

INFLUENCE OF SUNFLOWER SEED CHARACTERISTICS ON PRESSING PARAMETERS USING A GLOBAL SENSITIVITY ANALYSIS

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ABSTRACT

Mechanical extraction is one of the oldest oil extraction methods. The advantages of mechanical extraction of oil in relation to chemical are better oil quality and greater possibility of using pressing cake compared to meal containing traces of solvent. Critical parameters in the cold pressed oil production are the raw (pressing) material characteristics (type, hull content, oil and moisture content), feeding the press with pressing material, temperature, expeller screws speed rotation, nozzles diameter, pre-treatment of pressing material. Since sunflower oil belongs to the group of the most represented edible vegetable oils in the world, as in Serbia, this paper aims to investigate the newest sunflower hybrids. The aim of this study was to examine the influence of sunflower seed characteristics on pressing capacity, oil yield and pressing parameters using global sensitivity analysis. The mentioned analysis was preceded by the application of artificial neural networks, which was used to predict the capacity, oil yield and pressing parameters based on the obtained characteristics of the seed. It was determined that the oil and seed yield had the greatest positive impact on the seeds oil content (24.43 and 26.85%, respectively), as well as the mass of pressing materials (10.04 and 11.64%). The biggest negative impact on these two output parameters had the cake oil content (-16.65 and -14.31%). The obtained result indicates that the seeds mass has a decisive influence on the seeds flow through the press, and confectionary sunflower hybrids with a significantly higher 1000 seeds mass, compared to oily hybrids, had a significantly lower seed flow. Also, the global sensitivity analysis confirmed that sunflower seeds with higher dimensions and seeds mass reached higher oil temperature during pressing.

Keywords: sunflower, seeds characteristics, pressing parameters, oil

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