



KARYA TUGAS AKHIR

**PENGARUH SELADA (*Lactuca sativa*) TERHADAP PENURUNAN
TINGKAT INSOMNIA DENGAN PENDEKATAN IN SILICO**

Oleh:

Riffaldy Gusti Anggara

NIM. 202110330311143

FAKULTAS KEDOKTERAN

UNIVERSITAS MUHAMMADIYAH MALANG

2025



KARYA TUGAS AKHIR

PENGARUH SELADA (*Lactuca sativa*) TERHADAP PENURUNAN TINGKAT
INSOMNIA DENGAN PENDEKATAN IN SILICO

Oleh:

Riffaldy Gusti Anggara

NIM. 202110330311143

FAKULTAS KEDOKTERAN

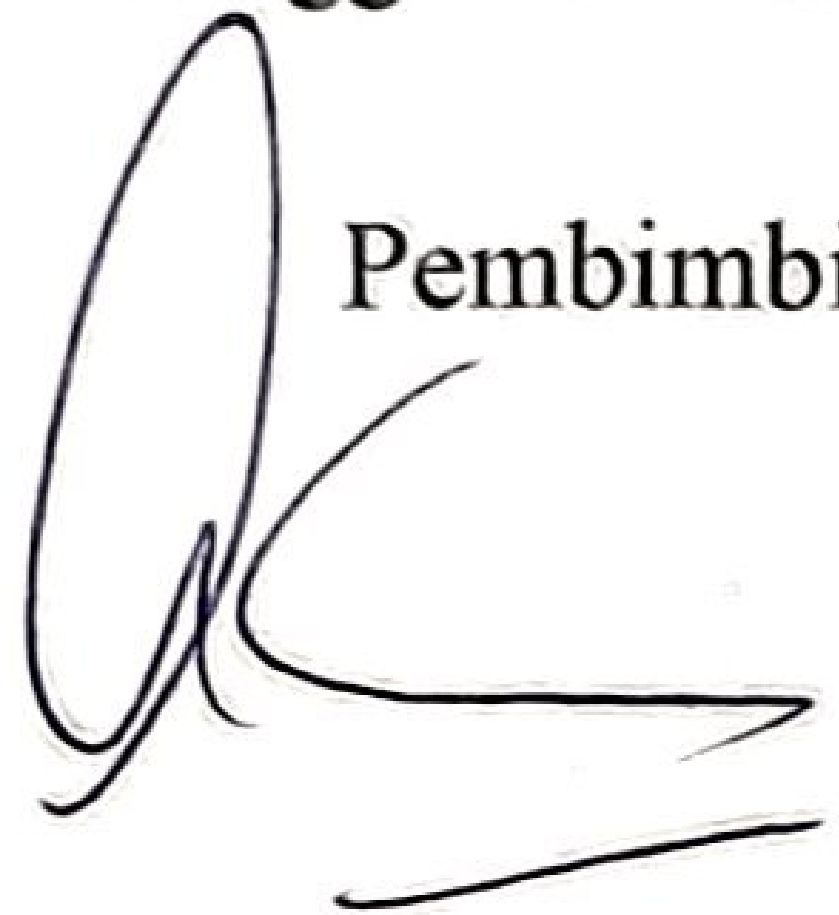
UNIVERSITAS MUHAMMADIYAH MALANG

2025

LEMBAR PENGESAHAN
LAPORAN HASIL PENELITIAN

Telah Disetujui Sebagai Hasil Penelitian Untuk Memenuhi Persyaratan
Pendidikan Sarjana Fakultas Kedokteran
Universitas Muhammadiyah Malang

Tanggal: 2 Januari 2025


Pembimbing I

Dr. dr. Kusuma Andriana, Sp. OG
NIDN. 0725096801

Penguji



Dr. Noviana Dwi Lestari, S.Si., M.Si
NIDN. 0722119302

Mengetahui,
Fakultas Kedokteran Universitas Muhammadiyah Malang
Dekan




Dr. dr. Meddy Setiawan, Sp. PD. FINASIM
NIP. 19680521 200501 1 002

LEMBAR PERNYATAAN ORISINALITAS

Saya yang bertanda tangan di bawah ini,

Nama : Riffaldy Gusti Anggara

NIM : 202110330311143

Program Studi : S1 Pendidikan Dokter

Menyatakan bahwa karya tulis akhir yang saya tulis ini adalah karya saya sendiri. Dan sumber yang dikutip maupun dirujuk telah saya nyatakan benar adanya.

Demikian surat pernyataan saya,

Melang, 2 Januari 2025
buat pernyataan



88A0AAMX104139246

Riffaldy Gusti Anggara

LEMBAR PENGUJIAN

Karya Tulis Akhir oleh Riffaldy Gusti Anggara ini
Telah Diuji dan Dipertahankan di Depan Tim Penguji
pada Tanggal 2 Januari 2025

Tim Penguji



Dr. Noviana Dwi Lestari, S.Si., M.Si

Ketua



Dr. dr. Kusuma Andriana, Sp. OG

Anggota

KATA PENGANTAR

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Assalamu'alaikum Warahmatullah Wabarakaatuh.

Setinggi puji sedalam puja kehadiran Allah SWT Yang Maha Pengasih lagi Maha Penyayang dan atas karunia serta izin-Nya, penulisan usulan proposal penelitian dapat selesai dengan baik. Shalawat serta salam selalu tercurahkan kepada Rasulullah Muhammad shalallahu alaihi wasallam, keluarga dan para sahabatnya yang telah berjasa membawakan syiar dakwah Islam ke seluruh dunia.

Penelitian tugas akhir ini berjudul “Pengaruh Selada (*Lactuca sativa*) terhadap Penurunan Tingkat Insomnia dengan Pendekatan *In Silico*”. Penelitian ini diusulkan dan diajukan untuk memenuhi persyaratan penyelesaian Pendidikan Sarjana (S1) Fakultas Kedokteran Universitas Muhammadiyah Malang.

Penulis menyadari usulan penelitian ini masih jauh dari kata sempurna, oleh karena itu, penulis sangat mengharapkan saran dan masukan yang membangun. Semoga karya tulis ini dapat bermanfaat dan menambah wawasan keilmuan bagi semua pihak.

Wassalamu'alaikum Warahmatullah Wabarakaatuh.

Malang, 7 Januari 2025

Riffaldy Gusti Anggara

DAFTAR ISI

LEMBAR HASIL PENELITIAN	iii
LEMBAR PENGESAHAN	iv
LEMBAR PERNYATAAN ORISINALITAS	v
LEMBAR PENGUJIAN	vi
KATA PENGANTAR	vii
UCAPAN TERIMAKASIH	viii
DAFTAR ISI	xi
DAFTAR TABEL	xiii
DAFTAR GAMBAR	xiv
DAFTAR SINGKATAN	xv
DAFTAR LAMPIRAN	xviii
BAB I PENDAHULUAN	19
1.1 Latar Belakang	19
1.2 Rumusan Masalah	21
1.3 Tujuan Penelitian	22
1.3.1 Tujuan umum	22
1.3.2 Tujuan khusus	22
1.4 Manfaat Penelitian	22
BAB II TINJAUAN PUSTAKA	23
2.1 Selada	23
2.1.1 Definisi	23
2.1.2 Taksonomi Selada (<i>Lactuca sativa L</i>)	24
2.1.3 Morfologi Tanaman Selada	25
2.1.4 Jenis – Jenis Selada	27
2.2 Insomnia	29
2.2.1 Definisi	29
2.2.2 Klasifikasi	29
2.2.3 Etiologi	30
2.2.4 Faktor Risiko	31
2.2.5 Patofisiologi	31
2.2.6 Manajemen Insomnia	33
2.3 Database dan Software Penunjang	36
2.3.1 Database KNApSAcK	36
2.3.2 Database PubChem	37
2.3.3 <i>SwissADME</i>	38
2.3.4 Avogadro	39
2.3.5 Uji In Silico	40
BAB III KERANGKA KONSEPTUAL DAN HIPOTESIS PENELITIAN	41
3.1 Kerangka Konseptual Penelitian	41
3.2 Hipotesis Penelitian	43

BAB IV METODE PENELITIAN	44
4.1 Jenis Penelitian	44
4.2 Lokasi dan Waktu Penelitian	44
4.2.1 Lokasi penelitian	44
4.2.2 Waktu penelitian	44
4.3 Alat Penelitian	44
4.4 Prosedur Penelitian	45
4.5 Prosedur Kerja	55
4.6 Analisis Data	56
BAB V HASIL PENELITIAN	57
5.1 Senyawa Bioaktif dalam Selada	57
5.2 Hasil Uji Farmakokinetika	58
5.2.1 Boiled-Egg	58
5.2.2 Bioavailabilitas	60
5.3 Docking	61
5.3.1 Validasi Docking	61
5.3.2 Hasil Docking	62
5.3.3 Visualisasi Hasil Docking	64
5.4 Interaksi Hasil Docking	81
BAB VI PEMBAHASAN	84
BAB VII PENUTUP	90
7.1 Kesimpulan	90
7.2 Saran	91
DAFTAR PUSTAKA	92
LAMPIRAN	106

DAFTAR TABEL

Tabel 5.1 Daftar Senyawa Selada dari Database KNApSack.....	57
Tabel 5.2 Profil Senyawa Selada Prediksi SwissADME	60
Tabel 5.3 Daftar Hasil <i>Docking</i> Senyawa Selada	62
Tabel 5.4 Daftar Hasil <i>Docking</i> Senyawa Selada yang Potensial.....	63
Tabel 5.5 Daftar Gambar Hasil Docking Visualisasi 2D.....	65



DAFTAR GAMBAR

Gambar 2.1 Jenis Selada	24
Gambar 3.1 Bagan Kerangka Konsep.....	41
Gambar 5.1 Analisis Boiled-Egg SwissADME pada Senyawa Selada.....	59
Gambar 5.2 Interaksi Hidrofobik pada Senyawa Selada	81
Gambar 5.3 Interaksi Hidrogen pada Senyawa Selada	82



DAFTAR LAMPIRAN

Lampiran 1 Berkas Izin Penelitian.....	106
Lampiran 2 Hasil Deteksi Plagiasi.....	108
Lampiran 3 Kartu Konsultasi Tugas Akhir.....	109



DAFTAR PUSTAKA

Abbaoui, B. *et al.* (2018) “Cruciferous Vegetables, Isothiocyanates, and Bladder Cancer Prevention,” *Molecular Nutrition & Food Research*, 62(18), hal. 1800079. Tersedia pada: <https://doi.org/https://doi.org/10.1002/mnfr.201800079>.

Adlian, Lenci Patty, K. dan Kirihio, F. (2023) “EFEKTIVITAS PEMBERIAN AIR CUCIAN BERAS TERHADAP PERTUMBUHAN DAN HASIL TANAMAN SELADA (*Lactuca sativa* L.),” *Oryza: Jurnal Agribisnis dan Pertanian Berkelanjutan*, 8(2), hal. 1–10.

Aernout, E. *et al.* (2021) “International study of the prevalence and factors associated with insomnia in the general population,” *Sleep Medicine*, 82, hal. 186–192. Tersedia pada: <https://doi.org/10.1016/j.sleep.2021.03.028>.

Afendi, F.M. *et al.* (2012) “KNAPSAcK family databases: Integrated metabolite-plant species databases for multifaceted plant research,” *Plant and Cell Physiology*, 53(2), hal. 1–12. Tersedia pada: <https://doi.org/10.1093/pcp/pcr165>.

Ali, Z. (2021) “Identifikasi Gen Target Potensial Dan Mekanisme Molekuler Capsaicin Dalam Mengatasi Resistensi Trastuzumab Pada Kanker Payudara Dengan Pendekatan Bioinformatika.” Universitas Gadjah Mada. Tersedia pada: <http://etd.repository.ugm.ac.id/penelitian/detail/208294>.

Ami Fini Faqiha *et al.* (2022) “Potensi Senyawa Nitazoxanide dan Arbidol sebagai Antivirus SARS-CoV-2 terhadap Reseptor NSP5 (7BQY dan 2GZ7) dan

ACE2 (3D0G dan 1R4L),” *Journal of Food and Pharmaceutical Sciences*, 10(1), hal. 570–583. Tersedia pada: <https://doi.org/10.22146/jfps.3393>.

Amin, S. *et al.* (2023) “Penambatan Senyawa Antivirus Pada Reseptor Non Structural Protein Sebagai Agen Terapeutik Covid-19,” *Jurnal Kesehatan Bakti Tunas Husada: Jurnal Ilmu-ilmu Keperawatan, Analisis Kesehatan dan Farmasi*, 23(1), hal. 51–61. Tersedia pada: <https://doi.org/10.36465/jkbth.v23i1.1312>.

Annisa Fitriyani Suryana, Hilda Aprilia dan Taufik Muhammad Fakhri (2022) “Uji Aktivitas In Silico Senyawa Amritoside, Tinosporaside dan Turunannya sebagai Kandidat Senyawa,” in *Bandung Conference Series: Pharmacy*, hal. 601–610. Tersedia pada: <https://doi.org/10.29313/bcsp.v2i2.4369>.

Ashari, I., Sugianto, A. dan Nurhidayati (2020) “PENGARUH METODE APLIKASI VERMIKOMPOS DAN JUMLAH TANAMAN PER POT TERHADAP PERTUMBUHAN DAN HASIL TANAMAN SELADA (*Lactuca sativa* L.) PADA SISTEM HIDROGANIK,” *AGROUNISMA*, (198), hal. 32–38.

Asprillia, S.V., Darmawati, A. dan Slamet, W. (2018) “Pertumbuhan dan produksi selada (*Lactuca sativa* l.) pada pemberian berbagai jenis pupuk organik,” *Journal of Agro Complex*, 2(1), hal. 86. Tersedia pada: <https://doi.org/10.14710/joac.2.1.86-92>.

Bhaskar, S., Hemavathy, D. dan Prasad, S. (2016) “Prevalence of chronic insomnia in adult patients and its correlation with medical comorbidities,” *Journal of Family Medicine and Primary Care*, 5(4), hal. 780. Tersedia pada:

<https://doi.org/10.4103/2249-4863.201153>.

Bjornsdottir, E. *et al.* (2020) “Are symptoms of insomnia related to respiratory symptoms? Cross-sectional results from 10 European countries and Australia,” *BMJ Open*, 10(4), hal. 1–8. Tersedia pada: <https://doi.org/10.1136/bmjopen-2019-032511>.

Bollu, P.C. dan Kaur, H. (2019) *Sleep Medicine: Insomnia and Sleep, Missouri medicine*.

Bouayyadi, A. *et al.* (2020) “Molecular docking analysis of $\alpha 2$ -containing GABAA receptors with benzimidazoles derivatives,” 16(8), hal. 611–619. Tersedia pada: <https://doi.org/10.6026/97320630016611>.

Daina, A., Michielin, O. dan Zoete, V. (2017) “SwissADME: A free web tool to evaluate pharmacokinetics, drug-likeness and medicinal chemistry friendliness of small molecules,” *Scientific Reports*, 7(October 2016), hal. 1–13. Tersedia pada: <https://doi.org/10.1038/srep42717>.

Dermawan, D., Sumirtanuridin, R. dan Dewantisari, D. (2019) “Molecular Dynamics Simulation of Estrogen Receptor Alpha Against Andrografolid as Anti Breast Cancer,” *Indonesian Journal of Pharmaceutical Science and Technology*, 6(2), hal. 65–76.

Dewi, T.J.D., Ariqoh, S.S. dan Wafi, A. (2023) “Studi In Silico Senyawa Alkaloid dari Daun Sirsak (*Annona muricata* L.) Sebagai Inhibitor Angiotensin Converting Enzyme (ACE),” *Journal of Islamic Pharmacy*, 8(2), hal. 108–113.

Van Dyk, T.R. *et al.* (2022) “Prevalence of somatic and pain complaints and

associations with sleep disturbance in adolescents with insomnia presenting to a behavioral sleep medicine clinic,” *Journal of Clinical Sleep Medicine*, 18(1), hal. 151–160. Tersedia pada: <https://doi.org/10.5664/jcsm.9522>.

Farvid, M.S. *et al.* (2019) “Fruit and vegetable consumption and breast cancer incidence: Repeated measures over 30 years of follow-up,” *International Journal of Cancer*, 144(7), hal. 1496–1510. Tersedia pada: <https://doi.org/https://doi.org/10.1002/ijc.31653>.

Feizi, F. *et al.* (2019) “Medicinal Plants for Management of Insomnia: A Systematic Review of Animal and Human Studies,” *Galen Medical Journal*, 8, hal. e1085. Tersedia pada: <https://doi.org/10.31661/gmj.v8i0.1085>.

Ferini-Strambi, L. *et al.* (2021) “Insomnia disorder: clinical and research challenges for the 21st century,” *European Journal of Neurology*, 28(7), hal. 2156–2167. Tersedia pada: <https://doi.org/10.1111/ene.14784>.

Fernando R dan Hidayat R (2020) “1117-Article Text-2497-1-10-20201105,” *Jurnal Ners*, 4, hal. 8389.

Ghit, A. *et al.* (2021) “GABAA receptors: structure, function, pharmacology, and related disorders,” *Journal of Genetic Engineering and Biotechnology*, 19(1), hal. 123. Tersedia pada: <https://doi.org/10.1186/s43141-021-00224-0>.

Goldschen-Ohm, M.P. (2022) “Benzodiazepine Modulation of GABAA Receptors: A Mechanistic Perspective,” *Biomolecules*, 12(12), hal. 1–14. Tersedia pada: <https://doi.org/10.3390/biom12121784>.

Griffin, C.E. *et al.* (2013) “Benzodiazepine pharmacology and central nervous system-mediated effects,” *Ochsner Journal*, 13(2), hal. 214–223.

Gumiwang, W.D.N. dan Setiowati, F.K. (2024) “Analisis Molekuler Docking Senyawa Daun Sirsak (*Annona muricata* L.) sebagai Antidepresan Terhadap Reseptor Monoamine Oxidase A,” *Biota: Jurnal Ilmiah Ilmu-Ilmu Hayati*, hal. 247–257.

Haack, M. *et al.* (2020) “Sleep deficiency and chronic pain: potential underlying mechanisms and clinical implications,” *Neuropsychopharmacology*, 45(1), hal. 205–216. Tersedia pada: <https://doi.org/10.1038/s41386-019-0439-z>.

Hanifah, G.R., Ardiningrum, K.C. dan Sartika, R.A.D. (2023) “Gambaran gangguan tidur insomnia pada mahasiswa di masa pandemi Covid-19 : studi literatur,” *Jurnal Kedokteran Syiah Kuala*, 23(1), hal. 108–115. Tersedia pada: <https://doi.org/10.24815/jks.v23i1.24104>.

Haseeba Sardar (2023) “Drug like potential of Daidzein using SwissADME prediction: In silico Approaches,” *PHYTONutrients*, hal. 01–07. Tersedia pada: <https://doi.org/10.62368/pn.vi.18>.

Hasibuan, R.K. dan Hasna, J.A. (2021) “Gambaran Kualitas Tidur pada Lansia dan Faktor-Faktor yang Mempengaruhinya di Kecamatan Kayangan, Kabupaten Lombok Utara, Nusa Tenggara Barat,” *Jurnal Kedokteran dan Kesehatan*, 17(2), hal. 187. Tersedia pada: <https://doi.org/10.24853/jkk.17.2.187-195>.

Hasriati, H. dan Anshar, M. (2023) “PENGARUH PERBANDINGAN MEDIA TANAM (TANAH DAN PUPUK KANDANG) TERHADAP PERTUMBUHAN DAN HASIL TANAMAN SELADA (*Lactuca sativa* L.),” *AGROTEKBIS : E-JURNAL ILMU PERTANIAN*, 11(3), hal. 542–549. Tersedia pada: <https://doi.org/10.22487/agrotekbis.v11i3.1724>.

Hatmanti, N. mawarda dan Muzdalifah, L. (2019) “HUBUNGAN TINGKAT DEPRESI DENGAN KEJADIAN INSOMNIA PADA LANJUT USIA DI GRIYA WERDHA JAMBANGAN SURABAYA,” *Journal of Health Sciences*, 12(1), hal. 67–77. Tersedia pada: <https://doi.org/10.33086/jhs.v12i1.832>.

Ikram, A.D. (2019) “PENGARUH KOMBINASI KOMPOSISI MEDIA TANAM DAN PUPUK ORGANIK CAIR YANG BERASAL DARI BATANG PISANG TERHADAP PERTUMBUHAN DAN HASIL TANAMAN SELADA (*Lactuca sativa* L.)” Universitas Siliwangi, hal. 6–13.

Ilgün, S. *et al.* (2020) “Sedative effects of latexes obtained from some *Lactuca* L. species growing in Turkey,” *Molecules*, 25(7), hal. 1587. Tersedia pada: <https://doi.org/10.3390/molecules25071587>.

Ivanović, V. *et al.* (2020) “Lipinski’s rule of five, famous extensions and famous exceptions,” *Popular Scientific Article*, 3(1), hal. 171–177.

Jatmiko, R.A. (2020) “Metabolite Profiling dan uji aktivitas Antineuroinflamasi Fraksi N-Heksana daun semanggi (*Marsilea crenata* C Presl.) secara In Silico.” Universitas Islam Negeri Maulana Malik Ibrahim. Tersedia pada: <http://etheses.uin-malang.ac.id/20126/1/16670005.pdf>.

Jo, K. *et al.* (2021) “Effects of green lettuce leaf extract on sleep disturbance control in oxidative stress-induced invertebrate and vertebrate models,” *Antioxidants*, 10(6). Tersedia pada: <https://doi.org/10.3390/antiox10060970>.

Khudzaifi, M., Kalsum, S.A. dan Nisak, A.Z. (2024) “Molecular Docking Senyawa Flavonoid Daun Sirsak (*Annona muricata* L.) Terhadap Reseptor Estrogen

Alfa (RE- α) Sebagai Kandidat Obat Antikanker Payudara,” *Sains Medisina*, 3(1), hal. 1–9.

Kim, H.D. *et al.* (2017) “Sleep-inducing effect of lettuce (*Lactuca sativa*) varieties on pentobarbital-induced sleep,” *Food Science and Biotechnology*, 26(3), hal. 807–814. Tersedia pada: <https://doi.org/10.1007/s10068-017-0107-1>.

Kim, S. *et al.* (2022) “PubChem Protein, Gene, Pathway, and Taxonomy Data Collections: Bridging Biology and Chemistry through Target-Centric Views of PubChem Data,” *Journal of Molecular Biology*, 434(11). Tersedia pada: <https://doi.org/10.1016/j.jmb.2022.167514>.

Kwon, C.Y. *et al.* (2019) “Herbal medicine for insomnia in elderly with hypertension: A systematic review and meta-analysis,” *European Journal of Integrative Medicine*, 30(August), hal. 100961. Tersedia pada: <https://doi.org/10.1016/j.eujim.2019.100961>.

Lee, J. *et al.* (2017) “Colors of vegetables and fruits and the risks of colorectal cancer,” *World Journal of Gastroenterology*, 23(14), hal. 2527–2538. Tersedia pada: <https://doi.org/10.3748/wjg.v23.i14.2527>.

Lo, Y.-J. *et al.* (2022) “Clinical Spectrum and Trajectory of Innovative Therapeutic Interventions for Insomnia: A Perspective,” *Aging and disease*, 14(4), hal. 0. Tersedia pada: <https://doi.org/10.14336/ad.2022.1203>.

Lopresti, A.L. *et al.* (2021) “Effects of a *Bacopa monnieri* extract (Bacognize®) on stress, fatigue, quality of life and sleep in adults with self-reported poor sleep: A randomised, double-blind, placebo-controlled study,” *Journal of Functional Foods*, 85, hal. 104671. Tersedia pada:

<https://doi.org/10.1016/j.jff.2021.104671>.

Manullang, I.F., Hasibuan, S. dan Mawarni, R. (2019) “Pengaruh Nutrisi Mix Dan Media Tanam Berbeda Terhadap Pertumbuhan Dan Produksi Tanaman Selada (*Lactuca sativa*) Secara Hidroponik dengan Sistem Wick,” *Bernas: Jurnal Penelitian Pertanian*, 15(1), hal. 82–90.

Matos, M.S. *et al.* (2020) “Assessing the intestinal permeability and anti-inflammatory potential of sesquiterpene lactones from chicory,” *Nutrients*, 12(11), hal. 1–20. Tersedia pada: <https://doi.org/10.3390/nu12113547>.

Metwally, A. *et al.* (2023) “Prevalence of Insomnia and Its Associated Factors in the General Population of Saudi Arabia: A Cross-Sectional Study,” *Cureus*, 15(8), hal. 3–13. Tersedia pada: <https://doi.org/10.7759/cureus.44342>.

Morin, C.M. *et al.* (2023) “World sleep society international sleep medicine guidelines position statement endorsement of ‘behavioral and psychological treatments for chronic insomnia disorder in adults: An American Academy of sleep medicine clinical practice guidelines,’” *Sleep Medicine*, hal. 164–169. Tersedia pada: <https://doi.org/10.1016/j.sleep.2023.07.001>.

Motti, R. (2021) “Wild plants used as herbs and spices in Italy: An ethnobotanical review,” *Plants*, 10(3), hal. 1–14. Tersedia pada: <https://doi.org/10.3390/plants10030563>.

Moujir, L. *et al.* (2020) “Applications of sesquiterpene lactones: A review of some potential success cases,” *Applied Sciences (Switzerland)*, 10(9). Tersedia pada: <https://doi.org/10.3390/app10093001>.

MunIem, F. (2023) “... muricata Linn. Terhadap Protein Sulfonylurea Receptor-1

(SUR-1) dan Sodium-dependent Glucose Cotransporter-2 (SGLT-2) Sebagai Antidiabetes dengan Studi In” Tersedia pada: <https://repository.unisma.ac.id/handle/123456789/8286>.

Noor, D.M. (2022) “PENGARUH BEBERAPA MEDIA TANAM HIDROPONIK TERHADAP PERTUMBUHAN DAN HASIL TANAMAN SELADA HIJAU (*Lactuca sativa* L) PADA SISTEM NFT (Nutrient Film Technique).” Universitas Islam Batik Surakarta.

Palagini, L. *et al.* (2020) “Expert opinions and consensus recommendations for the evaluation and management of insomnia in clinical practice: joint statements of five Italian scientific societies,” *Frontiers in Psychiatry*, hal. 1–12. Tersedia pada: <https://doi.org/10.3389/fpsyt.2020.00558>.

Peltzer, K. dan Pengpid, S. (2019) “Prevalence, social and health correlates of insomnia among persons 15 years and older in Indonesia,” *Psychology, Health and Medicine*, 24(6), hal. 757–768. Tersedia pada: <https://doi.org/10.1080/13548506.2019.1566621>.

Poon, S. *et al.* (2021) “Insomnia Disorders : Nosology and Classification Past , Present , and Future.” Tersedia pada: <https://doi.org/10.1176/appi.neuropsych.20080206>.

Porwal, A. *et al.* (2021) “An Update on Assessment, Therapeutic Management, and Patents on Insomnia,” *BioMed Research International*, 2021. Tersedia pada: <https://doi.org/10.1155/2021/6068952>.

Prabowo, M.A., Ihsan, M. dan Juli, S. (2022) “KAJIAN KOMPOSISI MEDIA TANAMAN DAN DOSIS PUPUK NITROGEN TERHADAP

PERTUMBUHAN DAN HASIL TANAMAN SELADA (*Lactuca sativa* L.),” *Jurnal Agronomika*, hal. 93–98. Tersedia pada: www.journal.uniba.ac.id.

Ragnoli, B. *et al.* (2021) “Comorbid insomnia and obstructive sleep apnea (Comisa): Current concepts of patient management,” *International Journal of Environmental Research and Public Health*, 18(17). Tersedia pada: <https://doi.org/10.3390/ijerph18179248>.

Rajendran, P. *et al.* (2023) “Computational-Simulation-Based Behavioral Analysis of Chemical Compounds,” *Journal of Composites Science*, 7(5), hal. 1–13. Tersedia pada: <https://doi.org/10.3390/jcs7050196>.

Rayan, B. dan Rayan, A. (2017) “Avogadro Program for Chemistry Education: To What Extent can Molecular Visualization and Three-dimensional Simulations Enhance Meaningful Chemistry Learning?,” *World Journal of Chemical Education*, 5(4), hal. 136–141. Tersedia pada: <https://doi.org/10.12691/wjce-5-4-4>.

Rochima, N.A., Hakim, R. dan Damayanti, D.S. (2021) “Ekstrak Etanol Dsun Sirsak (*Annona muricata* L.) Sebagai Pengaktif LDL Receptor dan Penghambat HMG-CoA Reductase secara insilico,” *Jurnal Kedokteran Komunitas*, hal. 1–11.

Rosenberg, R., Citrome, L. dan Drake, C.L. (2021) “Advances in the treatment of chronic insomnia: A narrative review of new nonpharmacologic and pharmacologic therapies,” *Neuropsychiatric Disease and Treatment*, 17, hal. 2549–2566. Tersedia pada: <https://doi.org/10.2147/NDT.S297504>.

Rotondo, R. *et al.* (2020) “Implication of Lactucopicrin in Autophagy, Cell Cycle Arrest and Oxidative Stress to Inhibit U87Mg Glioblastoma Cell Growth,” *Molecules (Basel, Switzerland)*, 25(24). Tersedia pada: <https://doi.org/10.3390/molecules25245843>.

Sadino, A. *et al.* (2024) “HYPNOTIC-SEDATIVE ACTIVITY TEST OF 70% ETHANOL EXTRACT OF LETTUCE (*Lactuca sativa* L.) IN MALE WHITE MICE SWISS WEBSTER STRAIN,” *Jurnal Ilmiah Farmako Bahari*, 15(2), hal. 113. Tersedia pada: <https://doi.org/10.52434/jifb.v15i2.3090>.

Şahin, S. dan Dege, N. (2021) “A newly synthesized small molecule: the evaluation against Alzheimer’s Disease by in silico drug design and computational structure analysis methods,” *Journal of Molecular Structure*, 1236, hal. 130337. Tersedia pada: <https://doi.org/10.1016/j.molstruc.2021.130337>.

Samoal, A., Botanri, S. dan Gawariah (2018) “Perbaikan kualitas pertumbuhan dan produksi tanaman Selada (*Lactuca sativa* L) setelah aplikasi pupuk kotoran sapi,” *Jurnal Agrohut*, 9(2), hal. 141–150.

Sepehri, N.Z. *et al.* (2022) “Lettuce as an Effective Remedy in Uremic Pruritus: Review of the Literature Supplemented by an In Silico Study,” *Evidence-based Complementary and Alternative Medicine*, 2022. Tersedia pada: <https://doi.org/10.1155/2022/4231854>.

Sham, T.-T. *et al.* (2013) “A Review of the Phytochemistry and Pharmacological Activities of Raphani Semen,” *Evidence-Based Complementary and Alternative Medicine*. Diedit oleh M.N. Ghayur, 2013, hal. 636194. Tersedia

pada: <https://doi.org/10.1155/2013/636194>.

Shi, M. *et al.* (2022) “Phytochemicals, Nutrition, Metabolism, Bioavailability, and Health Benefits in Lettuce—A Comprehensive Review,” *Antioxidants*, 11(6).

Tersedia pada: <https://doi.org/10.3390/antiox11061158>.

Shofi, M. (2021) “Analisis Senyawa α -spinasterol Pada Biji Trembesi (Samanea saman (jacq.) Merr) Terhadap Penghambatan 3C-like Protease SARS-CoV-2 Melalui Uji In Silico,” *Jurnal Sintesis: Penelitian Sains Terapan dan Analisisnya*, 2(2), hal. 74–88.

Sunarjono, H. dan Nurrohmah, F.A. (2018) *Bertanam Sayuran Daun & Umbi*. Penebar Swadaya Grup.

Syaqila, C.N. *et al.* (2024) “Molecular Docking Senyawa (8) -Shogaol Sebagai Obat,” 9(3), hal. 72–76.

Trisnaputri, D.R. *et al.* (2023) “Studi In Silico Senyawa α -Mangostin Sebagai Inhibitor Terhadap Reseptor Glikogen Sintase Kinase 3β (Gsk 3β) Sebagai Alternatif Terapi Kanker Payudara,” *Jurnal Pharmacia Mandala Waluya*, 2(2), hal. 63–75. Tersedia pada: <https://doi.org/10.54883/jpmw.v2i2.63>.

Utami, E.P. dan Anwar, N.M.R. (2021) “Analisis Usahatani Budidaya Tanaman Selada Kepala Secara Konvensional: Studi Kasus di Gapoktan Lembang Agri,” *Media Agribisnis*, 5(2 SE-Articles), hal. 150–161. Tersedia pada: <https://doi.org/10.35326/agribisnis.v5i2.1393>.

Varinthra, P. *et al.* (2024) “The role of the GABAergic system on insomnia,” *Tzu Chi Medical Journal*, 36(2), hal. 103–109. Tersedia pada: https://doi.org/10.4103/tcmj.tcmj_243_23.

Vega Alanis, B.A. *et al.* (2020) “Allosteric GABAA receptor modulators—a review on the most recent heterocyclic chemotypes and their synthetic accessibility,” *Molecules*, 25(4), hal. 999. Tersedia pada: <https://doi.org/10.3390/molecules25040999>.

Vitasari, R., Isrul, M. dan Ramadhan, D.S.F. (2022) “Kajian Aktivitas Metabolit Andrographolide dan Turunannya Dalam Herba Sambiloto (*Andrographis paniculata*) Terhadap Mutasi D614G SARS-CoV-2 Protein Spike Secara In Silico,” *Jurnal Pharmacia Mandala Waluya*, 1(6), hal. 290–304. Tersedia pada: <https://doi.org/10.54883/jpmw.v1i6.55>.

Weng, H. *et al.* (2020) “Low oral bioavailability and partial gut microbiotic and phase ii metabolism of brussels/witloof chicory sesquiterpene lactones in healthy humans,” *Nutrients*, 12(12), hal. 1–12. Tersedia pada: <https://doi.org/10.3390/nu12123675>.

Widmaier, E., Raff, H. dan Strang, K.T. (2022) *Vander's human physiology*. McGraw-Hill US Higher Ed USE.

Widowati, E., Parnanto, N. dan Muthoharoh (2020) “Pengaruh Enzim Poligalakturonase Dan Gelatin Dalam Klarifikasi Sari Buah Naga Super Merah (*Hylocereus Costaricensis*) Influence Of Polygalacturonase Enzyme And Gelatin In The Clarification Of Super Red Dragon Fruit Juice (*Hylocereus Costaricensis*),” *Jurnal Teknologi Hasil Pertanian*, XIII(1), hal. 56–69.

Wijayanti, P.M. *et al.* (2024) “Permodelan Farmakofor Remdesivir dan Skrining Virtual dari Basis Data Senyawa Bahan Alam Sebagai Inhibitor SARS-CoV-

2,” *Jurnal Pharmacia Mandala Waluya*, 3(5), hal. 282–293.

Wulandari, R.P. *et al.* (2023) “In Silico Study of Secondary Metabolite Compounds in Parsley (*Petroselinum crispum*) as a Drug Therapy for Blood Cancer (Myeloproliferative Neoplasm (MPN)) targeting JAK-2,” *Indonesian Journal of Chemical Science*, 12(2), hal. 212–224.

Zhafira, R.A.I. *et al.* (2024) “STUDI IN SILICO SENYAWA BIOAKTIF DALAM DAUN ZAITUN (*Olea europaea* L.) SEBAGAI ACE INHIBITOR DALAM HIPERTENSI,” *Pharmacoscript*, 7(2), hal. 440–453.



Lampiran 2 Hasil Deteksi Plagiasi

NO	Bagian	Maksimum Kesamaan	Hasil Deteksi		
			Tgl	Tgl	Tgl
1	Bab 1 (Pendahuluan)	10	11/01/25	5	
2	Bab 2 (Tinjauan Pustaka)	25	14		
3	Bab 3 dan 4 (Kerangka Konsep & Metodologi)	35	35		
4	Bab 5 dan 6 (Hasil dan Pembahasan)	15	14,4		
5	Bab 7 (Kesimpulan dan Saran)	5	5		
6	Naskah Publikasi	25	0		

Kesimpulan Deteksi Plagiasi : LOLOS / ~~TIDAK LOLOS~~ PLAGIASI

Mengetahui
Pembimbing I

Malang, 11 Januari 2025
Koordinator Deteksi Plagiasi FKUMM,

Dr. dr. Kusuma Andriany, Sp. OG

Okoko Febriantoro S.Ikom., MSi

Kampus I
Jl. Gunung I Malang, Jawa Timur
P: +62 341 561 203 (Pusat)
F: +62 341 561 450

Kampus II
Jl. Dendangri Butani No. 183 Malang, Jawa Timur
P: +62 341 521 140 (Pusat)
F: +62 341 522 090

Kampus III
Jl. Raya Tlogomas No. 246 Malang, Jawa Timur
P: +62 341 464 310 (Pusat)
F: +62 341 464 430
E: info@um.ac.id