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Mitigation of acrylamide content in French fries by using some enzymatic treatments

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Although the presence of acrylamide in foods was detected a decade ago, public concern about this issue, and in general about food health, seems to have increased in recent years. Acrylamide is a toxic human carcinogen present mainly in foods from plant origin and subjected to transformation processes in which temperatures above 120°C are reached, such as frying and baking. Foods that mostly contribute to the intake of acrylamide are: French fries and chips, coffee and coffee substitute, biscuits, bread, pastries, battered and breaded products, breakfast cereals, being children and adolescents the most exposed population. From a chemical point of view, acrylamide

is formed mainly from the reaction, during thermal processing, between asparagine and reducing sugars, as an intermediate product of the Maillard reaction. In the last decade, both health authorities and the scientific community have made great efforts in scientifically establishing limits of toxicity as well as exploring strategies aimed at reducing acrylamide formation. **The purpose** of this paper is framed in this last sense. On the one hand, our work has been focused on using new strategies for acrylamide mitigation, in French fries. The effect of an enzymatic treatment technique, named l-asparaginase, and glucose oxidase, as well as their mixed treatments were studied. In the case of French fries however, the strategy consisted in modifying their composition by adding enzymes, after having tested its potential in model systems.

Keywords: *functional foods, l-asparaginase, glucose oxidase, Acrylamide, French fries.*

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'Vik 2020': a new industrial hemp variety with a high content of cannabigerol

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Purpose. To create an industrial hemp variety of the Central European ecological and geographical type with a high content cannabigerol and universal application. **Methods.** Breeding (self-pollination, creation of artificial populations, selection), field, biochemical (thin-layer and gas-liquid chromatography of cannabinoid compounds), instrumental and technological assessment of fibre quality, and statistical methods. **Results.** Variety 'Vik 2020' was obtained as a result of creation of artificial populations. The plants are characterized by higher content of cannabigerol ($1.034 \pm 0.0323\%$), and

almost zero of other secondary metabolites, such as cannabidiol, cannabidiol, cannabichromene and psychotropic tetrahydrocannabinol (0.003 ± 0.0011 , 0.018 ± 0.0080 , 0.012 ± 0.0027 , and $0.005 \pm 0.0012\%$, respectively). The trait of cannabigerol content is quite stable within the population and is not correlated with the trait of tetrahydrocannabinol content ($r = -0.23$). According to the results of the competitive variety test, when growing to obtain fibre and seeds, the variety features short height, specifically significantly lower total (206.4 cm) and technical stem length (135.6 cm) compared to the standard variety, significantly higher inflorescence length (70.8 cm), which determine the formation of the significant yield of biomass suitable for pharmaceutical use and high seed yield (0.98 t/ha). The yield of total fibre was the same as in the standard variety (29.0%), but its quality and technological value for primary processing were higher. The vegetation period to the biological maturity

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stage (BBCH 89) made up 116 days. **Conclusions.** 'Vik 2020' is a new variety of industrial hemp with a high content of cannabigerol (a non-psychoactive component of cannabinoids that has a number of medicinal properties). It is characterized by almost zero content of tetrahydrocannabinol, increased inflorescence size, high seed yield, improved fibre quality characteristics, homogeneous sex structure,

resistance to abiotic and biotic environmental factors. The variety is recommended for growing in order to obtain seeds, fibre, and, potentially, cannabigerol (given the respective changes in Ukrainian regulation).

Keywords: *hemp; cultivar; breeding; self-pollination; cannabigerol; tetrahydrocannabinol; correlation; productivity.*

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Humus effect on Agriculture Tile Drainage

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Purpose. Soil moisture is very important for plant productivity, as well amount of fertilize depends on the soil moisture. Drainage is the tool for productive farming in the wet fields, but drainage accelerates leaching biogenous from the soil, so, it is very important the right management of drainage discharge. Drainage discharge depends not only of the temperature, precipitation, but also of the amount of humus in the soil. **Methods.** Field experiments, data comparison, generalization and

evaluation by statistical analyses. **Results.** The results of daily temperature, precipitation and drainage discharge in the object with different hummus thickness layers (bold - up to 40-50 cm - thick and natural – 20-30 cm - layer) on 2018-2020 are presented. The weather was drought (about 15% less as Climatic Normals), and hot (the temperature was about 1,8°C above Climatic Normals) the last 3 years in the Kaunas, Lithuania. The drainage system was working quite short period of investigation time, mainly during winter and early spring only. **Conclusions.** In case of thickened humus layer annual drainage discharge was higher compare with drainage discharge with natural humus layer.

Keywords: *drainage discharge, humus layer, soil moisture.*

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Seeding Density Influence on Grain Yield and Agro-Physiological Parameters of Bread Wheat Genotypes under Rainfed Condition

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Purpose. Planting density is an important factor that influences the yield and yield component of bread wheat (*Triticum aestivum* L.) genotypes. The objective of this study was to determine the influence of the seeding rate on the grain yield and yield component of winter wheat genotypes. **Methods.** In the experiment, a total of 8 genotypes and three seeding density (400, 500 and 600 seed per square meter) were evaluated during the 2015-2016 and 2016-2017 growing season. The experiment was conducted in the randomized completely blocks design in the split block with three replications. Grain yield, number of spike per square meter, number of kernel and spikelet per spike, peduncle length,

spike length, flag leaf area, and normalized difference vegetative index (NDVI) were investigated. **Results.** Analysis of the variance showed that there were significant differences between years, among genotypes and their interaction. Genotype G6 had a higher grain yield (7730 kg ha⁻¹), and G1 the lowest yield (4994 kg ha⁻¹). Genotype G2 had a higher spikelet number per spike (19.28), G4 kernel number per spike (44.78), G3 spike number per square meter (592.9), and G1 had a higher flag leaf area (26.20 cm²) and NDVI. The data showed that the seeding density differed non-significantly for the grain yield. The use of 500 seeds per square meter produced a higher grain yield of 6280 kg ha⁻¹ than other seeding density used. The use of 400 seed per square meter produced higher peduncle length (31.04 cm) and spike length (8.94 cm). In the case of seeding rates, the maximum spikelet

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