# ISOLASI DAN KARAKTERISASI FLAVONOID TERISOPRENILASI DARI AKAR *Artocarpus heterophyllus* SEBAGAI INHIBITOR ASETILKOLINESTERASE: PENGUJIAN POTENSI *IN SILICO*

**SKRIPSI**

diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar
Sarjana Sains

**Oleh:**

Laras Adistya Putri

2103259

**PROGRAM STUDI KIMIA**

**FAKULTAS PENDIDIKAN MATEMATIKA**

**DAN ILMU PENGETAHUAN ALAM**

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Sebuah skripsi yang diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Sains pada Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam

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**LARAS ADISTYA PUTRI**

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disetujui dan disahkan oleh pembimbing:

Pembimbing I,

Dr. Iqbal Musthapa, M.Si.

NIP. 197512232001121001

Pembimbing II,

Vidia Afina Nuraini, S.Si, M.Sc.

NIP. 199307052020122009

Ketua Program Studi,

Prof. Fitri Khoerunnisa, M.Si, Ph.D.

NIP. 197806282001122001

## ABSTRAK

Tumbuhan *Artocarpus heterophyllus*, atau nangka, merupakan tumbuhan yang memiliki berbagai senyawa dengan potensi biologis seperti flavonoid, prenilflavonoid, sterol, stilbenoid, polifenol, dan terpenoid yang telah dilaporkan memiliki aktivitas antioksidan, antiinflamasi, antibakteri, antikanker, antikariogenik, dan antijamur. Penelitian ini bertujuan untuk mengisolasi dan mengkarakterisasi senyawa turunan flavonoid dari akar tumbuhan nangka, serta menguji aktivitas antialzheimer secara *in silico*. Tahap isolasi dilakukan dengan ekstraksi, fraksinasi, dan pemurnian menggunakan berbagai teknik kromatografi, yaitu Kromatografi Cair Vakum (KCV), Kromatografi Kolom Gravitasi (KKG), dan Kromatografi Lapis Tipis (KLT). Dari tahap pemisahan dan pemurnian, dihasilkan 1 isolat berupa padatan coklat kemerahan sebanyak 29,7 mg. Karakterisasi struktur senyawa yang diperoleh didasarkan pada data spektroskopi *Nuclear Magnetic Resonance* (NMR) 1D ($^1$H-NMR) dan membandingkannya dengan literatur. Hasil dari karakterisasi tersebut menunjukkan senyawa isolat 1 memiliki struktur yang serupa dengan senyawa Licoflavone C. Uji aktivitas secara *in silico* dengan aplikasi BIOVIA Discovery Studio Visualizer dan AutoDock Tools menunjukkan bahwa senyawa licoflavone C memiliki aktivitas yang lemah untuk dijadikan sebagai kandidat obat antialzheimer dalam menggantikan donepezil melalui mekanisme penghambatan asetilkolinesterase.



**Kata Kunci:** Akar nangka, alzheimer, asetilkolinesterase, flavonoid, licoflavone C

## ABSTRACT

*Artocarpus heterophyllus*, or jackfruit, is a plant that has various compounds with biological potential such as flavonoids, prenylflavonoids, sterols, stilbenoids, polyphenols, and terpenoids that have been reported to have antioxidant, anti-inflammatory, antibacterial, anticancer, anticariogenic, and antifungal activities. This research aims to isolate and characterize flavonoid-derived compounds from jackfruit roots, as well as to test their anti-Alzheimer activity with *in silico* method. The isolation stage was carried out by extraction, fractionation, and purification using various chromatographic techniques, such as Vacuum Liquid Chromatography (VLC), Gravity Column Chromatography (GCC), and Thin Layer Chromatography (TLC). From the separation and purification stages, isolate 1 was produced in the form of a reddish-brown solid was obtained, weighing 29.7 mg. The structural characterization of the compound obtained was based on 1D Nuclear Magnetic Resonance (NMR) spectroscopy data ($^1$H-NMR) and comparing it with the literature. The result of the characterization showed that isolate 1 compound has a similar structure to the Licoflavone C compound. *In silico* activity test using the BIOVIA Discovery Studio Visualizer and AutoDock Tools applications showed that the licoflavone C compound has weak activity to be used as a candidate of anti-Alzheimer's drug to replace donepezil through the acetylcholinesterase inhibition mechanism.



**Keywords:** Acetylcholinesterase, Alzheimer's disease, flavonoids, jackfruit's root, licoflavone C

## DAFTAR ISI

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# DAFTAR GAMBAR

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