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Optimization of Vanillic Acid Production by *Pseudomonas* sp. AZ10 UPM Using Statistical Analysis Approach

Nurul Hanisah Md Badrul Hisham and Suraini Abd. Aziz*

Department of Bioprocess Technology, Faculty of Biotechnology and Biomolecular Sciences,
Universiti Putra Malaysia (UPM), 43400 UPM Serdang, Selangor, Malaysia

*Corresponding author's e-mail: suraini@upm.edu.my

Abstract. The world market demand of vanillin could not totally supply through natural extraction, chemical synthesis, or tissue culture technology. Biotechnological approaches provide an alternative route to produce biovanillin economically viable such as the microbial conversion pathway. Research has shown that agro-waste containing ferulic acid, such as oil palm empty fruit bunch (OPEFB) can be used to produce vanillin. However, the vanillin is rapidly converted to vanillic acid which is the less toxic form. The present work describes the screening of microbial strains capable of degrading ferulic acid as sole carbon source and optimization of fermentation conditions for the enhancement of vanillic acid production. Vanillic acid can then be used as a precursor for vanillin production. From this study, the potential isolate was selected based on the ability of the strain to grow on ferulic acid, highest intensity of colour changes on rapid screening plate, and subjected to fermentation for vanillin and vanillic acid quantification. The strain *Pseudomonas* sp. AZ10 UPM exhibited a significant result because of colour changes observed on the assay plate on day 1 with a high intensity of yellow colour. Then, optimization was carried out by screening four factors namely pH, temperature, concentration of synthetic ferulic acid, and percentage of inoculum with main and interaction effects evaluated using Design Expert® software. The optimal yield of vanillic acid obtained were at pH 7, incubation temperature of 31 °C, 1.5 g/L synthetic ferulic acid, and 10% inoculum size with molar conversion yield of 75%.

Keywords: Ferulic acid; Biovanillin; Vanillic acid; Optimization; *Pseudomonas* sp.