Optimization of Process Parameters for Corn Oil Extraction

N. Harish¹, K. Anil Kumar², D. Srinivas³ and Sivala Kumar⁴

^{1,2,3}P.G.Student, College of Agricultural Engineering, Bapatla., (A.P, India) ⁴College of Agricultural Engineering, Bapatla., (A.P, India) E-mails: ¹naitamharish@gmail.com, ²anilkumarcae002@gmail.com, ³durgamsrinivas0024@gmail.com, ⁴ksivala@rediffmail.com

Abstract—In this study, oil extracted from wet-milled corn germs was optimized using Response Surface Methodology (RSM). The effects of preheating temperatures (90, 120, 150 & 180^{-0} C) & time durations (2, 4, 6 & 8 min) on the oil yield and quality parameters of oil (saponification value, acid value, iodine value & peroxide value) obtained by mechanical pressing were investigated. Sixteen experimental runs applying an optimal (custom) design with RSM was employed. Statistical analysis with response surface regression showed that the oil yield, acid value, iodine value and peroxide value of corn germ oil were significantly (p<0.001) affected with preheating temperature and time. But saponification value affected by p<0.01. Based on response surface, optimum conditions were preheating temperature of 110 0 C and time of 8 min. Analysis of variance indicating that the models were adequate for representing the experimental data. The treatments resulted in oil yield ranging from (38.26 to 47.30%), saponification value (209.88 to 219.70 mgKOH/g), acid value (1.12 to 1.68 mgKOH/g), iodine value (92.1 to 122.68 glodine/100g) and peroxide value (0.6 to 2 meq/kg). In this extraction process, the dependent variables such as oil yield, acid value and peroxide value increased preheat conditions while saponification value is above the recommended value (189-195 mgKOH/g) for edible oil, so it requires refining process and the high value indicates it useful for soap making. Acid value is above the recommended value (106 mgKOH/g) for edible oil, so it requires refining process. Iodine value is within the recommended range (103-135 glodine/100g) for edible oil and this value indicates it is a semi drying oil. Peroxide value is below the recommended value (≤ 10 meq/kg) for edible oil, indicates it is a semi drying oil. Peroxide value is below the recommended value (≤ 10 meq/kg) for edible oil, indicates it is a semi drying oil. Peroxide value is below the recommended value (≤ 10 meq/kg) for edible oil, indicat