



**UNIVERSITI PUTRA MALAYSIA**

***RECOVERY OF VOLATILE TERPENES PRODUCED BY  
GENETICALLY ENGINEERED *Escherichia coli* STRAINS USING  
FLUIDIZED BED***

**AZIN AMIRI**

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ENGINEERED *Escherichia coli* STRAINS USING FLUIDIZED BED**

By

**AZIN AMIRI**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,  
in Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

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