

FULL FACTORIAL DESIGN FOR PRODUCTION OF METHYL 3-(3,5-DI-TERT-BUTYL-4-HYDROXYPHENYL) PROPIONATE USING OIL PALM FROND JUICE AS A SOLE SUBSTRATE BY *Ceratocystis fimbriata*

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ABSTRACT

Oil palm frond (OPF) juice has been known as a good source of sugars to replace commercial sugars to produce methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate. The aim of this study was to investigate the effect of temperature (°C), initial pH medium, agitation speed (rpm) and concentration of glucose (g/L) on the production of methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate from OPF juice by using *Ceratocystis fimbriata* (*C. fimbriata*). The design of experiment (DOE) method was used to screen the best parameters affecting the production of methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate. The Gas Chromatography-Mass Spectroscopy (GC-MS) with Solid Phase Micro Extraction (SPME) was used to analyze and separate the peak of methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate. Based on the GC-MS analysis, it showed that the most favorable condition for methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate production was achieved at an initial pH medium (8), agitation speed (100 rpm), temperature (25°C) and 30 g/L of glucose in OPF juice. Methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate were produced when the retention time was 32.80 min, the relative peak area was 0.24 % of chromatogram area. This result showed the great potential usage of OPF juice as a substrate to produce methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate by *C. fimbriata*.

Keywords: Oil palm frond juice, Methyl 3-(3,5-di-tert-butyl-4-hydroxyphenyl) propionate, *Ceratocystis fimbriata*.