

**UNIVERSITI TEKNOLOGI MARA**

**OPTIMIZATION OF  
NITROFURAZONE DEGRADATION  
BY LOCAL *Aspergillus tamarii*  
KX610719.1**

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## ABSTRACT

Microbial transformation is a biological process during which microorganisms transform organic molecules. Nitrofurazone is widely applied in poultry and aquaculture veterinary drugs. Without appropriate treatment, nitrofurazone residue from agriculture animal waste may have a negative impact on microorganisms. Thus, a study to enhance nitrofurazone degradation using local *Aspergillus tamarii* KX610719.1 was explored by optimizing the selected parameters. The specific aims of the exploration were: 1) to optimize parameters (pH, temperature and agitation speed) for nitrofurazone degradation rate, 2) to determine the nitrofurazone residue using a High-Performance Liquid Chromatography-diode array detector (HPLC-DAD), 3) to verify the optimum parameters performance in degrading nitrofurazone. Response Surface Methodology (RSM) based on Central Composite Design (CCD) was employed to evaluate and optimize the effect of parameters as independent parameters on the nitrofurazone degradation rate as the response function. The interaction effects and optimum parameters were obtained using Design Expert Version 13.0 software (Stat Ease, Inc., Minneapolis, USA). Statistical analysis of variance (ANOVA) with a 95 % confidence level was used to identify the adequacy of the model test and revealed good agreement between the experimental data and the proposed model. The results demonstrate that the optimum conditions for nitrofurazone degradation rate were at the pH value (4.80), temperature (35.84 °C) and agitation speed (121.33 rpm) with a coefficient of determination,  $R^2$  of 0.9612. Based on the verification process, the actual and predicted results was did not significantly differ ( $p < 0.01$ ). After 96 hours of incubation, the percentage of nitrofurazone residue was measured by HPLC-DAD is found to be 8.40 %. *Aspergillus tamarii* KX610719.1 showed a great ability in degrading nitrofurazone under optimum parameters.

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