

doubt plants provide good alternatives. Herbs which are generally consumed directly or are used in various local recipes to enhance the flavour of the foods have been reported to have a wide range of biological activities due to their phenolic compounds. The utilization of herbs as natural preservatives in food products and food packaging film to prolong shelf-life and to improve safety, thus maintaining the quality of the product has become our focus.

Keywords: Herbs, natural preservatives, shelf-life

Dr. Hisham Mohd Nooh

Senior Lecturer, Department of Food Science and Technology, Faculty of Applied Sciences, Universiti Teknologi MARA, Cawangan Negeri Sembilan, Kampus Kuala Pilah, Malaysia



Dr. Hisham Mohd Nooh was born on 4th February 1984 at Raub, Pahang. Currently, he is a senior lecturer at Universiti Teknologi MARA, Kampus Kuala Pilah, Negeri Sembilan. He graduated with a Master of Science, Major in Microbial Biotechnology in February 2012 at Universiti Putra Malaysia with 1st Class. He graduated with a Ph.D., Major in Industrial Biotechnology with 1st Class in November 2018. Dr. Hisham Mohd Nooh has skills in Laboratory Hazardous Chemical Management (MS ISO 9001:2008), Laboratory Management - Procurement, Calibration, Service and Documentation, Research & Development Natural Bio-Product, Identification of Bacteria Using Molecular Technique, NCBI Basic Local Alignment Search Tool (BLAST), SDSC Biology Workbench, Statistical Analysis, Optimization Process - Response Surface Methodology & Artificial Neural Network (Neural Power) Cloning & Expression Using Bacteria And Yeast Host., Bioreactor Operation & Enzyme Production, Soap & Detergent Formulation, Rotary Evaporator, Freeze Dryer & Spray Dryer Operation And Maintenance, Computer Maintenance, Build And Upgrade.

Presentation Summary

Production of Thermostable T1 Lipase Using Agro-Industrial Waste Medium Formulation

Hisham Mohd Nooh^{1,2,6*}, Malihe Masomian^{3,6}, Abu Bakar Salleh^{2,5,6}, Rosfarizan Mohamad^{4,7}, Mohd Shukuri Mohamad Ali^{5,6}, and Raja Noor Zaliha Raja Abd. Rahman^{2,3,6}

¹*Department of Food Science and Technology, Faculty of Applied Sciences, Universiti Teknologi MARA, Cawangan Negeri Sembilan, Kampus Kuala Pilah, 72000 Kuala Pilah, Negeri Sembilan, Malaysia*

²*Laboratory of Molecular Biomedicine, Institute of Bioscience, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia*

³*Department of Microbiology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia*



⁴Department of Bioprocess Technology, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

⁵Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

⁶Enzyme and Microbial Technology Research Centre, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

⁷Institute of Tropical Forestry and Forest Products, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia

*Corresponding author: hishamnooh@uitm.edu.my

Large-scale production of T1 lipase using conventional culture media is costly. To reduce the cost of production, an alternative growth medium using local resources has been developed. In this study, the growth of recombinant *Escherichia coli* and expression of T1 lipase were tested using different agro-industrial wastes as carbon and nitrogen sources by conventional method. Subsequently, by using central composite rotatable design (CCRD), a set of 30 experiments was generated to evaluate the effect of different parameters, including the amount of molasses (as carbon source), fish waste (as nitrogen source), NaCl, and inducer concentration on production of T1 lipase. Response surface methodology (RSM) analysis indicated that all factors had significant effects on T1 lipase production. This statistical analysis was utilised to develop a quadratic model to correlate various important variables for the growth of the recombinant strain and regulation of gene expression to the response (T1 lipase activity). Moreover, the optimum conditions obtained can be applied to scale up the process and minimise the cost of enzyme production.

Keywords: T1 lipase, agro-industrial waste, molasses, fish waste

