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# The Functional Food

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# The Functional Food

Food can be considered functional if it has been proven to have a beneficial effect on one or more body functions beyond its nutritional effect, such as improving health and well-being and/or reducing the risk of disease.

*(FUFOSE z 1999 r. - Functional Food Science in Europe)*



## Bioactive food ingredients – confirmed beneficial health properties:

- *dietary fiber*
- *oligosaccharides*
- *polyols - polyhydric alcohols*
- *amino acids, peptides, proteins*
- *polyunsaturated fatty acids*
- *vitamins*
- *minerals*
- *choline and lecithin*
- *lactic acid bacteria*
- *phytochemicals*



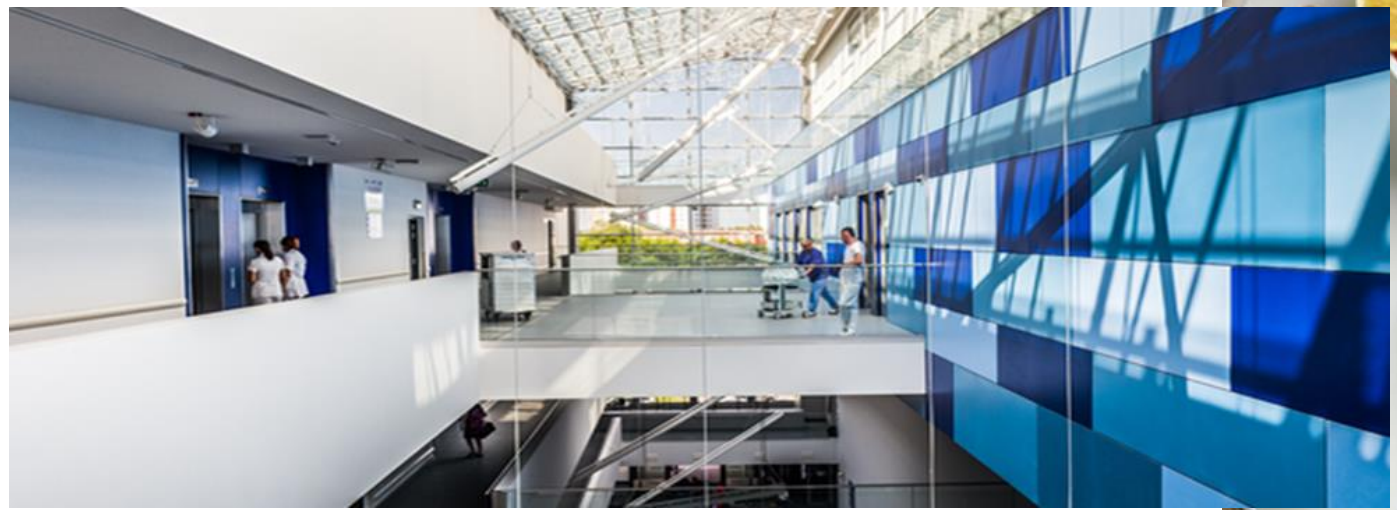




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# Trends in the development of functional foods:

- Designing new functional products with confirmed (also by clinical trials) properties;
- Conducting studies similar to clinical trials – **nutritional interventions** with the use of tested products;
- Cooperating with the food industry sector – joint **R&B projects**;
- Executing **implementation projects**.





## Examples of R&D projects carried out at the Department of Bromatology, MUB

Projects within the "Innovation Incubator 4.0" program:

1. Pre-implementation research "SNACKS FOR INSULIN-RESISTANT" - recipe development and selected qualitative and consumer research
2. Functional food for people with Hashimoto's disease

Project carried out in cooperation with an entrepreneur financed by National Center of Research and Development:

Development of recipes for full-value products replacing daily meals



# „SNACKS FOR INSULIN-RESISTANT”

## Project stages:

1.

Market review  
and conducting  
a consumer survey

2.

Selection  
of products  
with potentially  
the most beneficial  
properties  
(literature review)

3.

Development of recipes,  
conducting sensory analysis,  
qualitative research,  
consumer analysis,  
assessment of the impact of  
consumption on glycemia

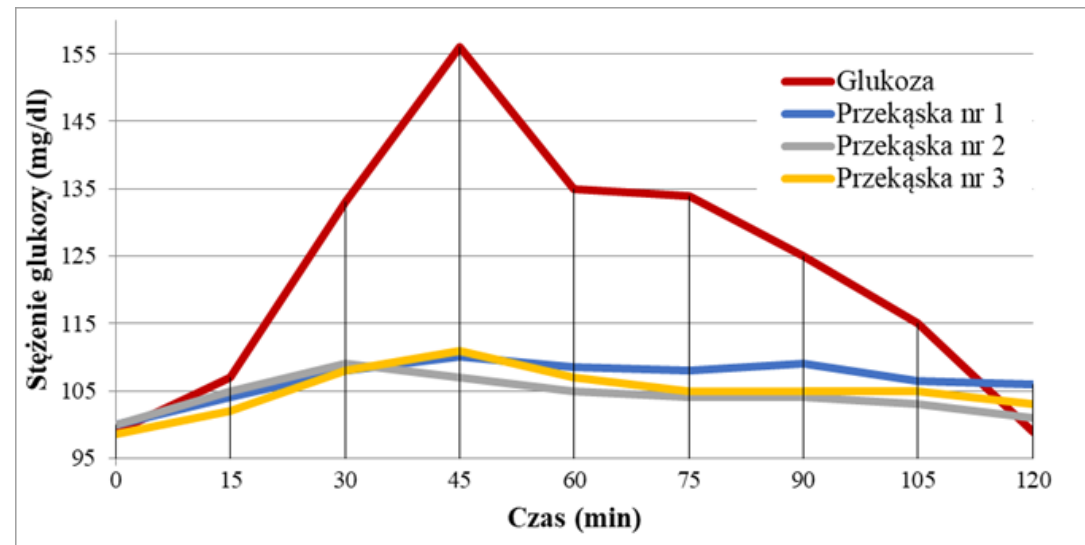
**GOAL:**  
snack for  
insulin-  
resistant  
people





**Table 1. Glycemic index and glycemic load of the developed snacks.**

	Grupa kontrolna		Grupa badana		Razem	
	Indeks glikemiczny	Ładunek glikemiczny	Indeks glikemiczny	Ładunek glikemiczny	Indeks glikemiczny	Ładunek glikemiczny
Przekąska nr 1	28	1,2	19	1,7	24	1,5
Przekąska nr 2	20	2,2	24	2,0	22	2,1
Przekąska nr 3	15	1,9	15	1,4	15	1,7



**Figure 1. The impact of consuming the developed snacks on glycemia levels.**

# ASSESSMENT OF THE NUTRITIONAL VALUE OF SELECTED CHOKEBERRY JUICES AND FIBRES AVAILABLE ON THE MARKET, INCLUDING THE DETERMINATION OF THE CONTENT OF BIOACTIVE SUBSTANCES AND CONTAMINANTS



- 25 types of 100% chokeberry juices from different producers (15 organic and 10 conventional)
- 5 types of chokeberry fibers from different producers
  - (3 organic and 2 conventional)

1. Determination of vitamin C content - HPLC method

2. Determination of selected mineral components (Zn, Se, Mg, Mn, Cu, Fe) and toxic elements (Pb, Cd, As) - AAS and ICP-MS methods

3. Determination of mercury content - AAS method with amalgamation technique

4. Evaluation of nitrate (V) and (III) content using Griess reagent I and II

5. Determination of total phenolic content- using the Folin-Ciocalteu reagent

6. Flavonoid content determination – according to Arvouet-Grand et al. with own modification

7. Evaluation of antioxidant potential using the FRAP method



## **ASSESSMENT OF THE IMPACT OF CONSUMPTION OF ARONIA JUICE AND ARONIA FIBER ON SELECTED METABOLIC PARAMETERS OF THE SUBJECTS**

**1. Sociodemographic analysis of study participants**

**2. Assessment of participants' nutrition**

**3. Assessment of the nutritional status of the study participants**

**4. Blood pressure measurement**

**102 study participants (30-65 years old)**

**study duration: 90 days;**

**consumption of 100 ml of chokeberry juice daily for 90 days, after 60 days adding chokeberry fiber in the amount of 10 g daily;**

**all determinations were performed 3 times: before starting the dietary intervention, after 60 days of chokeberry juice consumption, after 90 days - after a month of simultaneous consumption of chokeberry juice and fiber.**

**5. Assessment of the occurrence of metabolic disorders**

**6. Analysis of physical activity level-**

**7. Determination of plasma antioxidant potential of study participants.**

**8. Determination of the concentration of macroelements, microelements and toxic elements in the blood.**

**9. Sensory evaluation of juices and fiber on a 5-point scale.**

Article

# Consumption of Chokeberry Bio-Products Improves Specific Metabolic Parameters and Increases the Plasma Antioxidant Status

Ewa Olechno <sup>1</sup>, Anna Puścion-Jakubik <sup>2,\*</sup>, Katarzyna Socha <sup>2</sup>, Caterina Pipino <sup>3</sup>  
and Małgorzata Elżbieta Zujko <sup>1,\*</sup>

## 90-DAY INTERVENTION WITH CHOKEBERRY BIO-PRODUCTS

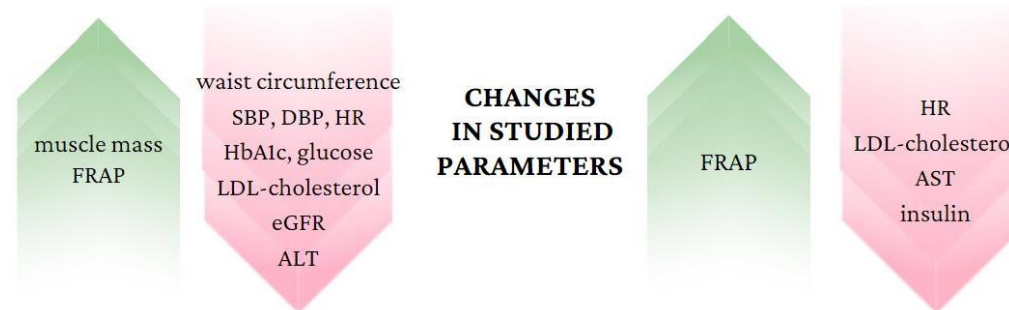
### STAGE 1 - 60 DAYS

chokeberry juice (100 mL/day)



### STAGE 2 - 30 DAYS

chokeberry juice + chokeberry fiber  
(100 mL/day) (10 g/day)



**Figure 2. Important changes in studied parameters during chokeberry intervention.**

## Sales of know-how for entrepreneurs:

- *Development of recipes for health bars for children*



- *Modification of the recipes of functional bars*





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performs a wide range of analyses based on DNA sequencing using Next Generation Sequencing (NGS) methods ...



### **Metabolomics and Proteomics Laboratory of the Clinical Research Centre at the MUB**

specialises in metabolomic and proteomic analyses used in medical research, e.g. on personalised medicine ...

### **Experimental Medicine Centre**

is one of the most modern experimental facilities in Europe that creates favorable conditions for the work of research teams ...



### **Academic Centre for Pathomorphological and Genetic-Molecular Diagnostics**

is one of the largest in the country and the largest in the north-eastern region comprehensive diagnostic centre ...





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**We invite you to cooperate!**

