Possibilities of use and quality parameters of beaver canned meat (*Castor fiber* L.)

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The aim of this study was to determine the sensory properties of canned beaver meat. The study also included determination of chemical composition and instrumental colour measurement of the canned meat. Two samples with different amounts of beaver meat were made (36%, 51% of beaver meat) and compared with samples which contain the beef meat instead of beaver meat (36%, 51% beef meat) other ingredients in the recipe was pork meat, boiled pork skin, salt, and spices. There were not considerable differences in chemical composition between products ($p > 0.05$). Instrumental colour measurement displayed that samples with beaver meat were significantly lighter than those with beef meat ($p < 0.05$). Sensory analysis did not prove significant differences between individual samples, but preferential test showed that the sample with 36% of beaver meat was rated the best. The study confirm that beaver meat can be used in canned meat and offer a fine quality product. There is not enormous difference between the product properties if you replace beef meat with beaver meat. The beaver meat can be used in heat treated meat products and enhance the meat product market.

Keywords: **beaver, game, canned meat, colour, sensory analysis**

Quality of malt made from current and historical malting barley varieties

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Breeding changed quality of malting barley. Historical barley varieties and malt made from them have not been sufficiently researched. The aim of this study was to measure the parameters related to cytolytic (friability, β–glucans in wort), proteolytic (relative extract at 45 °C, Kolbach Index) and amylolytic modification of grain (final attenuation, diastatic power, malt extract). The historical varieties showed lower values of friability, relative extract, Kolbach Index, diastatic power, and malt extract and they contained more nitrogenous substances compared to the current varieties. Based on the values of malt parameters, the Malting Quality Index was determined: for the Chlumecky variety–1; Stupicky starocesky–2; Bojos–3; Sebastian–3.

Keywords: **barley, malt, malting quality index, historical varieties of barley, barley grain modification**

Use of leftover bread for beer production

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This research is aimed at the sustainable use of bakery leftovers with the help of beer production technology, thus preventing an increase in the number of unused bakery products by returning them to commodity circulation by introducing the postulate of the circular economy. Conducting research includes two investigations: First, brewing beer by partly using a malt substitute (bakery leftovers); and second, condition optimisation of brewing beer with bread. In the first part of our research, we were challenged by sensorial problems (weak saturation and fullness; undesirable taste) that was connected to the chemical composition of the final beer and the chemical composition of the bread that was used for the beer production, respectively. We changed some conditions in the different stages of brewing (we added glucose, α-amylase, used double and triple decoction, applied higher and lower temperatures during fermentation and boiled for a longer period). To conclude, the best option for brewing beer with bread is to boil for a longer period (65 °C for 60 min and 75 °C for 60 min), which will help extract more elements from bread and malt. The best first fermentation temperature to achieve the most fullness and saturation is 4 °C. Two samples were contaminated by *Leuconostoc mesenteroides*, which caused a viscous taste and a bad evaluation in the total rating. To prevent an undesirable taste, the brewer must prevent contamination of the beer during all stages of brewing, especially during fermentation, and must know the composition of the bread being used.

Keywords: **beer production, bakery leftovers, food waste**

Quality of beer made from bakery leftovers

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The project solved the issue of beer production using bakery leftovers. A regular pastry was prepared in the recipe with a different amount of fat. Breadcrumbs were then made from the prepared dried pastry. Microsamples of beer from water, hops, brewer's yeast and malt were produced. Partial replacement of barley malt was carried out using bakery leftovers in different proportions (up to 0%, 10%, 20%, 30%). The colour of individual laboratory samples was determined on a Konica Minolta CM 3500d device and the basic parameters of beer were determined on a FermentoFlash device.

Keywords: **beer, bakery leftovers, malt, quality of beer, colour**

Reduction of weight loss after defrosting of meat using a gelatin-based coating

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Freezing is one of the methods to extend the storage time of meat. However, the negative phenomenon is the weight loss that occurs after its thawing. The main goal of this paper is to reduce these losses by using gelatine coatings. Poultry processing by-products, such as paws, have prepared gelatine with a proteolytic enzyme (Protamex). The meat was immersed in gelatine solution (8% gelatine, 10% glycerol and 1% glutaraldehyde). Losses in uncoated samples ranged from 0.42 to 3.84%, depending on the freezing rate and defrosting method. From the obtained weight loss results, for all tested combinations of freezing and thawing, it was found that the application of a gelatine coating had a positive effect on the reduction of weight losses after thawing of meat. The most significant losses occurred at -18 °C and defrosting in the microwave, with an average of more than 2% lower when the coating was applied. According to the results, freezing at -80 °C and defrosting in a refrigerator appeared to be the most considerate way of storing and processing meat. The uncoated sample weighed 0.42% less after defrosting, while the coated samples had an average weight loss of 0.33%. Due to the above results, the gelatine-based coating is suitable for eliminating meat juice losses.

Keywords: **coatings, poultry by-products, gelatine, weight loss, beef**

Encapsulation of fortifying ingredients in colloidal emulsions of lecithin

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The present contribution focuses on the study of the encapsulation of enrichment components in colloidal dispersions. The research focuses on curcumin and vitamin C as active ingredients that have potential applications in the food industry or pharmaceuticals. Another part is devoted to liposomal encapsulation of active ingredients in colloidal dispersions. Furthermore, the contribution focuses on the study of the stability of liposomal dispersions containing soy lecithin and carboxymethylcellulose as suitable encapsulants for curcumin and vitamin C. The zeta potential values for the vitamin C dispersions ranged from -24 to -27 mV. The zeta potential values for the dispersions with curcumin ranged from -64 to -79mV. The data showed that the dispersion with encapsulated curcumin was approximately 2 times more stable than the dispersion with encapsulated vitamin C.

Keywords: **encapsulation, emulsion, curcumin, vitamin C**

Quality of superworm (*Zophobas morio*) fats determined by Raman spectroscopy

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Insects with their high content of proteins and fats are among the good-quality sources that can be used for food industry and feed purposes. Fat for use in food or feed industries can be of various origins. To use a new source of fat in food and feed industries, it is necessary to analyse its composition. An important parameter of fat quality is the representation of fatty acids which are a significant element of nutrition. Various representations of fatty acids can be found in conventional sources, such as olive oil, canola oil or lard, as well as in the fat of superworms (*Zophobas morio*). This paper evaluates the composition of fats of animal and vegetable origin from a qualitative point of view and assesses the vibration characteristics of fatty acids of the compared fats. Namely, fatty acids of domestic pig, wild boar, domestic goose, river nutria, domestic sheep, rice, linseed, canola, olive, plant based fat – Hera, sunflower, and superworm were compared. Superworm differs in the following regions of wavenumbers: 599.27 cm/1 from domestic sheep, 720.4 cm/1 from domestic sheep and coconut fat, 796.32 cm/1 from sunflower, coconut, and pig fat, 1022.8 cm/1 from coconut and pig fat.

Keywords: **superfood, fatty acids, animal fat, plant oil, edible insect**

Development of 3D printing in food processing

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The aim of this work was to convert a 3D printer for plastic to a printer for printing food materials with a piston extruder and 200 ml storage container (maximum dimensions of the printed object: X = 232 mm, Y = 232 mm, Z = 250 mm). Using Sharp3D graphics software, a final model of a pasty extruder was built after several prototypes, using the original stepper motor along with two gears, a housing, and a piston. The models that were printed corresponded to the original computer model, including dimensions. The main parameters were to determine the height of the layer of the printed samples, the number of solid layers to ensure the homogeneity of the printed samples, and the infill density, as it ensures the correct filling of the model. For sample 1 (vegan pate), the optimal filling value is 60% and layer height is 1 mm.

Keywords: three-dimensional printing, extrusion, 3D structures, food products, vegan pate

Effects of a preparation based on a functional collagen polymer on the skin in the periorbital area

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Aging is an inevitable process that manifests itself in the body through a number of physiological changes. They also include the formation of wrinkles and a decrease in collagen in the skin. Poultry protein-rich by-products can be used as a source of collagen. For the cosmetic industry, collagen hydrolyzate is used for its potential. The study tested the effect of a 1% hydrolyzate prepared from chicken stomachs mixed in a gel formulation on the condition of the skin (elasticity, change in skin relief and reduction in the amount of wrinkles). The aim was to determine, using non-invasive *in vivo* testing, whether collagen-based preparations incorporated into a carbopol gel applied topically for 8 weeks could have a positive effect on the biophysical properties of the skin in the periorbital area. For skin elasticity, the resonance times decreased on average from 257 ± 48 A.U. at 218 ± 58 A.U. to the right and from 258 ± 46 A.U. at 219 ± 57 A.U. on the left area. According to the values found, all roughness parameters R1 to R5 also decreased. For parameter R1 there was an average decrease of 38 ± 3%, for parameter R2 there was a decrease of 43 ± 4%, roughness parameter R3 decreased by 39 ± 3%, roughness parameter R4 decreased by 34 ± 5% and finally roughness parameter R5 decreased by 39 ± 5%. Visualization of the area showed a decrease in the amount of wrinkles by 16 ± 2% on the right and by 15 ± 3% on the left. The results of regular application of the formulation with the addition of 1% collagen hydrolyzate confirmed the assumption of increased elasticity, reduced skin roughness and reduced amount of wrinkles in the periorbital area. Chicken collagen could thus find application in the production of antiaging agents.

Keywords: cosmetic formulation, chicken collagen hydrolyzate, skin elasticity, skin relief, wrinkle reduction