

## FeCl<sub>3</sub>-catalyzed Synthesis of Dehydrodiisoeugenol

Athina Mardhatillah<sup>1,2</sup>, Mutakin Mutakin<sup>1</sup>, Jutti Levita<sup>1</sup>

<sup>1</sup>Faculty of Pharmacy, Universitas Padjadjaran, Jl. Raya Bandung-Sumedang Km.21 Jatinangor, West Java 45363, Indonesia

<sup>2</sup>Faculty of Pharmacy, University of Jenderal Achmad Yani, Jl. Terusan Jenderal Sudirman Cimahi, West Java, Indonesia

Correspondence: Jutti Levita, Faculty of Pharmacy, Universitas Padjadjaran, Jl. Raya Bandung-Sumedang Km.21 Jatinangor Sumedang, West Java 45363, Indonesia. Tel: 622-2779-6200. E-mail: jutti.levita@unpad.ac.id

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### Abstract

Dehydrodiisoeugenol (DDIE) synthesis has been performed by modifying a method recommended by Leopold with a different ratio of isoeugenol and FeCl<sub>3</sub> (1.9:1). FeCl<sub>3</sub> was chosen as catalyst due to its efficiency and environment-friendly property. This modification yielded 22.93 % of product. The product, a white crystalline form, was characterized using thin layer chromatography, melting point, UV, IR, HRMS, and NMR spectroscopy, as well as HPLC, employing pure DDIE as the standard. TLC chromatogram showed R<sub>f</sub> 0.32 using n-hexane/ethyl acetate (8:2). The crystals melted at 138-139 °C, while its UV maximum was detected at λ 273 nm. IR spectrum showed a specific broad O-H stretch at 3437.15 cm<sup>-1</sup>, C-H aromatic and C-H alkene at 3163.26 and 3024.38 cm<sup>-1</sup>, C-H alkyl stretch at 2951.09 and 2927.94 cm<sup>-1</sup>. An overtone peak of aromatic was detected at 2100 to 1700 cm<sup>-1</sup>. C-O peak was detected at 1126.43 cm<sup>-1</sup>. HPLC showed that this compound was eluted at 11.886 minutes after it was injected to a C18 column 250 x 4 mm using a mixture of methanol and double distilled water (73:27) for mobile phase. HRMS spectra predicted that the molecular structure is C<sub>20</sub>H<sub>22</sub>O<sub>4</sub> as showed by abundance peak at m/z 327.1595 of [M+H]<sup>+</sup>. <sup>1</sup>H-NMR and <sup>13</sup>C-NMR indicated that the synthesized compound contains 13 types of proton and 20 types of carbon. Herein we reported that white needle-like crystals of DDIE using FeCl<sub>3</sub> as catalyst had been synthesized, moreover the decreasing of the catalyst reduced the yield of the product.

**Keywords:** antidiabetic, anti-inflammatory, diabetes, DDIE, *Myristica fragrans* Houtt, nutmeg, PPAR $\gamma$

### 1. Introduction

Dehydrodiisoeugenol (DDIE) (Fig.1) is a chemical compound contained in fruit and seed of nutmeg (*Myristica fragrans* Houtt).



Fig. 1. Chemical structure of DDIE (a) and isoeugenol (b)

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DDIE showed anti-inflammatory (Li and Yang, 2012) and antidiabetic activity on PPAR $\gamma$  receptor (Lestari, 2012). Previous study determined that the level of DDIE, myristicin, and saffrole in the ethanol extract of nutmeg seeds was 4.662 %, 17.226 %, and 10.979 %, respectively using RP-HPLC (Saputri, 2014). Isolation of bioactive compounds from