

Accepted Manuscript

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PII: S0167-577X(18)30726-2
DOI: <https://doi.org/10.1016/j.matlet.2018.04.122>
Reference: MLBLUE 24289

To appear in: *Materials Letters*

Received Date: 6 March 2018
Revised Date: 17 April 2018
Accepted Date: 30 April 2018

Please cite this article as: A. Arumugam, G. Karuppasamy, G.B. Jegadeesan, Synthesis of mesoporous materials from bamboo leaf ash and catalytic properties of immobilized lipase for hydrolysis of rubber seed oil, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.04.122>

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Synthesis of mesoporous materials from bamboo leaf ash and catalytic properties of immobilized lipase for hydrolysis of rubber seed oil

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ABSTRACT

Mesoporous MCM-41 was synthesized via the extraction of silica from bamboo leaf ash and used as a support matrix for the immobilization of lipase to hydrolyze rubber seed oil. The effect of extraction parameters on MCM-41 synthesis was evaluated using Central Composite Design (CCD). More than 85% silica recovery from bamboo leaf ash was obtained for an extractant to ash weight ratio – 1.75 (wt/wt), ultra-sonication time - 8h and temperature - 80°C). Lipase from porcine pancreas (triacylglycerol ester hydrolase, EC 3.1.1.3) was immobilized on the synthesized MCM-41. Approximately 73% hydrolysis was obtained at an immobilized lipase loading of 100 mg and water content - 20v/v % at room temperature (35°C). Less than 15 % reduction in percent hydrolysis of rubber seed oil even after 15 cycles of reuse suggested the effectiveness of the reused catalyst.

Keywords: Bamboo leaf ash, MCM-41, immobilization, Rubber seed oil, Hydrolysis.

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