CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

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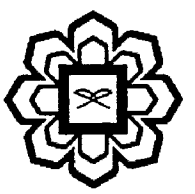

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CHAPTER 29

OPTIMIZATION OF PROCESS PARAMETERS FOR EXTRACTION OF XANTHINE OXIDASE INHIBITOR (XOI) FROM *Lycopersicon esculentum*

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ABSTRACT

Xanthine oxidase (XO) is an enzyme that catalyses the oxidation of hypoxanthine and xanthine to uric acid, which plays a crucial role in gout. Gout is distinguished by recurring attacks of joint inflammation. It is influenced by a high dietary intake of foods rich in nucleic acid. Our preliminary screening studies have shown that methanolic extract of *Lycopersicon esculentum* leaves demonstrated the highest inhibition of XO. Thus, it was subjected to optimization of extraction parameters, which include extraction temperature, extraction time, agitation speed and ratio of the solvent to plant materials. By using Central Composite Design (CCD) for the optimization, various XO inhibitory activities can be monitored. The optimum conditions as stated by further numerical analysis of the responses using Design Expert v.6.0.8 revealed that the maximum XO inhibitory activity is 88.41% at extraction temperature of 30°C, extraction time of 25.15 hour, extraction speed of 25 rpm, and solvent to plant ratio of 10.71 ml/1 g.

Keywords: *Lycopersicon Esculentum*, Xanthine Oxidase Inhibitor, Gout, Optimization, Central Composite Design.

INTRODUCTION

Gout is one of the oldest diseases in history. It represents a group of heterogeneous diseases characterized by hyperuricemia and recurrent attacks of arthritis. Hyperuricemia results from the condition of raised blood uric acid, which is a chemical that is produced from the breaking down and building up of food and body tissues, whereas the attacks of arthritis are caused by an inflammatory response to monosodium urate crystals formed in human joints with elevated serum urate concentration (Faraawi, 2004).

One of the therapeutic agents for gout or hyperuricemia is xanthine oxidase inhibitor (XOI). XOI inhibits xanthine oxidase (XO), which is an enzyme that catalyzes the conversion of hypoxanthine to xanthine and of xanthine to uric acid, subsequently reduces the amount of uric acid in the blood and urine by slowing the rate of production of uric acid. Commercial XOI, allopurinol (Lopurin, Zurinol, Zyloprim) is currently the best medicine for people who