

DIETARY VALUE OF TRITICALE WHOLEGRAINS

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I IN BRIEF

- Assessment of nutrients – proteins and starch – in triticale wholegrains harvested in Latvia.
- Latvian scientists first reported of presence of luesin in triticale that could provide potential health benefits.
- Next – clinical studies – analysis of triticale wholegrains and sprouted triticale glicemic index and insulin index.



II AIM

Aim of the study was to assess the macronutrient content in different triticale varieties (genotypes - Dinaro, 9403-97, 9405-23, 9402-3) harvested in Latvia.

IV METHODS

1. Triticale grain samples

Conventional triticale grain varieties:

- Dinaro;
- 9403-97;
- 9405-23;
- 9403-2

harvested in State Priekuli Plant Breeding Institute (Latvia)



2. Detection of protein and starch content

Grains were grounded in laboratory mill obtaining fine whole grain flour.

A spectroscopic investigations with an *Infratec* model 1241 Grain Analyzer from Foss Tecator Abhas has been used for a measurement of protein and starch content in triticale grains. The instrument had an extended wavelength of 570-1100 nm. [3]



III INTRODUCTION

Triticale (*x Triticosecale* Wittmack) is a man-made cereal crop developed around 1870 that was derived from inter-specific crosses between rye (*Secale cereale* L.) and common wheat (*Triticum aestivum* L.) or durum (*Triticum turgidum* L.). [1]

The main goal in creating triticale was to produce a grain with many of the advantages of wheat for product development – with the ability of rye to thrive in adverse conditions. [2]

- Despite that triticale grains contain:
- 13-19% of proteins, with lower protein complex which forms gluten;
 - high in dietary fibres;
 - excellent source of manganese and a good source of magnesium and phosphorus;
 - very good source of folates and thiamin and other vitamins of B-group
- these grains are mainly used in livestock feeding and production of bioethanol.



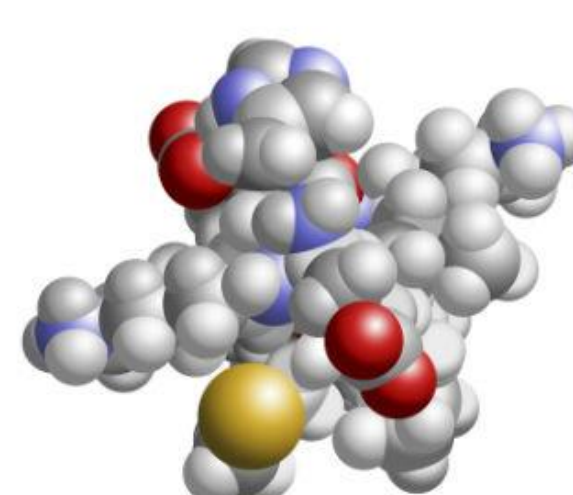
V RESULTS AND DISCUSSION

Characteristics of winter triticale varieties according to their nutritional traits, 2012, data from State Priekuli Plant Breeding Institute

Content of proteins and starch in different triticale varieties:

Genotype	Mean protein content, % <i>RS</i> _{0.05} =0.5	Mean starch content, % <i>RS</i> _{0.05} =0.8
Dinaro	9.7	69.0
9403-97	10.3	67.4
9405-23	11.0	67.6
9402-3	10.0	68.4

Scientific team from Latvia also detected a peptide luesin in Dinaro variety (mean content 3.109 ± 0.029 mg/g grain).



Lunasin is a 43-amino acid long peptide that has been previously isolated from soybean, barley, rye and wheat.

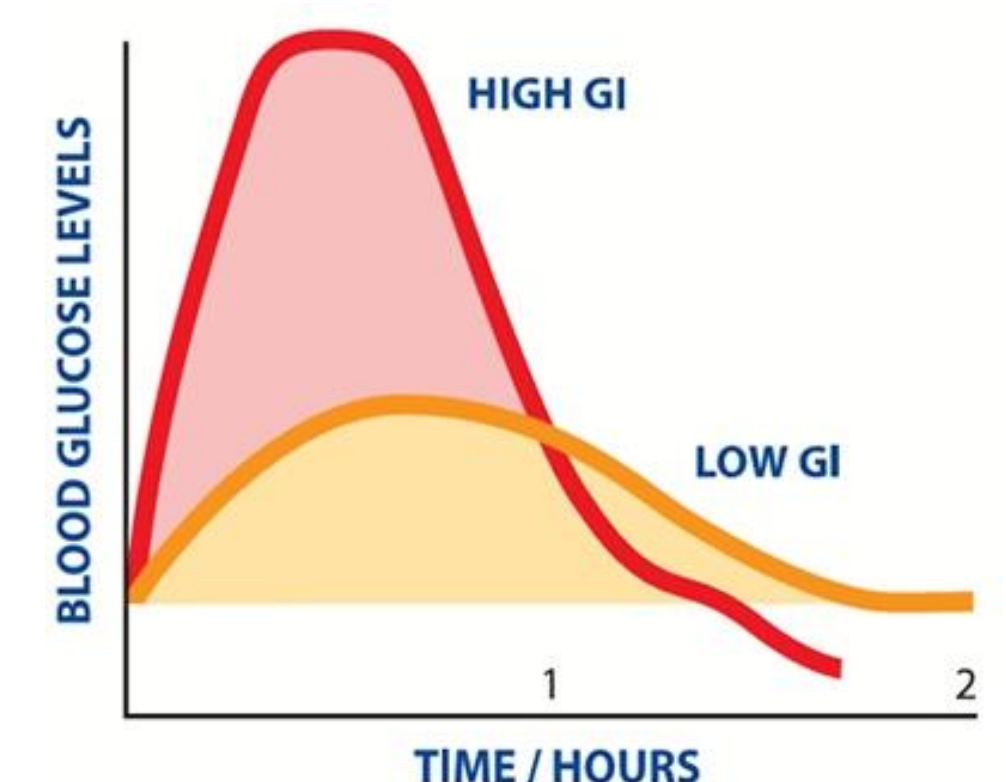
Lunasin has potential anti-antioxidant, anti-inflammatory and anti-cancer properties.

Conclusion and further scientific work

Triticale is an alternative wholegrain source for human diet and could potentially be a functional food due to luesin content.

Our next research study will be linked with the grain effect in human body – we will determine glicemic and insulin index after triticale wholegrain and sprouted triticale wholegrain meal, as well for oats, hull-less oats, wholegrain barley, hull-less barley, rye and their sprouted meals.

- Serial experiment,
- 4-6 weeks long,
- 2 test groups,
- 15 persons per each



Content of amino acids in winter triticale varieties

Genotype	Lysine, % <i>RS</i> _{0.05} =0.01	Threonine, % <i>RS</i> _{0.05} =0.02	Arginine, % <i>RS</i> _{0.05} =0.03	Leucine, % <i>RS</i> _{0.05} =0.04	Isoleucine, % <i>RS</i> _{0.05} =0.02	Valine, % <i>RS</i> _{0.05} =0.02	Tryptophan, % <i>RS</i> _{0.05} =0.01	Proline, % <i>RS</i> _{0.05} =0.07	Histidine, % <i>RS</i> _{0.05} =0.02
Dinaro	0.36	0.33	0.54	0.70	0.37	0.48	0.11	0.96	0.25
9403-97	0.37	0.35	0.57	0.74	0.31	0.51	0.12	1.04	0.27
9405-23	0.38	0.36	0.59	0.76	0.39	0.52	0.12	1.07	0.28
9402-3	0.37	0.34	0.55	0.71	0.37	0.49	0.11	0.99	0.26



Standart glucose solution



Samples of flakes

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References

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 [2] wholegrainscouncil.org
 [3] Kalnina S, et al. 2013 Investigation in physically chemical parameters of in Latvia harvested conventional and organic triticale grains. *Int J Biol Biomol Agric Food Biotech Eng* 7: 581-585.



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