exhausted olive pomace, olive stones and olive tree pruning residues. Biorefinery processes associated with these wastes allow their valorization to produce bioenergy and high value-added renewable products. In this work, using geographic information system tools, the biomass from olive crop fields, mills and olive pomace-extracting industries, where these wastes are generated, was determined and quantified in the study area (provinces of Jaén, Córdoba and Seville), making it possible to identify the best locations for the implementation of the biorefineries based on olive-derived biomass.



Click on the link to know more about it: https://www.mdpi.com/1996-1073/14/11/3052

4.2 Oil and protein extraction from fruit seed and kernel by-products using a one pot enzymatic-assisted mild extraction

Sum up of the content: This research evaluated the application of a one-pot enzymatic extraction by using a protease for the concomitant and sustainable extraction of oils and proteins from fruit seeds/kernels of different species of stone, citrus and exotic fruits. The proteolysis improved the oil solvent-extractability of seeds/kernels of some fruit species compared to the use of acid and/or organic solvents and led to directly recover fat (10–33%) from mango, lemon and pumpkin seeds. Good protein extraction yields were obtained compared to conventional solvent extractions and with a good hydrolysis degree (almost 10%) in the case of lemon and pumpkin seed protein hydrolysates. The

nutritional quality of all the protein hydrolysates was quite low, because of their limiting amino acids (histidine, methionine and lysine). On the contrary, the fruit seed/kernel oils resulted with high nutritional value, as they were mostly rich in unsaturated fatty acids, primarily oleic acid (>25%) and linoleic acid (till 40%).

Click on the link to know more about it: https://i4ce.eu/wp-content/uploads/2025/05/Oil-and-protein-extraction-from-fruit-seed-and-kernel-by-products-using-a-one-pot-enzymatic-assisted-mild-extraction.pdf

4.3 Protease-Assisted Mild Extraction of Soluble Fibre and Protein from Fruit By-Products: A Biorefinery Perspective

Sum up of the content: By-products from the fruit supply chain, especially seeds/kernels, have shown great potential to be valorised, due to their high content of macronutrients, such as lipids, protein, and fibre. A mild enzymatic assisted extraction (EAE) involving the use of a protease was tested to evaluate the feasibility of a cascade approach to fractionate the main fruit by-products components. Protease from Bacillus licheniformis (the enzyme used in the AOAC 991.43 official method for dietary fibre quantification) was used, and besides protein, the conditions of hydrolysis (60 °C, neutral pH, overnight) allowed us to dissolve a portion of soluble fibres, which was then separated from the solubilized peptide fraction through ethanol precipitation. Good protein extraction yields, in the range 35–93%, were obtained. The soluble fibre extraction yield ranged from 1.6% to 71% depending on the by-product, suggesting its applicability only for certain substrates, and it was found to be negatively correlated with the molecular weight of the fibre. The monosaccharide composition of the soluble fibres extracted was also diverse. Galacturonic acid was present in a low amount, indicating that pectin was not efficiently extracted. However, a predominance of arabinose and galactose monomers was detected in many fractions, indicating the isolation of a fruit soluble fibre portion with potential similarity with arabinogalactans and gum arabic, opening up perspectives for technological applications. The residual solid pellet obtained after protease assisted extraction was found to be an excellent fibre-rich substrate, suitable for being subjected to more "hard" processing (e.g., sequential pectin and hemicellulose extraction) with the objective to derive other fractions with potential great added economic value.

Click on the link to know more about it: https://i4ce.eu/wp-content/uploads/2025/06/foods-12-00148.pdf

5 GRAPEVINE & WINEMAKING

5.1 Organic mulches in viticulture

Sum up of the content: Organic mulches have emerged as a promising and sustainable solution for enhancing cultivation practices worldwide. Unlike traditional synthetic materials, organic mulches are derived from natural sources such as plant residues, compost, straw, or even post-cultivation substrates like mushroom remnants. Their increasing popularity comes from the numerous benefits they bring to various agricultural systems, including the cultivation of crops like vineyards.
Click on the link to know more about it: https://www.clusterfoodmasi.es/wp-content/uploads/2023/09/Skills-Hub-october-1-Organic-Mulches-in-Viticulture.pdf

5.2 Winemaking By-Products

Sum up of the content: The by-products of grapes are the materials or components obtained as a result of the winemaking process. These by- products can be recovered and used for various purposes, or in some cases, they are sought to be avoided due to their potential negative impact on the final product. The most common by-products include grape pomace, grape seeds, wine lees, and wine acids.

Click on the link to know more about it: https://www.clusterfoodmasi.es/wp-content/uploads/2023/09/Skills-Hub-october-2_-Wine-byproducts.pdf

5.3 Exploring apple processing by-products: an overview of 5 ways of valorisation for apple pomace

Sum up of the content: Apple is a fruit frequently produced and consumed in Europe. Indeed, the European Union is the second largest apple producer in the world, behind China, but ahead of the United States. The European production of apples is led by 3 countries: Poland, Italy and France. These three countries represent more than 50% of European apple production. Historically, Europe is an exporter of apples. However, the situation is very different depending on the country. Lithuania and Latvia, for instance, are very dependent on apple imports.

Click on the link to know more about it: https://pole-innovalliance.com/wp-content/uploads/2024/04/Exploring-apple-by-products_5-ways-of-valorisation-for-apple-pomace.pdf

5.4 Exploring wine-making by-products: an overview of eight ways of valorisation for grape pomace

Sum up of the content: Grapes are a fruit commonly produced in Europe. In 2020, there were 2.2 million vineyards holdings for wine in the EU. Grapes are either consumed as fresh fruit, or processed, usually into wine. Europe is one of the most important producers of table grapes and wine, though the production varies enormously from one country to another. Grape production holds economic value for two main markets: the food industry, and wine industry. In the food industry, grapes can be sold as fresh fruit or as raisins, but they also can be processed to produce juice, vinegar, etc. Both industries generate different types and large quantities of by-products: rotten grapes, for instance, are a by-product of harvesting, while wine production generates stalks, peels, grape seeds, etc.

Click on the link to know more about it: https://pole-innovalliance.com/wp-content/uploads/2024/04/Article-B-REs-pour-skills-hub-grapes-and-winemaking.pdf

6 OTHER VALUE CHAINS

6.1 In Morbihan (France), Terremo'logic eggshells are a hit

Sum up of the content: This company has created an innovative solution for recycling eggshells as an agricultural amendment. It has invested 800,000 euros in its manufacturing process. It is reaching saturation point, and a second line is being studied.

Terremo'Logic will transform 6,000 tonnes of eggshells this year, collected from five Breton "casseries". Located in Lizio (Morbihan), the Terremo'Logic team will then grind and heat these shells using a unique and confidential process.

Click on the link to know more about it: https://www.pole-valorial.fr/voy_content/uploads/2023/03/article-terremologic-22-3-23.pdf

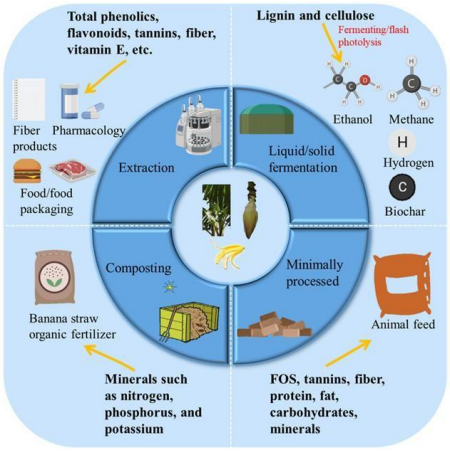
6.2 The tomato skin by-product: a source of innovation for the market

Sum up of the content: Two examples of tomato skin valorization: on the cosmetic market and on biopolymers. The processing of tomato fruit into puree, juices, sauces, etc, produce numerous by-products in the form of tomato pomace, which includes peel and seeds. These by-products are rich in water and difficult to transport and must be consumed quickly after their production. Furthermore, in addition to the technical difficulty of their exploitation, the economic reality of valuing such a by-product is also an issue.

Click on the link to know more about it: https://pole-innovalliance.com/wp-content/uploads/2023/09/B-Resilient-1.3-INA_Tomato-skin.pdf

6.3 The Valorization of Banana By-Products: Nutritional Composition, Bioactivities, Applications, and Future Development.

Sum up of the content: A great deal of waste and by-products is produced during banana harvesting and consumption, including stems, leaves, inflorescences, and peels. Some of them have the potential to be used to develop new foods. This paper summarized the composition information, functions, and comprehensive utilization of banana by-products. Moreover, the problems and future development in its utilization



Click on the link to know more about it: https://www.mdpi.com/2304-8158/11/20/3170

6.4 A closer look at the MiRaDi project

Sum up of the content: Migino, Ranobo and Didess joined hands 2 years ago. Together they founded the MiRaDi partnership on nut processing. Together with Flanders' FOOD and VIVES and with the support of VLAIO, they developed an extensive product range with a focus on zero-waste. From mayo to croquette, discover MiRaDi's zero-waste nut buffet here.

Click on the link to know more about it: A closer look at the MiRaDi project -Flanders' FOOD (flandersfood.com)

7 GENERAL ELEMENTS/RESOURCES ON RESILIENCE FOR FOOD PRODUCING AND PROCESSING SMES

7.1 Reusing by-products: a flagship theme for the Walloon Region as well as for Europe

Sum up of the content: According to the ADEME's definition, a by-product is something that is created during the process of producing a product, whether or not this is intentional. The by-product is intended for a specific use, different from that of the product from which it is derived. So it is somewhere between an original product and waste. What are the obstacles that get in the way of your by-products?

Click on the link to know more about it: https://info.wagralim.be/en/blog/durabilite-5/reusing-by-products-a-flagship-theme-for-the-walloon-region-as-well-as-for-europe-192
Click on the video link to know more about it: https://youtu.be/iPILgR4VhF8

7.2 MixMatters project to optimize the value derived from mixed biological waste

Sum up of the content: The MixMatters Integrated System is a smart and multi-purpose solution that makes valorisation of a wide range of mixed bio-waste streams containing impurities from the agri-food industry a viable option.

The system consists of a Separation Unit and the Valorisation Hub, encompassing a range of advanced technologies into an Integrated System that is mobile, modular, multi-purpose and smart.

The overall objective of MixMatters is to set up the system and demonstrate the separation and valorisation of mixed agri-food biowaste containing impurities such as plastic, cardboard or metal and coming from three streams from the agri-food industry (wholesale markets, greenhouses, and the food and drink industry) into six high-value outputs: powdered ingredients, sugar concentrates, recombinant proteins, green fibres, bioactive compounds, and plastic monomers.

Click on the article link to know more about it: https://www.clusterfoodmasi.es/wp-content/uploads/2023/11/MixMatters-Project.pdf

7.3 The agrifood system of Emilia-Romagna region

Sum up of the content: The Emilia-Romagna Region has published a brochure in English entitled "The agrifood system of Emilia-Romagna region" which is now available online; it reports the most significant data of the agri-food system of the Emilia-Romagna region; its structure, economy and excellence. From territorial to economic data, from production chains to import-export data, from excellent products (Labels) to sustainable production techniques (organic and integrated), the publication paints a complete picture of the characteristics of quality, safety, traceability, and sustainability of production which have given Emilia-Romagna that leading role in agri-food which has been recognized for years both in Italy and abroad.

Click on the article link to know more about it: https://agricoltura.regione.emilia-romagna.it/internazionalizzazione/pubblicazioni/the-agrifood-system-of-emilia-romagna-region/@@download/publicationFile/agrifood-2021-accessibile.pdf

7.4 Byp4dev training tools to valorise by-products

Sum up of the content: Byp4Dev aims to provide learners with suitable training tools, which will facilitate the transition and acceleration to the bio-based society and the primary sector development through a generation of more added value products and processes.

Click on the article link to know more about it:
https://erasmusmoocs.thinkific.com/courses/byp4dev

7.5 Characterizing and valorizing food and industrial wastes using omics techniques

Sum up of the content: Characterizing and valorizing food and industrial wastes using omics techniques and biotechnology is vital for sustainable practices. Omics methods provide a comprehensive understanding of waste composition, and when coupled with biotechnology, enable the conversion of these wastes into valuable bioactive products. This integrated approach aligns with circular economy principles, minimizing environmental impact and transforming waste into valuable

resources.

Studies like "Engineering Strategies for Efficient Bioconversion of Glycerol to Value-Added Products by Yarrowia lipolytica," demonstrates how engineering strategies can optimize the bioconversion of glycerol into valuable products using Yarrowia lipolytica. By focusing on genetic, biochemical, and industrial aspects, such research advances efficient utilization of waste, promoting sustainability and contributing to a circular economy.

Click on the article link to know more about it:
https://www.mdpi.com/2073-4344/13/4/657

7.6 White paper on Food and drink waste management

Sum up of the content: Model2Bio, a European Funded Project that ran from 2020 to 2023, developed a mathematical, predictive model to help identify, select, and reuse organic waste streams. The model specifically covered stream composition, volume, and transformation as well as logistics and business cases.

B-Resilient, along with other EU Funded projects, collaborated with Model2Bio in the creation of a white paper on waste management. The final result, a comprehensive document on Food and Drink Waste Management, is a great tool to learn everything about the great valorisation potential of the agri-food industry's by-products, as well as the limitations or obstacles that may hinder this valorisation.

The white paper can be found here:
https://www.model2bio.eu/wp-content/uploads/2023/10/Model2Bio_White_Paper.pdf

7.7 Cultivated meat: Out of the lab, into the frying pan

Sum up of the content: Cultivated meat, a product that a handful of restaurant patrons

bit into for the first time in December, could change the world's menus in astonishing ways. It could mean that one day consumers will pay no more for Wagyu beef and bluefin tuna than for chicken nuggets and burgers. It could mean a small island could serve up beefy platters at the same cost and efficiency as a continent with wide, grassy plains. By 2030, cultivated meat could provide as much as a half of 1 percent— billions of pounds—of the world's meat supply, with implications for multiple sectors.

Click on the link to know more about it:
https://www.mckinsey.com/industries/agriculture/our-insights/cultivated-meat-out-of-the-lab-into-the-frying-pan

7.8 Novel proteins: consumer appetite for sustainably made ingredients

Sum up of the content: Ingredients made with biotechnology could play an important role in the future of food—and they're beginning to come to market. Over the past five years, $4 billion has been invested to develop novel ingredients ranging from mycelium proteins to animal-free eggs. These ingredients are made through fermentation to create proteins and fats that can function like conventional proteins, but they are animal-free and can be more sustainable.

Click on the link to know more about it:
https://www.mckinsey.com/industries/agriculture/our-insights/novel-proteins-consumer-appetite-for-sustainably-made-ingredients

7.9 The next wave: alternative-seafood solutions

Sum up of the content: Global demand for fish and shellfish is growing rapidly and alternative proteins are well positioned to sustainably scale the industry. millions of people rely on healthy oceans as a source of jobs and food, and demand for fish protein is only increasing. Projections show growth of 14 percent by 2030 versus 2020 levels,

driven by growing markets in Asia, Europe, Latin America, and Oceania. That said, the amount of wild-caught seafood remains flat, with more than 85 percent of the world's fisheries pushed to or beyond their limits.

Click on the link to know more about it:
https://www.mckinsey.com/industries/agriculture/our-insights/the-next-wave-alternative-seafood-solutions

7.10 Online course on food waste prevention

Sum up of the content: VET LOVES FOOD is a new European Project mainly addressed to VET teachers, trainers, students and schools.

Click on the link to know more about it: https://learn.vetlovesfood.eu/

7.11 Feedback on the Valorial'Connection: "Adding value to co-products: how to integrate environmental impact".

Sum up of the content: We were interested in the valorization of co-products from agri-agro chains, with a view to better integrating environmental issues. This approach is often implemented with the aim of generating economic value, but few players have yet considered the environmental impact of the operations involved in recovery. Throughout the morning, LCA experts, co-product specialists and innovators shared their views on this issue. The networking lunch that followed provided an opportunity for rich exchanges between speakers and participants.

Click on the link to know more about it: https://www.pole-valorial.fr/adherents/login/?redirect_to=/adherents/retours-sur-la-valorialconnection-valorisation-des-coproduits-comment-integrer-limpact-environnemental/

7.12 Julie Litas & Sandrine Lopis-Presle:Agricultural co-products, new added value for the Vaucluse region

Sum up of the content: Julie Litas, from Vaucluse Provence Attractivité, and Sandrine Lopis-Presle from innov'Alliance, explain how co-products from agriculture and the food industry can become new value-added ingredients, enhancing the appeal of the Vaucluse as a territory for sustainable innovation.

The event is supported by the Southern Region's OIR Naturalité, organised by VPA and

Innov'Alliance, and spearheaded by Team Vaucluse.

Click on the link to know more about it: https://www.youtube.com/watch?v=6Xubt-zTeh8

7.13 Valorisation of food-industry by-products as fibre and protein sources: a short review

Sum up of the content: The sustainable valorisation of food by-products has gained significant attention in modern food processing, allowing for waste reduction and enhanced resource efficiency. These by-products, often considered waste, can be transformed into valuable resources through various technologies. After presenting the conventional methods for fibre and protein valorisation from biomass, this article will provide insights into green extraction techniques to reduce solvent and chemical consumption. Dry fractionation methods will then be highlighted as sustainable methods for biomass valorisation.

Click on the link to know more about it: https://i4ce.eu/wp-content/uploads/2025/05/Valorisation-of-food-industry-by-products-as-fibre-and-protein-sources-a-short-review.pdf

7.14 Webinar: Food waste: Keys and practical solutions to comply with the new law

Sum up of the content: Clusaga, in collaboration with its associate company Phenix España, organised the webinar: " Food waste: Keys and practical solutions to comply with the new law", aimed at helping companies in the food sector adapt to the new standard on food despair.

Click on the link to know more about it:
https://www.youtube.com/watch?v=7yJXCTJnVdQ

8 ONLINE ACADEMY FOR FRONTRUNNERSIN BIOMASS RESILIENCE - INSPIRING VIDEOS

8.1 How to innovate the use of food residues in high added value products in a context of accelerated climate change, in which circular economy is more important than ever? (Vidéo)

Sum up of the content: Clust-ER Agrifood organized an online public event on April 12 at 16:00 to discuss a priority theme: how to innovate the use of food residues in high added value products in a context of accelerated climate change, in which circular economy is more important than ever. In partnership with the SPES Value Chain ("Valorization of by-products and waste – chemistry from biomass in the agrifood sector") of the Agrifood Clust-ER, 6 questions were discussed, as follows:

1. What are the top 5 trends in new ingredients from traditional value chains (traditional primary products such as wheat, stone fruit, grapes, etc.)?
2. What are the top 5 trends in new ingredients from non-traditional value chains (such as algae, insects, bio-based proteins)?
3. What are the main obstacles to allowing a wider diffusion of these new trends?
4. What is the added value of these new trends compared to what exists at the moment?
5. What are the best tips and tricks learned in the Emilia-Romagna region to create a constructive environment to support new developments?
6. What are the main needs (finance, research, startup/scaleup facilities, business support, right partners, …) to create new resilient value chains?

The opportunities offered to SMEs by the EUROCLUSTER "B-Resilient" project were also presented - namely the "lump sum" Mobility, Business Continuity Plan, Innovation & Internationalization calls - which aim to finance innovative products generated by primary or secondary productions using the biotechnology.

Click on the video link to know more about it: https://youtu.be/iPILgR4VhF8

8.2 Business Continuity Plan when valorising Food biomass: discover the dedicated lump sum in the framework of B-Resilient project

Sum up of the content: B-Resilient project offers the opportunity to be partly financed if you are an SME working on valorising food biomass and you are facing disturbance in logistic, production, raw material…

Click on the video link to know more about it: https://youtu.be/OC81K4DD-Ck

8.3 B-Resilient Webinar: how to secure the supply chain for food raw materials?

Sum up of the content: Innov'Alliance, in collaboration with Valorial and Wagralim, have organised a webinar on the theme of "how to secure the supply chain of food raw materials?" to help companies understand what a business continuity plan is. The B-resilient project offers financial assistance in this area.
Click on the video link to know more about it:
https://pole-innovalliance.com/events/webinaire-b-resilient-comment-securiser-la-supply-chain-des-matieres-premieres-alimentaires/

8.4 Business Continuity Plan training: comprehension and B-Resilient help for European SMEs

Sum up of the content: Organisations that work on sustainability and digitalisation are more resilient, less susceptible to crises and outperform their competitors. Will you be a front runner? A training has been organised to perform cluster managers and staffs' comprehension on the 'Business continuity Plan', and inspírate them with new ideas.

Click on the video link to know more about it:
https://www.youtube.com/watch?v=pBJOImth6rk

8.5 Novel food and process & product innovation

Sum up of the content: The introduction of Novel Food is a topic of great importance to

help the agrifood sector innovate and become more resilient, whilst also ensuring the improved sustainability of its supply chains, with a view to strengthening circular economy. On 14th December, Clust-ER Agrifood Emilia-Romagna organised in collaboration with the B-Resilient EUROCLUSTERS project the online training sessions "Novel food and process & product innovation" during which 5 speakers inspired and transferred knowledge to the an audience of over 50 participants on topics including food safety state of the art and regulatory aspects (EFSA's position); Novel Food: opportunities and obstacles for the supply chain regional agri-food, the case of Alia's Insect Farm, or the consumer's point of view between curiosity and resistances (by the National Confconsumatori association). The full event, in Italian, can be watched again at this link.
Click on the article link to know more about it:
https://www.youtube.com/watch?v=G6JS6uRV78U&t=449s&ab_channel=Clust-ERAgroalimentare-Agrifood

8.6 Roadmap Nevenstromen

Sum up of the content: Flanders' FOOD explains its strategic research and innovation agenda to make better use of by-products in the Flemish agri-food industry. This roadmap came about through interviews with Flemish food processing companies.

Click on the link to know more about it:
https://www.youtube.com/watch?v=jEN8MPQpDuk

8.7 Beyond the Plate - Unlocking Business Opportunities and Transforming Food Systems through Sidestreams

Sum up of the content: Maral Mahdad of the University of Eindhoven shares some interesting insights in how to deal with sidestreams over the whole value chain. Which business models could be interesting? Which technologies could be explored? Maral Mahdad of the University of Eindhoven shares some interesting insights in how to deal with sidestreams over the whole value chain. Which business models could be interesting? Which technologies could be explored?

Click on the video link to know more about it:
https://www.youtube.com/watch?v=oAsiX4hfl7Q

8.8 A smart way to assess valorization opportunities of side streams.

Sum up of the content: The Processtimator is a tool that predicts the financial and technical viability of valorisation options for sidestreams. In this video Martijntje Vollebregt and Annelie Verbon explain the ins and outs.

Click on the video link to know more about it:

https://www.youtube.com/watch?v=SaLS0hpZXp8

8.9 UNLOCK Project Podcast: First Episode with Sarah Montes from CIDETEC

Sum up of the content: UNLOCK designs and demonstrates an economically and environmentally sustainable supply-chain for a feather-based bioeconomy which will generate innovative functional materials for agricultural applications.

UNLOCK has received funding from the Bio-based Industries Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement Nº 101023306.

Learn more: https://unlock-project.eu/

Click on the link to know more about it:

https://www.youtube.com/watch?v=V7mx7W1US_w&list=PLtVp69Zrq6ORphh6Ln1fw62UtIoHIDoBe

8.10 International market trends: Upcycling movement

Sum up of the content: This exclusive webinar series will dive into global market insights for businesses in the upcycling and sustainability sectors. With a focus on key markets, consumer insights, and industry innovations, these sessions are essential for those looking to make a lasting impact in sustainable industries. Discover the trends driving the upcycling movement, from consumer behaviour to labelling and innovations beyond the food industry.

Click on the link to know more about it: https://youtu.be/Wqa6IlGlmqs

8.11 International market trends II: B-Resilient target countries' Snapshots

Sum up of the content: This exclusive webinar series will dive into global market insights for businesses in the upcycling and sustainability sectors. With a focus on key markets, consumer insights, and industry innovations, these sessions are essential for those looking to make a lasting impact in sustainable industries. Get an in-depth look at upcycling trends across key markets: USA, Canada, China, Japan, Singapore, South Korea, and Thailand; and learn about international replicability opportunities with the European project Brilian.

Click on the link to know more about it: https://youtu.be/u03mUHIBrEk

9 ONLINE ACADEMY FOR FRONTRUNNERS IN BIOMASS RESILIENCE - B-RESILIENT LUMP SUM LAUREATES TESTIMONIALS

9.1 Adding value to the by-products of salmon processing

Sum up of the content: How can the by-products of salmon processing be recycled?

After an initial collaboration, Upcyclink and Saumextra launched the Saumup project, winner in the innovation category of the European B Resilient call for projects, initiated by several clusters including Valorial.

Click on the link to know more about it:

https://www.pole-valorial.fr/voy_content/uploads/2024/03/article-saumup-pour-skills-hub.pdf

9.2 Macroalgae valorisation innovation

Sum up of the content: During the production of its premium food products, Algolesko generates 30% of non-recovered byproducts. The valorisation of this biomass is important in the current context of scarcity of resources and reach zero waste goal and circular concepts. Algolesko and Ivamer launched the ALGOVALO, winner in the innovation category of the European B Resilient call for projects, initiated by several clusters including Valorial.

Click on the link to know more about it:

https://www.pole-valorial.fr/en/innoviaa/success_stories/algovalo-an-innovative-project- to-extract-value-from-macro-algae/

9.3 Fungi-based By-products revalorization with real time monitoring

Sum up of the content: The FBRM project aims to develop large batches of sustainable and nutritious fungi-based burgers employing food industry by- products as a substrate, while ensuring accurate and timely assessment of their texture, protein and nutrient content thanks to a photonic based solution for real-time monitoring of the production.

Click on the link to know more about it: https://www.clusterfoodmasi.es/wp-content/uploads/2024/06/FBRM_Innomy.pdf

9.4 Innovative Bakery Products: Harnessing Upcycled Ingredients for a Sustainable Future

Sum up of the content: The Sustainable Ingredients for Innovative Products (SIIP) project is an innovation initiative aimed at revolutionizing the agri-food industry. Supported by a lump sum grant of €54,000, SIIP is poised to drive significant advancements in sustainable ingredient sourcing and product innovation. Through strategic collaborations and pioneering research, SIIP seeks to catalyze the development of novel food products with enhanced nutritional profiles and reduced environmental impact.

Click on the link to know more about it: https://agrifood.clust-er.it/innovazione-nei-soci-del-clust-er-agroalimentare-packtin-finanziato-da-b-resilient/

9.5 Terremo'logic

Sum up of the content: In Morbihan, France, Terremo'logic specializes in the recovery of by-products from egg breaking plants, and is the French leader in eggshell recovery. Thanks to an innovative and unique process, eggshells are hygienized and stripped of their membranes. They are then used as a lime substitute by local farmers. This represents 6,000 tonnes of eggshells a year!

Click on the link to know more about it:

https://www.pole-valorial.fr/focus_adherent/terremologic/

9.6 Unlocking the Potential of Phytate in Winemaking: The Wi-Phy Project

Sum up of the content: The Wi-Phy project , conceived by VINIDEA srl and awarded with a lump sum of €53,800 as part of the B-Resilient Innovation Project, aims to revolutionize winemaking practices by unleashing the potential of phytates , a natural compound found in grape seeds . The antioxidant and antimicrobial properties of phytates are still underexploited in the wine industry. Wi-Phy seeks to fill this gap by developing innovative extraction methods and integrating phytate into winemaking processes. Phytate, known for its antioxidant properties, is currently underutilized despite its potential benefits for wine production. The overall goal of the project is to develop innovative methods for the extraction and application of phytates within the wine value chain.

Click on the link to know more about it:

https://agrifood.clust-er.it/innovazione-nei-soci-del-clust-er-agroalimentare-vinidea-finanziato-da-b-resilient/

9.7 Upscaling the recycling process of spoiled grains in gourmet

mushrooms substrates production.

Sum up of the content: The aim of our project is to improve the process of recycling spoiled grains in the production of gourmet mushroom substrates.

After a few years in business, Eclo SRL launched a new plant in 2024 with the aim of becoming a leader in the production of mushroom substrates using co-products from other industries. To help them in their mission, they received support from the European BResilient call (innovation category).

Click on the link to know more about it:

https://www.wagralim.be/en/nos-projets-innovation/upscaling-the-recycling-process-of-spoiled-grains-in-gourmet-mushrooms-substrates-production/

9.8 Harnessing the potential of apple pomace (AP)

Sum up of the content: The project aims to reduce waste by repurposing apple pomace (AP) from traditional disposal into sustainable products like apple flour and edible items. By upcycling AP, it adds economic value and reduces environmental impact. Through nutritional innovation, AP flour is enriched with carbohydrates, pectin, and minerals to create nutrient-dense edible products. Additionally, a range of items (e.g., spoons, cups, cones) at various Technology Readiness Levels broadens market access, enhancing adoption potential and minimizing risk. Collaboration and knowledge-sharing among stakeholders are also critical, as the project's collaborative approach draws on expertise in apple juice production, processing technology, and product development to drive sustainable innovation and address complex environmental challenges.

Click on the link to know more about it:

https://www.wagralim.be/en/nos-projets-innovation/harnessing-the-potential-of-apple-pomace-ap/

9.9 Valowasteagri: recovering by-products from egg breakers to develop a new agricultural product

Sum up of the content: This project will use waste from the egg breaking industry (at the end of the food chain) to develop a biostimulant for the agricultural market.

Click on the link to know more about it: https://www.pole-valorial.fr/ressource/valowasteagri-valoriser-les-sous-produits-des-casseuses-doeufs-pour-le-developpement-dun-nouveau-produit-agricole/

9.10 BOKARIANE: A business continuity plan to secure the production of a bokashi-inspired sourdough from food by-products

Sum up of the content: The Bokariane project, led by ATELIER DU FUIT, received a EUR 17000 funding in the framework of the B-Resilient Acceleration scheme, to develop a Business Continuty Plan for securing the business model of its new bokashi-inspired sourdough product from food by-products.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/03/Laureates-article-for-the-Skills-Hub_ADF_BOKARIANE_FV.pdf

9.11 Upcycling with yeasts: meet NovelYeast

Sum up of the content: NovelYeast bv is a spin-off from the previous research group of Em. Prof. Johan Thevelein at the VIB/KU Leuven. With this company, Johan aims to use his extensive knowledge and technical know-how on yeast research and its many industrial applications to develop superior industrial yeast strains and their commercial implementation.

Click on the link to know about it: https://www.flandersfood.com/en/succesverhaal/2025/upcycling-yeasts-meet-

novelyeast

9.12 Business Resilience Game for a fresh vegetables processing plant

Sum up of the content: AGRIVIVA S.N has been laureate of the Business Continuity Plan lump for the project « Business Resilience Game for a fresh vegetables processing plant »for an amount of 17 000 € in the context of B-Resilient support.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/03/Laureates-article-Template-for-the-Skills-Hub-Agriviva-S.N.-v241212.pdf

9.13 Sustainable animal feed from sweetcorn cobs: meet Trotec

Sum up of the content: Trotec, founded in Veurne (BE), was a pioneer in the circular economy back in 1986. The company's vision was based on a simple premise: how to help food companies solve their waste and by-products problems. Trotec's philosophy is that by-products are not waste, but a valuable raw material. As a true early innovator, Trotec developed 100% advanced technologies for the safe and efficient handling of by-products. Trotec stands for Total Recycling, Optimisation, Transparency, Ecology and Creativity and has now become the industry leader with a plant in Veurne (BE) and since 2016 also in Albon (FR).

Click on the link to know about it:
https://www.flandersfood.com/en/succesverhaal/2025/sustainable-animal-feed-sweetcorn-cobs-meet-trotec

9.14 Grape Seed Oil: A Sustainable Opportunity for Biomass: Valorisation in the Agri-Food Sector

Sum up of the content: Grape seed oil, a by-product of the winemaking industry, represents a promising example of biomass valorisation. Traditionally discarded, grape seeds have gained attention due to their valuable oil content, which has numerous applications in the food, cosmetic, and pharmaceutical industries. Within the framework of the B-Resilient project, which seeks to enhance the resilience of food-producing and processing SMEs through sustainable and digitalised value chains, the utilisation of grape seed oil aligns perfectly with the goals of the circular economy and sustainability.

Click on the link to know about it: https://www.clusterfoodmasi.es/wp-content/uploads/2025/03/Grape-Seed-Oil-article_Fi.pdf

9.15 Les Salines de Guérande: Extra-fine Sea salt overseas – Australia

Sum up of the content: Producing fine sea salt generates a co-product, called extra-fine salt. It represents about 20% of our fine salt production. This co-product creates a problem of space as it takes an increased amount of room in our factory and warehouses. The extra-fine salt cannot be stored too long as the finer the salt is, the more it will absorb humidity. Instead of discarding the product, we are looking for new applications targeted to customers in the bakery, snacking, flour mills, milk & cheese and cured meat industries that could use this co-product.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/05/B-Resilient-Laureate-Article-Les-salines-de-guerande.pdf

9.16 Creating a new category in the Vinegar Market in Canda through Archie range product

Sum up of the content: Sum up of the content: This project will allow Archie to penetrate the Canadian Market with ease and success thanks to one of the most innovative apple cider vinegar food chain production in France and based on a unique approach towards Sugar Spike Reduction process.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/06/INT-013_FR_Archie-Canada_Laureates-article-Template-for-the-Skills-Hub.pdf

9.17 Harnessing Whey: Transforming Dairy By-Products into

Nutritional Powerhouses

Sum up of the content: The dairy industry has long faced the challenge of managing by-products such as whey, a liquid residue generated during cheese production. Historically discarded as waste or relegated to low-value applications like animal feed, whey has now emerged as a nutritional powerhouse with immense potential. Its high protein content, rich amino acid profile, and functional properties make it a valuable ingredient in the food and dietary supplement industries. As Europe increasingly focuses on sustainability and the circular economy, the valorisation of whey into high-quality food and nutrition products is gaining momentum, reducing waste while meeting consumer demand for healthier and more sustainable protein sources.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/06/Dairy-Whey-article_Fi.pdf

9.18 Algolesko: International New Business In Japan

Sum up of the content: The cultivation of wakame in Japan has been decreasing from 174k to 50k tons over the past five years due to ageing of seaweed fishermen. Today, Japan imports a large proportion of their production (80%) and are constantly on the lookout for new, distinctive, high-quality products. The demand for wakame has been formed by imports from South Korea and China.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/06/INT-016_FR_ALGOZU-Japan_Laureates-article-for-Skills-Hub.pdf

9.19 Algolesko: International New Business In Japan

Sum up of the content: This project targets the commercialization of high quality fresh salted seaweed produced by Algolesko on the market in Singapore. The production techniques have been taught to Algolesko by Japanese partners. The product has a vibrant green colour which is considered a critical visual indicator of quality in Japan and Singapore. The Algoleskos' range of fresh salted seaweed is composed of 3 species: wakame, dulse and sea spaghetti. The identified prospects are primarily Michelin-starred restaurateurs who will be our future ambassadors in Asia.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/06/INT-018_FR_ALGAPORE-article-for-Skills-Hub-.pdf

9.20 Algolesko: Macroalgae valorisation innovation

Sum up of the content: During the production of its premium food products, Algolesko

generates 30% of non-recovered byproducts. The valorisation of this biomass is important in the current context of scarcity of resources and reach zero waste goal and circular concepts. Algolesko and Ivamer launched the ALGOVALO, winner in the innovation category of the European B Resilient call for projects, initiated by several clusters including Valorial.

Click on the link to know about it: https://i4ce.eu/wp-content/uploads/2025/06/INO-020_FR_ALGOVALO-article-for-Skills-Hub.pdf