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OPTIMIZATION OF OIL EXTRACTION FROM SOYBEAN USING AZEOTROPIC TERNARY SOLVENT MIXTURES AND CAKE ANALYSIS

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ABSTRACT

Soybean (*Glycine max*) sample was subjected to solvent extraction with an azeotropic ternary solvent mixture (5-10% water, 5-10% ethanol, and 80-85% ethyl acetate) optimised based on D-optimal Design (DOD) under the Mixture Methodology of the Design Expert (7.0.1). The azeotropic solvent mixture developed was 9.17%, 6.67%, and 84.17% of water, ethanol, and ethyl acetate, respectively, with a 15.56 % yield of soy oil. The extraction suited a Quadratic model and the Analysis of Variance (ANOVA) indicate a Correlation Coefficient (R^2) of 0.9921. The Refractive Index, Fatty acid, as well as Acid, Saponification, Iodine and Peroxide values of the Soy oil, are 1.454, 8.39, 16,3, 56.12, 15.17 and 27.00, respectively. Moisture, ash, fibre, lipid, crude protein and carbohydrate contents of the defatted soybean cake are 16.75, 4.85, 5.00, 2.60, 31.54 and 39.86 %, respectively. The optimised solvent mixtures demonstrated suitable performance for the safe extraction of oil from soybean