

Determining optimum conditions for lipase-catalyzed synthesis of triethanolamine (TEA)-based esterquat cationic surfactant by a Taguchi Robust design method.

ABSTRACT

A Taguchi robust design method with an L₉ orthogonal array was implemented to optimize experimental conditions for the biosynthesis of triethanolamine (TEA)-based esterquat cationic surfactants using an enzymatic reaction method. The esterification reaction conversion% was considered as the response. Enzyme amount, reaction time, reaction temperature and molar ratio of substrates, [oleic acid: triethanolamine (OA:TEA)] were chosen as main parameters. As a result of the Taguchi analysis in this study, the molar ratio of substrates was found to be the most influential parameter on the esterification reaction conversion%. The amount of enzyme in the reaction had also a significant effect on reaction conversion%.

Keyword: Optimum conditions; Lipase-catalyzed synthesis; Triethanolamine (TEA)-Based Esterquat; Cationic surfactant; Taguchi Robust design method.