

DAFTAR PUSTAKA

- Abobakr, Y., Al-Hussein, F.I., Bayoumi, A.E., Alzabib, A.A., and Al-Sarar, A.S. 2022. Organophosphate Insecticides Resistance in Field Populations of House Flies, *Musca domestica*: Levels of Resistance and Acetyl-cholinesterase Activity. *Insects*. 13(2): 192-198.
- Ahmadi, E., Khajehali, J., Jonckheere, W., dan Van Leeuwen, T. 2022. Biochemical and Insecticidal Effects of Plant Essential Oils on Insecticide Resistant and Susceptible Populations of *Musca domestica* L. Point to A Potential Cross-Resistance Risk. *Pesticide Biochemistry and Physiology*. 184: 105115.
- Ahyanti, M., dan Yushananta, P. 2023. Kandungan Saponin dan Flavonoid pada Tanaman Pekarangan serta Potensinya sebagai Bioinsektisida Lalat Rumah (*Musca domestica*). *Ruwa Jurai: Jurnal Kesehatan Lingkungan*. 17(1): 31-43.
- Ahyanti, M., Yushananta, P., dan Usman, S. 2023. Potential of Some Plants as Bioinsecticides of the House Fly (*Musca domestica*). In Proceedings of the 1st UM Surabaya Multidisciplinary International Conference 2021 (MICon 2021). Edited by S. Febuanti, M. Mundakir, Y. Levani, P.L. Ghazali, J. Saputra, and M. Mujiarto. Atlantis Press SARL, Paris. pp. 1020–1026.
- Alabi, O.Y., Olaoluwa, O.O., Odeyemi, E.F., dan Buari, R.A. 2023. Insecticidal Activities of Volatile Oils of Lime Fruit Peels and African Black Pepper Seeds on Adult Kola Weevil and Their Chemical Compositions. *Afr. Crop Sci. J.* 31(3): 301–318.
- Anugraheni, D.D., dan Asngad, A. 2018. Pemanfaatan Tanaman Kemangi (*Ocimum basilicum*) dan Daun Sirih sebagai Insektisida Nabati Terhadap Mortalitas Lalat Buah (*Bactrocera* sp.). *Prosiding SNPBS (Seminar Nasional Pendidikan Biologi dan Saintek)*: 74–79.
- Attallah, Zahoor, M.K., Zahoor, M.A., Mubarik, M.S., Rizvi, H., Majeed, H.N., Zuhussnain, M., Ranian, K., Sultana, K., Imran, M., dan Qamer, S. 2020. Insecticidal, Biological and Biochemical Response of *Musca domestica* (Diptera: Muscidae) to Some Indigenous Weed Plant Extracts. *Saudi Journal of Biological Sciences*. 27(1): 106–116.
- Balboné, M., Sawadogo, I., Soma, D.D., Drabo, S.F., Namountougou, M., Bayili, K., Romba, R., Meda, G.B., Nebié, H.C.R., Dabire, R.K., Bassolé, I.H.N., dan Gnankine, O. 2022. Essential Oils of Plants and Their Combinations as an Alternative Adulticides Against *Anopheles gambiae* (Diptera: Culicidae). *Sci Rep*. 12(1): 19077.



2. Efektivitas Kombinasi Minyak Atsiri Daun Sereh Wangi (*Nardus*) dan Kulit Jeruk Nipis (*Citrus Aurantifolia*) pada Lilin Aromatik Pengusir Nyamuk *Aedes* dan *Culex* (Culicidae). *Innovation Research and Knowledge*. 1(11): 1551–1556.

- Cossetin, L.F., Santi, E.M.T., Garlet, Q.I., Matos, A.F.I.M., De Souza, T.P., Loebens, L., Heinzmann, B.M., dan Monteiro, S.G. 2021. Comparing the Efficacy of Nutmeg Essential Oil and a Chemical Pesticide Against *Musca domestica* and *Chrysomya albiceps* for Selecting a New Insecticide Agent Against Synantropic Vectors. *Experimental Parasitology*. 225: 108104.
- Daswito, R., Folentia, R., dan MF, M. Y. 2019. Efektifitas Ekstrak Daun Sirih Hijau (*Piper Betle*) sebagai Insektisida Nabati terhadap Mortalitas Lalat Rumah (*Musca domestica*). *Jurnal Kesehatan Terpadu (Integrated Health Journal)*. 10(2): 44-50.
- Dmirak, M. Ş., dan Canpolat, E. 2022. Plant-Based Bioinsecticides for Mosquito Control: Impact on Insecticide Resistance and Disease Transmission. *Insects*. 13(2): 162-169.
- Fahmi, I.F., Pujiati, R.S., dan Ellyke, E. 2022. Efektivitas Ekstrak Bawang Putih (*Allium sativum*) sebagai Repellent Lalat Rumah (*Musca domestica*). *Jurnal Ilmu Kesehatan Masyarakat*. 18(4): 251–258.
- Gustina, M., Ali, H., dan Kurniawan, Y. 2021. Efektivitas Ekstrak Daun Cengkeh (*Syzygium aromaticum*) dalam Mematikan Lalat Rumah (*Musca domestica*). *Journal of Nursing and Public Health*. 9(1): 61-68.
- Hao, T.Y., Hamzah, S.N., Alias, Z., Hao, T.Y., Hamzah, S.N., dan Alias, Z. 2020. Defence Against Oxidative Stress and Insecticides in *Musca domestica*. In Trends in Integrated Insect Pest Management. *IntechOpen*.
- Hasibuan, R., dan Gultom, E. 2021. The Effect of Method, Type of Solvent and Extraction Time Towards the Yield of Oil on Essential Oil Extraction from Lime Peel (*Citrus aurantifolia*). *IOP Conf. Ser.: Mater. Sci. Eng.* 1122(1): 012108.
- Hassan, A.O., Uyigue, P.O., Akinleye, C.A., dan Oyeromi, O.B. 2021. The Role of Common Housefly as a Mechanical Vector of Pathogenic Microorganisms. 3(1): 44-51.
- Kaur, H., Bhardwaj, U., dan Kaur, R. 2021. *Cymbopogon nardus* Essential Oil: A Comprehensive Review on its Chemistry and Bioactivity. *Journal of Essential Oil Research*. 33(3): 205–220.
- Kristanti, N.A., dan Purwani, K.I. 2022. Uji Efektivitas Formulasi Bioinsektisida Ekstrak Daun Waru (*Hibiscus tiliaceus*) terhadap Larva *Spodoptera litura* F. *Jurnal Sains dan Seni ITS*. 10(2): 23-28.
- Mukarram, M., Khan, M. M. A., Zehra, A., Choudhary, S., Naeem, M., dan Aftab, T. 2021. Biosynthesis of Lemongrass Essential Oil and the Underlying Mechanism for its Insecticidal Activity. *Medicinal and Aromatic Plants: and Industrial Applications*. 1(1): 429-443.
- ..., dan Kurniawati, E. 2023. Skrining Fitokimia, Total Flavonoid Daun Sereh Wangi (*Cymbopogon nardus* (L.) Rendle). *Jurnal Aplikasi Penelitian Kimia dan Terapannya*. 5(1): 62–70.
- ..., dan Budiarti, L. 2022. Toxicity and Compatibility of Botanical from Clove (*Syzygium aromaticum*), Lime (*Citrus aurantifolia*)



and Garlic (*Allium sativum*) Essential oil Against *Callasobruchus chinensis* L. *IOP Conf. Ser.: Earth Environ. Sci.* 1012(1): 012036.

- Permadi, N., Julaeha, E., Rosandi, Y., dan Nurzaman, M. 2021. Antioxidant Activity of Non-Volatile Lime (*Citrus aurantifolia* Swingle) Extract. *Jurnal Agrinika: Jurnal Agroteknologi dan Agribisnis.* 5(2): 122–128.
- Putri, F.D., Nurjanah, S., Widyasanti, A., dan Nuranjani, F. 2023. Ekstraksi Minyak Atsiri Kulit Jeruk Nipis (*Citrus aurantifolia* (Christm) Swingle) dengan Perbedaan Waktu Pengeringan. *Teknotan: Jurnal Industri Teknologi Pertanian.* 17(3): 207–216.
- Rusadi, M., dan Anwar, T. 2022. Efektivitas Ekstrak Daun Salam (*Syzygium polyanthum*) terhadap Kematian Lalat Rumah (*Musca domestica*). *Journal of Environmental Health and Sanitation Technology.* 1(2): 111-115.
- Sayekti, F.D.J., Qurrohman, M.T., Priyandari, D.A., dan Srikandini, C. 2020. Pengaruh Kombinasi Buah Jeruk Nipis dan Buah Mengkudu Terhadap Mortalitas *Pediculus humanus-capitis*. *At-Taqaddum.* 12(1): 47–54.
- Siskayanti, R., dan Kosim, M.E. 2021. Analisis Konsentrasi Minyak Atsiri dari Sereh Sebagai Aditif dalam Pembuatan Lotion Anti Nyamuk. *Jurnal Redoks.* 6(1): 26–34.
- Subaharan, K., Senthoorraja, R., Manjunath, S., Thimmegowda, G.G., Pragadheesh, V.S., Bakthavatsalam, N., Mohan, M.G., Senthil-Nathan, S., David, K.J., Basavarajappa, S., dan Ballal, C. 2021. Toxicity, Behavioural and Biochemical Effect of *Piper Betle* L. Essential Oil and its Constituents Against Housefly, *Musca domestica* L. Pesticide. *Biochemistry and Physiology.* 174(1): 104804.
- Susilowati, M., dan Syukur, C. 2022. Karakterisasi Beberapa Aksesori Serai Wangi (*Cymbopogon nardus* L.) Asal Cianjur. *Vegetalika.* 11(1): 305-309.
- Tavallali, H., Bahmanzadegan, A., Rowshan, V., dan Tavallali, V. 2021. Essential Oil Composition, Antioxidant Activity, Phenolic Compounds, Total Phenolic and Flavonoid Contents from Pomace of *Citrus aurantifolia*. *Journal of Medicinal Plants and By-Product.* 10(1): 103-116.
- Tonang, M.R., Hasnaeni, H., dan Handayani, V. 2023. Pengaruh Minyak Atsiri Kulit Buah Jeruk Nipis (*Citrus aurantiifolia* (Christm.) Swingle) Terhadap Larva *Aedes aegypti*. *Makassar Pharmaceutical Science Journal (MPSJ).* 1(1): 1–3.
- Wahyuni, D., Makonulamin, Sari, N.P. 2020. *Entomologi dan Pengendalian Vektor.* Publisher: Yogyakarta.

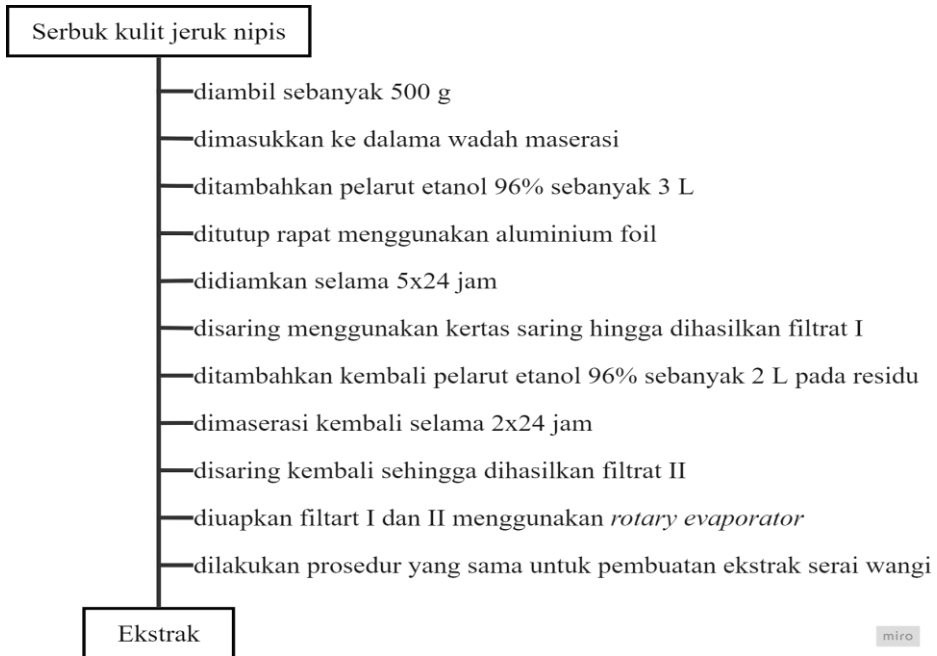


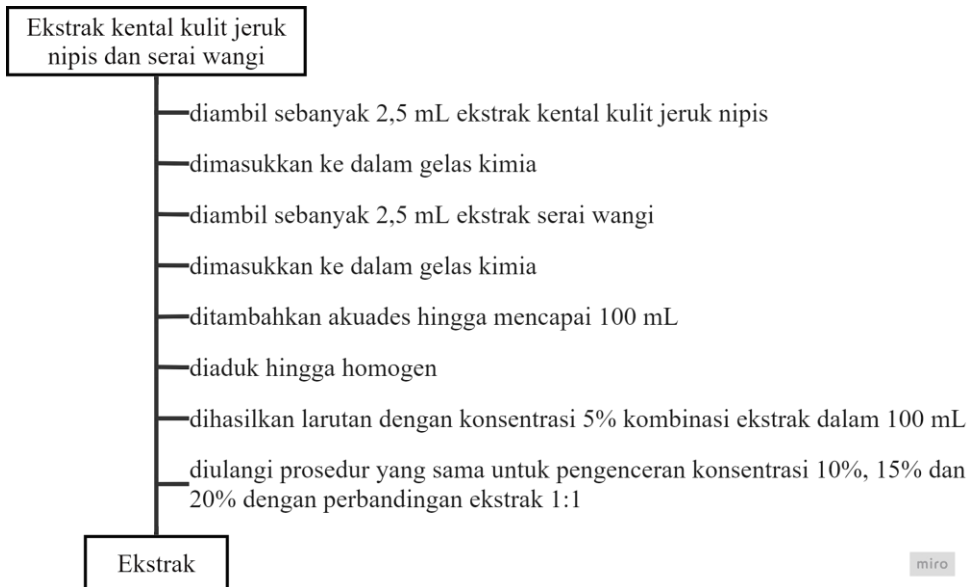
Optimization Software:
www.balesio.com

2021. Keragaman Jenis Serangga Diurnal di Kawasan Kampus Muhammadiyah Aceh sebagai Media Pembejaraan Zoologi *Jurnal Jeumpa.* 8(2): 631-643.

LAMPIRAN

Lampiran 1. Diagram alir ekstraksi kulit jeruk nipis dan serai wangi



Lampiran 2. Diagram alir formulasi *spray* bioinsektisida

Lampiran 3. Perhitungan Rendemen Ekstrak Kulit Jeruk Nipis dan Serai Wangi

Nama Sampel	Berat Sampel	Berat Ekstrak	Rendemen (%)
Kulit jeruk nipis	500 gram	73,0205 gram	14,6041%
Serai wangi	500 gram	73,5123 gram	14,70246%

1. Perhitungan Rendemen Ekstrak Kulit Jeruk Nipis

$$\% \text{ Rendemen} = \frac{\text{Bobot ekstrak kental (g)}}{\text{Bobot simplisia awal (g)}} \times 100\%$$

$$\% \text{ Rendemen} = \frac{73,0205 (g)}{500 (g)} \times 100\%$$

$$\% \text{ Rendemen} = 14,6041\%$$

2. Perhitungan Rendemen Ekstrak Serai Wangi

$$\% \text{ Rendemen} = \frac{\text{Bobot ekstrak kental (g)}}{\text{Bobot simplisia awal (g)}} \times 100\%$$

$$\% \text{ Rendemen} = \frac{73,5123 (g)}{500 (g)} \times 100\%$$

$$\% \text{ Rendemen} = 14,70246\%$$



Lampiran 4. Perhitungan Konsentrasi Ekstrak Kulit Jeruk Nipis dan Serai Wangi

1. Konsentrasi 5%

$$M_1 \times V_1 = M_2 \times V_2$$

$$100\% \times V_1 = 5\% \times 100 \text{ mL}$$

$$V_1 = \frac{5\% \times 100 \text{ mL}}{100\%}$$

$$V_1 = \frac{500 \text{ mL}}{100}$$

$$V_1 = 5 \text{ mL}$$

Jadi, 5 mL ekstrak kental yang digunakan untuk konsentrasi 5% dengan masing-masing 2,5 mL ekstrak kulit jeruk nipis dan 2,5 mL ekstrak serai wangi.

2. Konsentrasi 10%

$$M_1 \times V_1 = M_2 \times V_2$$

$$100\% \times V_1 = 10\% \times 100 \text{ mL}$$

$$V_1 = \frac{10\% \times 100 \text{ mL}}{100\%}$$

$$V_1 = \frac{1000 \text{ mL}}{100}$$

$$V_1 = 10 \text{ mL}$$

Jadi, 10 mL ekstrak kental yang digunakan untuk konsentrasi 10% dengan masing-masing 5 mL ekstrak kulit jeruk nipis dan 5 mL ekstrak serai wangi.

3. Konsentrasi 15%

$$M_1 \times V_1 = M_2 \times V_2$$

$$100\% \times V_1 = 15\% \times 100 \text{ mL}$$

$$V_1 = \frac{15\% \times 100 \text{ mL}}{100\%}$$

$$V_1 = \frac{1500 \text{ mL}}{100}$$

$$V_1 = 15 \text{ mL}$$

Jadi, 15 mL ekstrak kental yang digunakan untuk konsentrasi 15% dengan masing-masing 7,5 mL ekstrak kulit jeruk nipis dan 7,5 mL ekstrak serai wangi.

4. Konsentrasi 20%

$$M_1 \times V_1 = M_2 \times V_2$$

$$100\% \times V_1 = 20\% \times 100 \text{ mL}$$

$$V_1 = \frac{20\% \times 100 \text{ mL}}{100\%}$$

$$V_1 = \frac{2000 \text{ mL}}{100}$$

$$V_1 = 20 \text{ mL}$$

Jadi, 20 mL ekstrak kental yang digunakan untuk konsentrasi 20% dengan masing-masing 10 mL ekstrak kulit jeruk nipis dan 10 mL ekstrak serai wangi.



Lampiran 5. Data hasil penelitian**1. Jumlah lalat buah yang mati setelah pemaparan**

Ulangan (U)	Perlakuan (P)				
	P0 (%)	P1 (5%)	P2 (10%)	P3 (15%)	P4 (20%)
1	0	9	10	12	14
2	0	9	11	12	12
3	0	8	9	11	13
Jumlah	0	26	30	35	39
Rata-Rata	0	8,6	10	11,6	13

2. Hasil hitung persentase mortalitas lalat rumah**a. Konsentrasi 5%**

$$\text{Mortalitas (\%)} = \frac{\Sigma \text{lalat yang mati}}{\Sigma \text{lalat pada perlakuan}} \times 100\%$$

$$\text{Mortalitas (\%)} = \frac{26}{45} \times 100\%$$

$$\text{Mortalitas (\%)} = 57,78\%$$

b. Konsentrasi 10%

$$\text{Mortalitas (\%)} = \frac{\Sigma \text{lalat yang mati}}{\Sigma \text{lalat pada perlakuan}} \times 100\%$$

$$\text{Mortalitas (\%)} = \frac{30}{45} \times 100\%$$

$$\text{Mortalitas (\%)} = 66,67\%$$

c. Konsentrasi 15%

$$\text{Mortalitas (\%)} = \frac{\Sigma \text{lalat yang mati}}{\Sigma \text{lalat pada perlakuan}} \times 100\%$$

$$\text{Mortalitas (\%)} = \frac{35}{45} \times 100\%$$

$$\text{Mortalitas (\%)} = 77,78\%$$

d. Konsentrasi 20%

$$\text{Mortalitas (\%)} = \frac{\Sigma \text{lalat yang mati}}{\Sigma \text{lalat pada perlakuan}} \times 100\%$$

$$\text{Mortalitas (\%)} = \frac{39}{45} \times 100\%$$

$$\text{Mortalitas (\%)} = 86,67\%$$



Lampiran 6. Dokumentasi Penelitian



Gambar 7. Preparasi sampel kulit jeruk nipis dan serai wangi

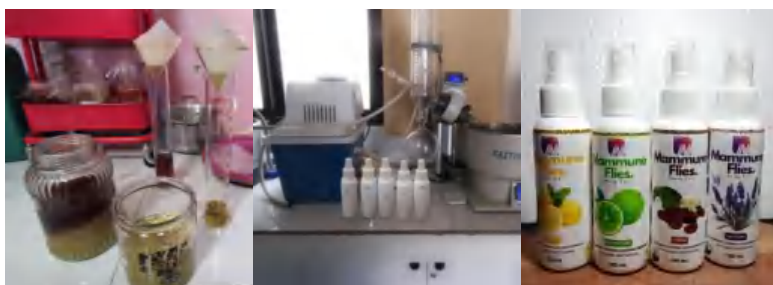


8. Maserasi sampel kulit jeruk nipis dan serai wangi





Gambar 9. Evaporasi larutan ekstrak kulit jeruk nipis dan serai wangi



Gambar 10. Formulasi *spray* kombinasi ekstrak kulit jeruk nipis dan serai wangi



Gambar 11. Hasil pengujian kombinasi ekstrak pada lalat rumah

