

### ABSTRACT TEMPLATE FORM

Preferred Session	(Please select only two) 1- _____ 2- _____
Title	<b>Effect of Ultrasound and Enzymes on the Extraction of Gallic Acid from <i>Labisia Pumila</i> (Kacip Fatimah)</b>
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Keywords	extraction, gallic acid, ultrasound, cavitation, cellulose, hydrolysis
Abstract Text	Ultrasound and enzymes is unified to extract gallic acid from <i>Labisa pumila</i> (Kacip Fatimah). Gallic acid has anti-fungal and anti-viral properties and acts as an antioxidant which helps to protect cells against oxidative damage. Gallic acid was found to show cytotoxicity against cancer cells, without harming healthy cells. Besides the effect of ultrasound and the activity of <i>Trichoderma reesei</i> cellulase on the extraction productivity, solid-liquid mass transfer limitations will be investigated. The effects of extraction time, extraction temperature, solvent-to-solid ratio, and sonication power on the extraction of gallic acid were parameters considered into account for the research. The unified ultrasound and enzymatic extraction were carried out at low intensity sonication (2.4-11.8 W/cm <sup>2</sup> ) using a sonicator probe in a designed reactor with optimum conditions for cellulase reaction (pH 4.8, 40-50 °C). Formation of cavitation bubbles by applying ultrasound enhances both extraction process and enzymes activity through the solid-liquid mass transfer by enlarging the plant pores, breaking the plant cell and reducing the plant particle size. The cellulolytic activity increased by some changes in spatial structure of enzyme molecules, which supported the formation of enzyme substrate complex and improved the adsorption of cellulase on insoluble cellulose. Enzyme hydrolysis enhancing the productivity of the extraction by loosening the network of the cell wall, then releasing more intracellular compound from the plant cell. The extraction of gallic acid was analysed by using high performance liquid chromatography. Meanwhile the conventional water extraction was used as a control of comparing the performance of the ultrasound and enzyme assisted extraction.
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Name, date	Noor Adilah binti Md Salehan, 4 <sup>th</sup> June 2014

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