Absorbance ratio optimization as a function of TiO_2-POE nanolubricant spectrophotometric wavelength using the quadratic design on one factor at a time

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Abstract. The UV visible spectrophotometry technique is one of the methods for determining a nanolubricant's stability standard. The absorbance level of a nanolubricant is determined by spectrophotometry. This method measures how well the nanolubricant absorbs UV rays from a light source. In this study, one factor at a time (OFAT) based on surface response was adopted to determine the effect of wavelength selection on the absorbance ratio of TiO_2-POE nanolubricant. The TiO_2-POE sample was prepared using a two-steps approach. The sample was ultrasonicated for 100 min using a homogenizer. UV visible spectrophotometry analysis was performed on day 1 and 15 to determine the absorbance ratio. Sixteen runs were performed using a quadratic design to acquire experimental data were fitted. The ANOVA analysis discovered that the experimental statistics were well suited to the polynomial model, with an R^2 value of 0.9970 and a model F-value of 2154.24. The findings suggest that the optimum wavelength is 500 nm with an absorbance value of 0.901239 and a desirability level of 1.0.

Keywords: ANOVA, OFAT, TiO2-POE nanolubricant, UV visible spectrophotometry

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