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MINISTRSTVO ZA IZOBRAŽEVANJE,
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Fakulteta za kemijo
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DROGA KOLINSKA

F4F functional food for the future



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NACIONALNI INŠTITUT ZA BIOLOGIJO



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Food for future - F4F

- Title of the programme: FOOD FOR FUTURE
- Acronym : F4F
- Relates to S4 priority area: Sustainable food production
- Start: 1.september 2016
- The project lasts for 4 years
- The total value of the registered programme is EUR 8,773,623.93,
- The co-financing amounts to EUR 5,992,204.91.
- The investment is co-financed by the European Union from the European Regional Development Fund and by the Republic of Slovenia





F4F consortium

- The whole programme is namely aimed at integrating skills among research organisations and food production companies and upgrading for marketing purposes on the domestic, European and global markets.
- Partners:
 - Industrial partners - 8 of the largest and most innovative Slovenian food processing companies, which are present on the Slovenian, European and global markets
 - 8 top Slovenian development and research institutions



F4F - industrial partners (1)

■ Žito d.o.o. – the leading partner



- Žito is the largest producer of bakery, confectionery and milling products and one of the largest food companies in Slovenia
- Portfolio consists of a number of brands that are recognizable in the entire region: Žito (flour and bakery products), Zlato polje (rice, pasta, grain products), Maestro (spices), 1001 cvet (teas), Natura (organic products), Gorenjka (chocolate) and Šumi (sweets)

■ Frutarom Etol .d.o.o.



- Company Frutarom Etol d.o.o. is the largest manufacturer of flavours and etheric oils in SE Europe. Frutarom Etol d.o.o. is a global company, since it generates 75% of its sales in foreign markets, while it is an approved supplier of numerous food multi-national corporations, such as Danone, Kraft, Mars and Nestle.



F4F - industrial partners (2)

■ Mlekarna Celeia d.o.o.



- The biggest Slovenian dairy, majority-owned by cooperatives. They are first dairy in Slovenia that obtained the "GMO-free" certificate. The company produces various fermented products, milk spreads, semi-hard cheeses and drinking milk. Their well known brand is Zelene Doline (Green Valleys).

■ Droga Kolinska d.d.



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- Droga Kolinska is the largest and most successful producer of coffee, savoury spreads and natural mineral water (Donat Mg) in Slovenia and in the whole of the south-eastern Europe region. The Argeta, Bebi, Barcaffè, Cockta and Donat MG brands are market leaders in the Slovenian market and in the markets of south-eastern Europe



F4F - industrial partners (3)

■ .Medex d.o.o.



- one of the leading companies in Europe in the field of processing and sales of products from bee hive products. They produce food supplements also for world renown pharmaceutical companies, which shows their dedication to high quality standards.

■ Valens Int. d.o.o.



- One of the most innovative companies in the field of food supplements and functional ingredients. We have earned their reputation by developing a special water-soluble formulation of coenzyme Q10 and Valechol – barley beta-glucans, which are proven to lower cholesterol levels in the blood and prevent cardiovascular diseases. For this product they received a positive scientific opinion from the EFSA in relationship to substantiation of a new health claim,

■ Amba Co. d.o.o.



- The biggest manufacturer of flexible multilayer printed packaging in Slovenia



F4F research organizations (1)

Participates 8 top Slovenian development and research institutions

■ The Jožef Stefan institut



- The Jožef Stefan Institute (IJS) is the largest research institute in Slovenia. It covers many varied fields of research in the natural and technical sciences, from biology to physics. The Institute will collaborate on three research topics and the research will take place in four departments: Department of Environmental Sciences, Department of surface engineering, Department of Knowledge Technologies and Department of Intelligent Systems .

■ The University of Ljubljana, Biotechnical faculty



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- Biotechnical Faculty, University of Ljubljana (UL BF) is a leading national higher education and research institution in the field of applied life sciences. Departments which will collaborate in this studies: Department of Animal Science and Department of Food Science and Technology (Chair of Biochemistry and Food Chemistry, Chair of Biotechnology, Microbiology and Food Safety, Chair of meat technology and food assessment, Chair of Technology, Nutrition and Wine and Chair of Microbiology)



F4F research organizations (2)

- **The University Of Maribor, Faculty of Mechanical Engineering**
- an educational and research institution, participates in numerous national, international and industrial projects.
- **The University Of Maribor, Faculty of Chemistry and Chemical Engineering - The Institute of Engineering Materials and Design**



Fakulteta za strojništvo



Fakulteta za kemijo
in kemijsko tehnologijo

- It is a leading, recognizable and respectable institute in the field of engineering materials, textile, clothing and design and as well as environmental protection in Slovenia, in Europe and world-wide.

- **The National Institute of Biology**



- NIB is a leading Slovenian research institution for the biology and microbiology fields. With modern high-technological equipment NIB is the only laboratory in Slovenia that can execute complex molecular studies and absolute quantification of nucleic acids



F4F research organizations (3)

■ The National Institute of Chemistry



Kemijski inštitut
Ljubljana
Slovenija

- A leading Slovenian research institution in the field of chemistry and related disciplines.

■ The Agricultural Institute of Slovenia.



Kmetijski inštitut Slovenije

- The largest agricultural research institute in the country, ranks among the five largest research institutes in the country

■ VIST – Higher School of Applied Sciences



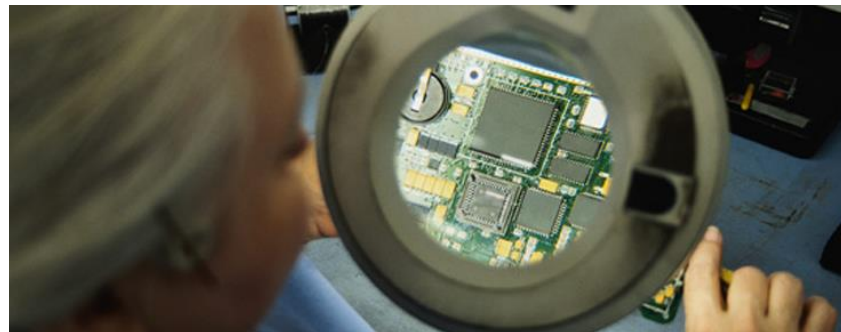
- The only institution in Slovenia and neighbouring countries that specializes in in vivo (clinical/biometric) studies on the impact of nutrition, dietary supplements, cosmetics and apparatus on the condition and function of the skin and body appearance.

The key S4 target is *raising the value added per employee*

- Overall S4 implementation performance (by 2023) will result in (measurable objectives):
 - **increased share of high-tech intensive products in export** - increase from 22.3% to EU-15 average of 26.5%
 - **increased share of export of knowledge-intensive services in total export** - increase from 21.4% to 33% which will reduce Slovenia's below-EU-average rate by a half
 - **increased overall entrepreneurial activity** - increase from the current 11% to at least the EU average of 12.8%



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S4 PRIORITY AREAS

■ HEALTHY WORKING AND LIVING ENVIRONMENT

- Smart cities and communities
- Smart buildings and homes, including wood chain

■ NATURAL AND TRADITIONAL RESOURCES FOR THE FUTURE

- Networks for the transition to circular economy
- Sustainable food production
- Sustainable tourism

■ (S)INDUSTRY 4.0

- Factories of the Future (FoF)
- Health – medicine
- Mobility
- Development of materials as end products



Sustainable food production - objectives

- To promote sustainable production of high-quality food
 - The development of a business model that will integrate knowledge institutions with manufacturers and economic entities along the entire value chain,
 - The development of new marketing models in domestic, European and global markets

- Establishment of an innovative and short supply chains for locally and organically produced foods with traceability from the field to the table

- To ensure long-term sustainable conditions for the development of the varieties and farming practices adapted to Slovenian territory and to climate change



Sustainable food production - focus areas and technologies

- Sustainable production and processing of food products into functional foods
- Technologies for sustainable agricultural production (livestock and plants)





The basic objective of the Food for Future (F4F) Programme

- To increase the competitiveness of Slovenian food processing industry through the development of new products with increased added value
- To integrate skills among RO's and companies and upgrading for marketing purposes on the domestic, European and global markets.
- To integrate interdisciplinary knowledge and experience, which ensures quality work and the achievement of target results



How F4F relates to S4

- The F4F programme promotes sustainable food production of premium quality business model that integrates knowledge institutions and producers along the entire value chain.
- The programme F4F provides establishment of innovative, short supply chains for locally produced foods
- Provides foods with a guaranteed and recognised traceability from the field to the table
- Provides establishment long-term sustainable conditions for the development of the Slovenian territory and varieties and agricultural practices, adapted to climate change
- The project will promote local supply chains
- The programme will also contribute to achieving the objective of raising the value added per employee in enterprises by 20% by 2023





F4F and S4 (sustainable food production priority)

F4F focus areas are:

- Sustainable production and processing of food products into functional foods
 - The identification and subsequent use of local varieties / raw materials.
 - Promote efficient use of waste materials for the purpose of obtaining functional ingredients)
 - The processing of food products into functional foods
- Technologies for sustainable crop and livestock production
 - Development and optimisation of new processes to achieve higher levels of functional ingredients



Functional food - working definition

- Functional food should have satisfactorily demonstrated beneficially affect on one or more target functions in the body beyond adequate nutritional effects in a way that is relevant to either an improved state of health and well-being or a reduction of disease risk (Ashwell 2002).
- In practice functional foods can be (Ashwell 2002):
 - Foods, in which a component has been enhanced (either through special growing conditions, breeding or biotechnological means; or with addition of food constituents),
 - Foods with a component has been reduced,
 - Foods with a component has been changed (i.e. to improve its bioavailability)
- Around 79% of Europeans are prepared to pay more for a product with a positive impact on health (Nielsen, 2015)
- One of the fastest growing markets in the field of foods





Improved diet is effective strategy to substantially reduce deaths and disease worldwide

Specific recommendations to the food industry include:

- Limiting the levels of saturated fats, trans-fatty acids, free sugars and salt in existing products;
- Development healthy and nutritious choices to consumers, introducing new products with better nutritional value; development of functional food
- To inform the consumers about healthy choices with respect to the nutritional value of foods – the role of evidence-based health claims



Claims on food

Claims on foods, regulated with (EU) 1924/2006				Claims not regulated by (EU) 1924/2006
Nutrition claims (NC)	Health claims (HC)			
	General function health claims	Claims ref. to children's health	Reduction of disease risk claims	
Claims stating, suggesting or implying that a food has particular beneficial nutritional properties.	Claims describing the role of a nutrient or other substance in growth, development and the functions of the body.	No further definition provided.	Claims that state, suggest or imply that the consumption of a food category, a food or one of its constituents significantly reduces a risk factor in the development of a human disease.	A number of claims which are not defined as NC/HC, for example: <i>technological claims, bioavailability claims, so called "beauty claims", ...</i>





F4F - TRL3-4 in TRL 5-6

TRL 3 – 4

RDP1

RDP2

RDP3

RDP4

RDP5

RDP6

RDP7

RDP8

RDP9

Food added value chains: cereals, meat, milk, fruits/vegetables, honey, food additives, intelligent packaging

TRL 5 - 6

RDP10

RDP11

WHO Recommendations:

1. Enriched foods
2. food products with decreased content of undesirable substances



F4F and functional foods - ambitions

. **Improving the nutritional composition of foods** while assuring optimal sensory properties - our research will be focused into development of new approaches, which will enable formulation of functional foods while assuring optimal sensory properties of the foods.



- **2. Improving composition of the foods to provide health benefits**
- The proposed project will provide further evidence about the relationship of the consumption of some functional foods, and health benefits, with ambition to provide evidence needed in the substantiation of new health claim. In RRP1 and RRP8 we will conduct a series of controlled human studies
- **3. Improvement of the quality, safety and stability of the foods**





F4F project results

- 40 innovations and patents: innovations will be recorded in the internal acts, Patent applications will be first submitted on national level, and later on on international level.
- Encouraged additional private investment in R&D
- 20 new technological, procedural and organizational solutions will be developed till the end of the project
- 15 groups of new products will be developed till the end of the project
- New capital expenditures (CAPEX) investments as a result of R&D investment