



international  
student  
competition  
game



# Spelt wheat – perspective ingredient in cracker's technology

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# The main advantages of crackers



Sustainable quality during long term of storage

Low-calorie food

Universal food-to-go

Ability to replace bread in the extremal living conditions

# Spelt wheat characteristics

*Promotes healthy digestion*



*Affects blood sugar levels*



*Improves bone health and prevents osteoporosis*



*Stimulates and strengthens the immune system*



*Increases blood circulation and energy levels of the body*



*Protein does not cause allergic reaction, and gluten is less aggressive than one of the modern wheat*

*Helps reduce the level of bad cholesterol in the body*



*Helps to maintain hormonal balance in the body*



*Promotes the development and growth of new tissues, muscles and organs*



*Spelt has less reaction to soil depletion, so it can be grown without fertilizer*



# The use of spelt in flour products



Pasta



Extruded products



Bread



Tortilla



Low-moisture flour products





**PROBLEM**

- Growing consumer`s demand for food, enriched with nutrients;
- Low nutritional value of flour products;
- Ecological impact of food technology;
- Narrow assortment of pastry based on ancient varieties of wheat

**→ SOLVE**

- Using the potential of spelt wheat;
- Development of pastry based on spelt flour/spelt dispergated grain mass;
- Implementation of low-waste technologies

The main aim is to study the efficiency of spelt flour/spelt dispergated grain mass usage in the crackers technology.

## Objectives

- investigating the influence of the spelt flour/ grain mass on the intensity of the fermentation process of crackers semi-finished products;
- evaluating the quality of crackers based on ancient wheat (spelt wheat);
- determination of nutritional value for crackers based on spelt flour/ spelt dispergated grain mass.





**In  
the project,  
whole grain spelt  
flour and dispergated  
spelt grain mass were  
suggested to use for the  
cracker`s production.**





## Elaborated samples

**Crackers of  
wholegrain  
modern  
wheat flour  
- (MWF)**

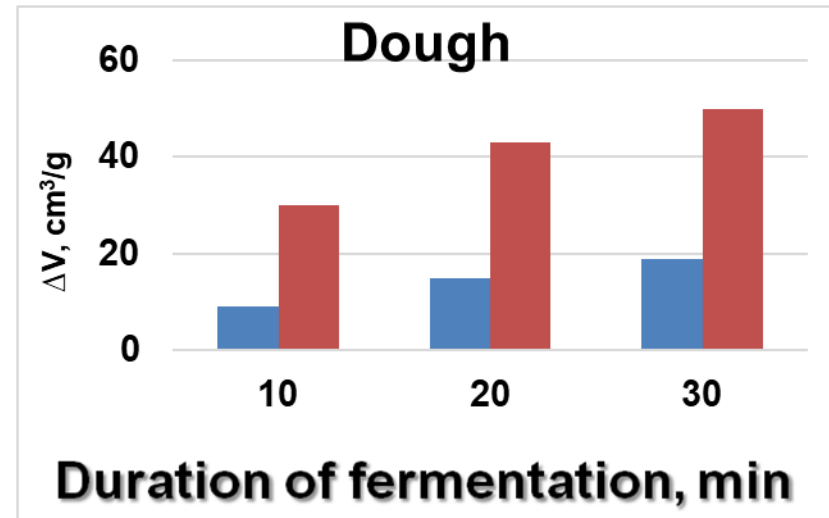
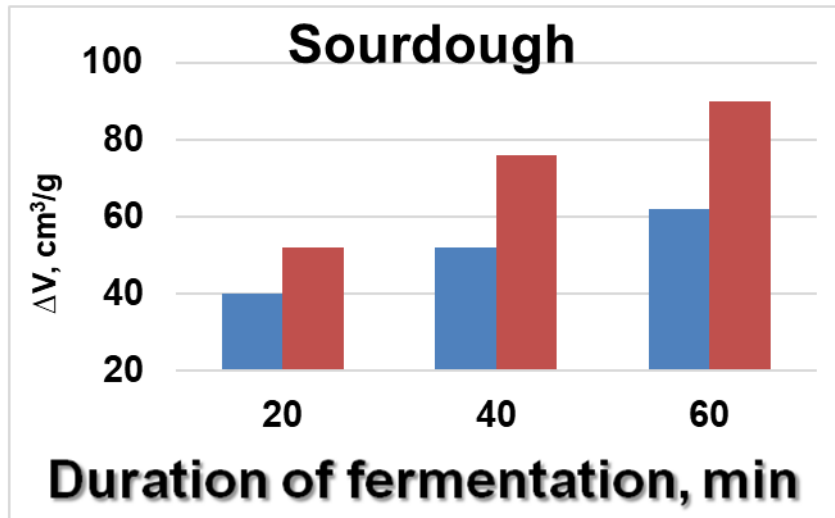
**Crackers of  
wholegrain  
spelt wheat  
flour  
- (SWF)**

## Technological parameters

Indicator	Sourdough	Dough
Moisture, %	55,0	36,0
Fermentation time, min	60	30

# Influence of whole grain spelt flour on the fermentation process of semi-finished products

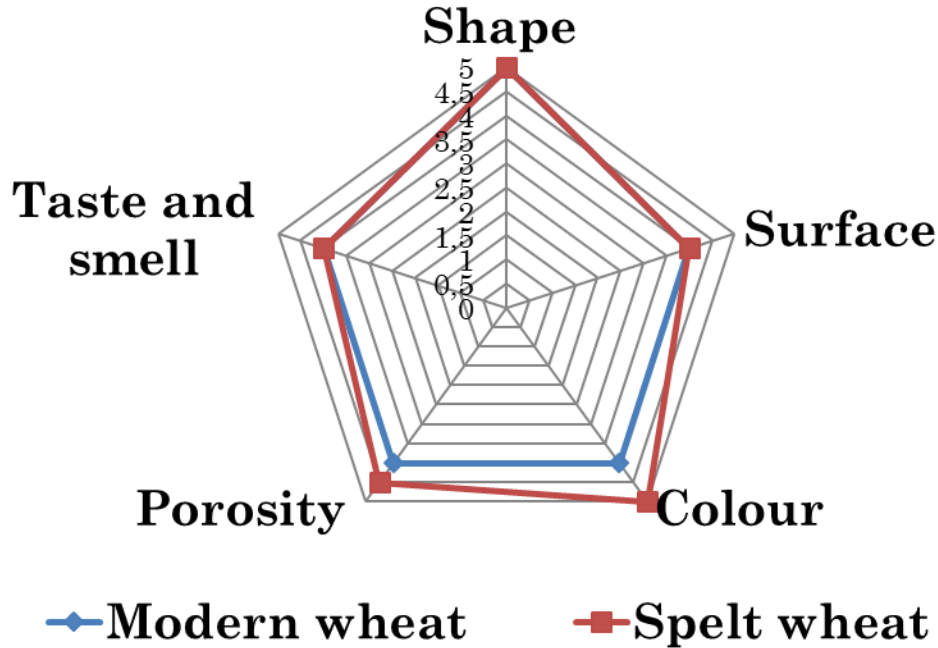
## The specific volume



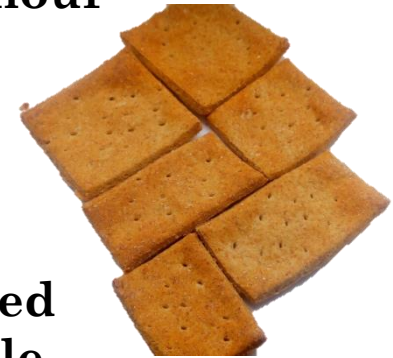
■ Modern wheat flour

■ Spelt wheat flour

# Crackers sensory evaluation



Crackers based on modern wheat flour



Crackers based on spelt whole wheat flour

# Nutritional and energy value of crackers based on whole grain spelt flour

**Protein**  
more than  
**19,5%**

**Vitamin B<sub>5</sub>**  
more than  
**83,6%**

**Mg**  
more than  
**21,7%**

**Fe**  
more than  
**27,8%**

**K**  
more than  
**22,9%**

**Vitamin PP**  
more than  
**32,6%**

**P**  
more than  
**4,8%**

**Carbohydrates**  
less by  
**3,1%**

# Evaluated samples

## Dispergated spelt grain mass (DSGM)

36 hours soaking (36 h)

48 hours soaking (48 h)

## Dispergated grain mass (DGM)

36 hours soaking (36 h)

48 hours soaking (48 h)



# Grain preparing process

Cleaning

Soaking

Dispergating/  
grinding



# Quality of crackers based on dispergated grain mass

(n = 5, P ≤ 0,05)

Indicator	DGM		DSGM	
	36 hours	48 hours	36 hours	48 hours
Moisture, %	14,1	14,3	14,0	14,2
Acidity, degree	0,8	1,0	0,8	1,2
Water absorption ability, %	180,3	168,8	184,7	170,1
Density, g/cm <sup>3</sup>	1,2	1,7	1,5	1,8
Hardness, *10 <sup>8</sup> J/kg <sup>2</sup>	9	8	8	8

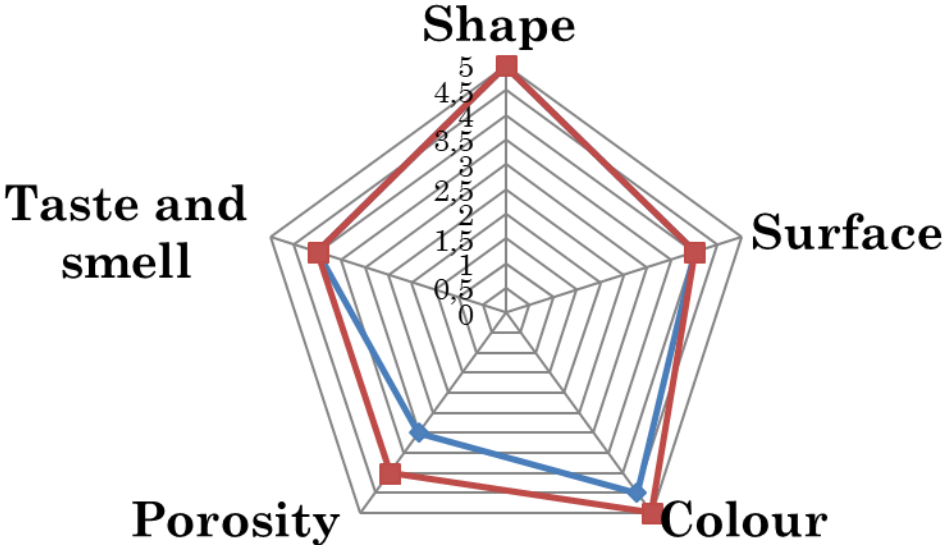
# Grain crackers sensory evaluation



Crackers based on dispergated grain mass of modern wheat



Crackers based on dispergated spelt grain mass



◆ Modern wheat varieties    ■ Spelt grain mass



# Nutritional and energy value of crackers based on dispergated spelt grain mass

**Protein  
more than  
23,4%**

**Na  
more than  
0,2%**

**Mg  
more than  
12%**

**Fe  
more than  
37,9%**

**Vitamin PP  
more than  
27,5%**

**K  
more than  
6,4%**

**P  
more than  
18%**

**Carbohydrates  
less by 4,1%**

# Benefits of the project

## Science & Technology

new types of crackers were developed on the base of ancient wheat varieties (spelt);

rational use of grain raw materials with high nutritional potential.

## Economic

developed technological solutions can be transferred to a wide range of confectionery and bakery small and medium enterprises;

the developed project does not require the use of additional equipment;

reduction of production costs as a result of non-waste technology implementation.

## Social

expanding the range of pastry products with high nutritional value;

reduction of waste in food technologies

Thank you  
for attention!!!