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Green Formulation for Synthetic Dye Extraction using Synergistic Mixture of Acid-Base Extractant

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Abstract

Synthetic dyes especially reactive dye that are usually discharged into the wastewater are considered as toxic and harmful to the aquatic organisms and human. Various methods have been introduced to remove the reactive dyes. In this study, a green synergistic extractant has been formulated in the-vegetable oil to enhance the extraction efficiency of liquid-liquid extraction (LLE) process for the Orange 3R removal. Several types of extractants were investigated as the extractant and synergist extractant to increase the extraction performance such as acidic, basic and neutral extractants. Interestingly, the results showed that Aliquat 336 and D2EHPA have shown their potentialities as an extractant and a synergist extractant, respectively. Both extractants were formulated in the-cooking palm oil as a diluent at the concentrations of 0.1M Aliquat 336 and 0.08 M D2EHPA. Using the aforementioned optimum conditions, about 90% of the Orange 3R has been successfully extracted with the highest synergistic coefficient (SC) of 67.2. In the meantime, the back extraction study have indicated that NaOH was capable of working as a potential stripping agent where almost 100% of dyes were successfully stripped out from the loaded organic-dye phase into the stripping phase. In conclusion, the green synergist formulation has offered a great prospective for the Orange 3R extraction via LLE process.

Keywords: Synergistic extractant, Orange 3R, liquid-liquid extraction, green formulation, acid-base extractant

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