

Enzymatic Synthesis of Olive-Based Ferulate Esters: Optimization by Response Surface Methodology

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Abstract : Ferulic acid has widespread industrial potential by virtue of its antioxidant properties. However, it is partially soluble in aqueous media, limiting their usefulness in oil-based processes in food, cosmetic, pharmaceutical, and material industry. Therefore, modification of ferulic acid should be made by producing of more lipophilic derivatives. In this study, a preliminary investigation of lipase-catalyzed trans-esterification reaction of ethyl ferulate and olive oil was investigated. The reaction was catalyzed by immobilized lipase from *Candida antarctica* (Novozym 435), to produce ferulate ester, a sunscreen agent. A statistical approach of Response surface methodology (RSM) was used to evaluate the interactive effects of reaction temperature (40-80°C), reaction time (4-12 hours), and amount of enzyme (0.1-0.5 g). The optimum conditions derived via RSM were reaction temperature 60°C, reaction time 2.34 hours, and amount of enzyme 0.3 g. The actual experimental yield was 59.6% ferulate ester under optimum condition, which compared well to the maximum predicted value of 58.0%.

Keywords : ferulic acid, enzymatic synthesis, esters, RSM

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