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Optimization of fermentation conditions for Teff (*Eragrostis tef*) malt wort using response surface methodology

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Teff is nutritious and gluten-free low risk cereal with the potential as an alternative raw material for gluten-free foods and beverages. The aim of the research was to investigate optimal fermentation conditions for Teff Malt-Wort to be fermented by *Lactobacillus amylolyticus*. The experimental design and statistical analysis were performed using Design Expert statistical software. High lactic acid formation was observed between 42 and 48 °C. An increase and decrease in temperature beyond the stated range caused a decrease in the formation of lactic acid. Temperature was the dominant factor influencing the three response variables viz. lactic acid to sugar ratio, lactic acid, and pH. However, the main factor influencing extract was time followed by cell concentration. The optimum conditions of the parameters such as temperature, initial pH, initial cell concentration, and fermentation time were 42°C, 5.4, 1.86×10^5 cells/ml, and 52 h, respectively. With this set of condition, a beverage with pH 3.5, lactic acid concentration 9.5 g/L, and lactic acid to sugar ratio 0.26 was predicted to be produced. The validation experimental runs demonstrated a good agreement between the experimental and predicted values. The sensory evaluation of the product also shows that it was accepted by the assessors.

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Fiber optic SOS-type biosensor for the control of the genotoxicity of some environmental objects

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In the report, it will be discussed the experimental approaches for the creation of the simple SOS-type biosensor based on the fiber optics, which works in the differential regime, and allows the genotoxicity control of the environmental objects with the chemical nature. This biosensor was tested at the determination of the genotoxicity of the number substances as: ethanol, dimethylsulfate, mitomycin C and some mycotoxins as well as nano-particles and nano-composites. The sensitivity of the proposed biosensor corresponds to the approaches based on the applications based on the traditional, complicate and expensive devices. It was shown that the nano-composites as a rule have not genotoxicity in contrary to nano-particles, particularly such as on the basis of silver and zinc oxides. Methanol and especial ethanol demonstrated much less level of genotoxicity in comparison with the dimethylsulfate and mitomycin C. Among the analysed mycotoxins (aflatoxin B1, patulin, searelenone and others) the highest level of the genotoxicity was revealed in the mycotoxin T2. The developed biosensor may be used for the express analysis, namely during 20 min, if the optrodes with the appropriate immobilised cells will be prepared in advance. It was informed that according to the preliminary results the functional activity of such optrodes may be served no less as one day. A special attention will be given to the comparison of the efficiency of the cell system immobilization on the surface optrode to obtain sensitivity analysis, repeatability of the obtained results, simplicity of the currying out of the procedure and possibility its fulfilment on line regime and in field conditions. It was concluded that the developed biosensor may have perspective in future for the using in the practice.

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