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REMOVAL OF REACTIVE BLUE 14 DYE USING MICELLAR SOLUBILIZATION
FOLLOWED BY IONIC FLOCCULATION OF SUFACTANTS

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Abstract. The treatment of effluent is a fundamental part of processing of textile materials due to large volumes produced and the presence of toxic dyes in it. Micellar solubilization followed by ionic flocculation of carboxylate anionic surfactants occurs in two stages. Firstly, solubilization of organic matter occurs inside the micelle, secondly, a solution of calcium is added to the system containing the micelles, causing precipitation of the surfactant in the form of flocs, which drag the organic compound on its surface, bringing the organic compound retained on the surface of the floc, then to be removed from the aqueous medium by a physical separation process. This process was used to remove Reactive Blue 14 (RB14) dye from synthetic effluent. Surfactant carboxylate used was produced from animal/vegetable fat. The effect of surfactant concentration, temperature, stirring speed, contact time, pH and electrolyte concentration were evaluated by observing dye removal efficiency. Enthalpy and entropy show that the process is exothermic and with decreasing randomness. The dye removal efficiency reached 86% at the temperature of 30 °C. Thus, it can be affirmed that application of ionic flocculation using anionic surfactant is an efficient technique in the treatment of textile effluent.

Keywords: ionic flocculation; anionic surfactant; micellar solubilization; dye removal

1. Introduction

Many chemical substances used in the production and processing of textile industry are highly toxic, for example dyes, which in some cases appear as mutagenic and carcinogenic materials. Dyes are used in the dyeing stage, which aims to give textile substrate its color, in this stage the industry consumes a large part of the water used in their processes, the average water use rate being 40 m³/ton of product [1]. In addition, conventional cities effluent treatment plants remove only 20-30% of the color associated with synthetic dyes [2], therefore, development of efficient processes for treatment of textile effluent is very important for the environment.

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