



PROMOTING FOOD INNOVATION - THEMATIC ANALYSIS STUDY

The thematic analysis study has been compiled within the Interreg BSR programme funded project “Biobord open innovation platform connecting bioeconomy developers in BSR (Connected by Biobord), implemented by the consortium of the following partners:

- Vidzeme Planning Region (Vidzeme, Latvia)
- Krinova Incubator and Science Park (Skåne, Sweden)
- SEI Tallinn and Pärnu County Development Center (Estonia)
- JAMK University of Applied Sciences (Central Finland, Finland)

Findings and recommendations, proposed by the food industry stakeholders during the transnational events: Food hackathon A2.1.2 and Follow-up workshop 2.1.3, are gathered in the report.

The partners of the consortium have analysed the innovation process and made some significant conclusions to be considered in the future projects, aimed to promote innovation and technological development in the food industry.

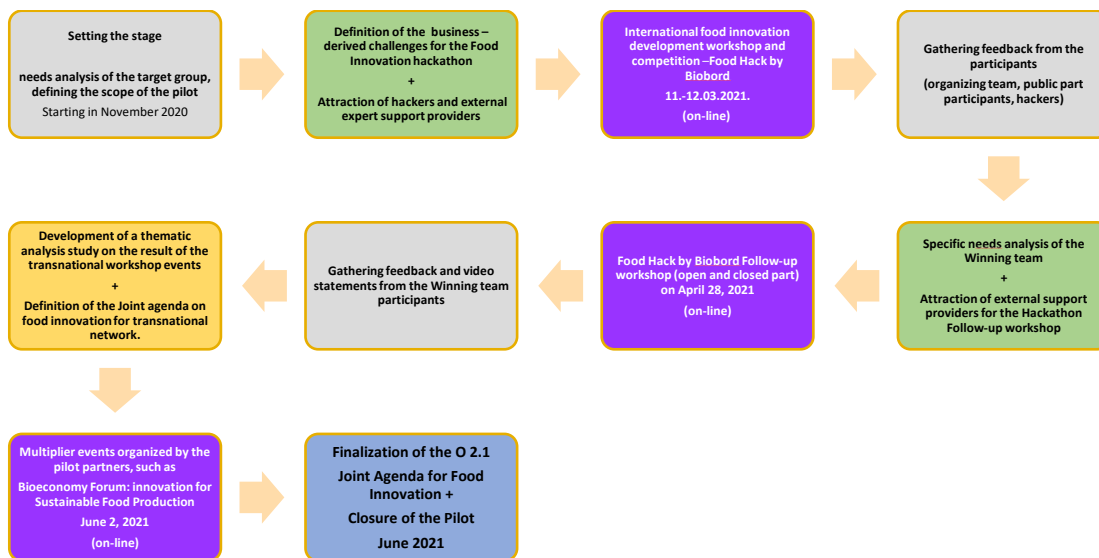
1. SUMMARY OF THE SCOPE AND ORGANISATION OF THE FOOD INNOVATION PILOT

Food Innovation Pilot (FIP) addressed the challenge targeting many Baltic Sea Region food processors. The food industry, especially small and medium enterprises (SMEs), are increasingly tackling with European and global society and food market demands for environmental, economic, and social sustainability, as well as fierce local and global competition.

Many food processors are trying to find niche for production of food or food ingredients from plant origin raw materials, as well obtain from plants ingredients for different food products and beverages. New protein sources, especially plant-based proteins, and new plant-based food products are on the agenda of many companies.

Innovative, economically justified technologies for extrusion of valuable compounds from plants and their introduction into new or known products, as well production of plant-based proteins can significantly support the enterprises in finding niche and strengthening their position in the market, as well would promote decrease of the negative climate effect of food production and introduce options for climate-friendly food consumption.

To search for solutions, the innovation process was organized a set of logical steps (please see the scheme below).



The key activities, directly engaging food enterprises, were:

- **Food hackathon**, organized on 11-12 March 2021, as a digital 24-hour long innovation competition with international teams of hackers representing a total of 14 SMEs from Latvia, Sweden, Finland, and Estonia.
- **A follow-up event**, organized on 28 April 2021, where participants got expertise and mentoring support from four internationally recognized food technology and innovation experts. The experts provided knowledge which would support companies in their development intentions.

2. FOOD PRODUCT AND MARKET DEVELOPMENT TRENDS – FINDINGS

2.1. Food products of plant-based proteins

There is growing demand around the world for plant-based food ingredients at food industry side and for plant-based food at consumer side. It can be justified by environmental and health aspects.

In the food product development plant-based protein sources often are used to produce foods that 'substitute meat' or 'are equal to meat', but such products often are heavily processed and contain many additives to make them more familiar or meat-like to consumers. It contradicts with changing perception and requirements of modern consumers regarding health aspects.

Another aspect - the view of plant-based proteins only as ingredient for substitution of meat is too limited. Plant-based protein products could be seen as a separate food category with their own interesting qualities and characteristics. This kind of products in line with processing also need market awareness raising measures.

Plant based proteins can be used for development of less processed foods (health aspect), and as alternative for imported ingredients, e.g., replace coconut oil, sugar, glucose syrup and invert sugar solution or similar (regional economy development aspect).

Currently the most know plant-based protein plants are legumes (especially beans and peas). Their production (growing) and protein processing had growing trend around Europe. Especially about organic protein, demanded in the markets around the world. The knowledge about other protein rich plants is limited.

2.2. Side streams and new raw materials for plant-based products and their materials production

Not only legumes (e.g., beans and peas) but also their processing side streams can and are used for the development of new food products. Besides mentioned raw material companies are interested also in processing food and/or ingredients out of other plants, e.g., brown pea (currently poorly accepted in the market), lupine, lentils, bran etc. Also, food processing side-streams, such as pea bark, potato pulp, beer malt etc. are at the attention of companies in search for new products, technologies, and application of these products not only in production of niche products, but also delivery of these products to the other food processors.

The main challenge is to find new application for these products (as new ingredient or the one replacing already known ingredient), and to raise awareness of processors, thus creating market for the offered products.

The main knowledge needs of companies are related to 1. Technologies for economically justified re-processing of the side streams, to develop side streams-based products which can replace other products, e.g., cereal, and their taste is acceptable by processors and consumers. 2. Evaluation of quality properties of various plant-based ingredients (produced from raw materials and from side streams) and identification of their application solutions (products, recipes).

2.3. AVAILABILITY OF PLANT BASED RAW MATERIAL

Another significant aspect is availability of raw material for plant-based protein and product production and availability of either raw material or product in volumes appropriate for production needs. When companies are small, they can easily produce or buy raw material or necessary volume, however at a certain development phase absence or limited volumes of raw material can affect production volumes and therefore create negative impact on further production growths and competitiveness. In the Baltic Sea Region countries agricultural land resources are limited and nearly fully used. It is raising a question - where to grow protein-rich plants if agricultural areas are used for growing other crops. This is an issue requiring reconsideration of agricultural policies and/or adopt appropriate policy implementation measures.

3. PRODUCT AND TECHNOLOGY DEVELOPMENT RELATED KNOWLEDGE NEEDS – RECOMMENDATIONS

The food processing enterprises, taking part in innovation project, raised a range of issues they need knowledge and competence to solve product and/or technological challenges. They are considered as recommendations for future innovation projects. They are as following:

- Development of plant-based products with appealing taste and texture (e.g., no sugar added, but sweet enough, no salt added, but salty enough etc.).
- Extrusion of bioactive compounds from plants and their application in different food products.
- Fermentation technologies for plant-based products.
- Novel technologies for food packaging, ensuring quality and extending shelf life of the products
- Approaches on how to create awareness on plant-based protein products as 'stand-alone products. How to promote, market these products?
- Availability of locally produced plants as raw material for production of plant-based proteins. Identification of other locally grown plants that could be new sources of protein.
- Possibilities to use new protein plant side streams – ways of application, economically justified production technologies.
- Economically feasible solutions needed for small and medium-sized production systems to create radical, dynamic and by the market accepted innovation.
- Regional, small scale testbeds would be developed to support enterprises in experimentation and testing of promising new products.
- Accessibility to research infrastructures.

4. MARKET RELATED KNOWLEDGE NEEDS - RECOMMENDATIONS

Application of plant-based proteins in food products and introduction of new plant-based products in the markets require new knowledge and sometimes combination of knowledge. It is quite difficult task for small and medium businesses, as a lot of research, experimentation and testing needs to be done to find mutually supportive ingredients in terms of taste, texture, nutrients, and appearance.

By market companies mean consumers, who are final consumers of food products and all intermediary stakeholders, who either create demand (by promoting specific products and their qualities) or respond to the demand of consumers (by delivery products).

About the market the companies need:

- Strategies and tactics to be used to identify modern consumers perception and requirements (taste, packaging etc.) and understand food waste reasons at consumers' side.
- Strategies to change food market and consumers' perception of plant-based proteins.
- Strategies to introduce niche products in Europe, other regions of the world (Asia, Middle East, North America, South America, etc).

5. INNOVATION PROJECT'S AND PROCESS ORGANISATION - RECOMMENDATIONS

Food enterprises are oriented to innovation and technological development which aims to promote business development what is primary goal of any enterprise. When they agree to take part in innovation incentives and projects, they expect either new knowledge, new contacts with other companies or researchers, which will support companies in achieving their development targets. The companies have recommended:

- Companies are interested in the best European and the world expertise, and they understand that these experts often are not available or financially affordable at a single company level.
- To consult with companies well in advance on specific thematic interests to be included in joint innovation measures, thus raising their awareness on proposed measures value and relevance and getting deep understanding on companies needs and information which will help to choose the most appropriate experts timely and to organise the innovation process in the most efficient way.
- Authorities, proposing innovation measures, should demonstrate well justified added value of the proposed measures, thus increasing interest and promoting engagement of enterprises.
- Maintaining of long-term relationship within projects is not interest and need for companies. It is suggested let them cooperate naturally, based on identified joint interests.
- Review and simplify format of the requests related to policy analysis and recommendations, to be provided by companies.

6. BIOBORD CONSORTIUM CONCLUSIONS

After review of the innovation process and feedback received from the involved food enterprises, the consortium has developed conclusions, to be considered in the future projects, aimed to encourage, and promote innovation in the food sector.

- The most significant strength of the Biobord network from the point of view of food industry stakeholders is a pool of experts, holding and developing knowledge appreciated by food processing enterprises and accessible to the Biobord network, not at the single company level.
- Business sector is ready to cooperate within projects, however investment (time, company knowledge and experience) and benefits (knowledge obtained, information, contacts) should be clear and balanced.
- Focusing on the whole sustainable food chain is too broad topic for innovation projects aimed to support regional food industry companies.
- To ensure active participation of companies in the project, the scope and thematic must be discussed well in advance and must be agreed with the targeted companies and/or industries.



- Innovation events aimed to food companies cannot be too general (even if the topic is at interest of companies, sometimes too general outlook does not bring added value) but should be precisely tailor made.
- The schemes developed to support companies in innovation and technological development should be simplified and demonstrate support to the real, achievable results (low-hanging fruits).
- Pilots are the way to get input for strategies and policies, however methods to get recommendations from companies should be reviewed and new approach should be shaped in a light way.
- There should be distinction between experienced companies and start-ups in the project (at least part of activities must be separated), as targets and perception of those two groups is hugely different.
- Future innovation projects should pay greater attention to the circularity (not purely on the bioeconomy). Issues such as food processing and consumption waste, and waste re-use must be addressed.