UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Abdelmohsen, U.R., Cheng, C., Reimer, A., Kozjak-Pavlovic, V., Ibrahim, A.K., Rudel, T., *et al.*, 2015. Antichlamydial sterol from the red sea sponge *Callyspongia aff implexa*. *Planta Medica*, **81**: 382–387.

Abimala, T. dan Rini, R.J., 2019. Classification of Distinct *Plasmodium* Species in Thin Blood Smear Images using Kapur Segmentation Strategy. *Research Journal of Pharmacy and Technology*, **12**: 2309.

Ahmad, M., Al-Wazzan, Y., Al-Odwani, A., dan Pallickal Thomas, J., 2017. Solid layer freeze crystallization processes for desalting saline waters. *Desalination and Water Treatment*, **66**: 60–71.

Alvarado, S., Roberts, B.F., Wright, A.E., dan Chakrabarti, D., 2013. The bis(Indolyl)imidazole alkaloid nortopsentin a exhibits antiplasmodial activity. *Antimicrobial Agents and Chemotherapy*, **57**: 2362–2364.

Amann, G., Gubitz, G., dan Santi, W., 1980. Spectrofluorimetric Determination of Pharmaceutical Compound with the Cerium System. *Analytica Chimica Acta*, **116**: 119–125.

Arnida, Sahi, E.R., dan Sutomo, 2017. Aktivitas Antiplasmodium In Vitro dan Identifikasi Golongan Senyawa dari Ekstrak Etanol Batang Manuran (*Coptosapelta tomentosa Valeton ex K.Heyne*) Asal Kalimantan Selatan. *Jurnal Ilmiah Ibnu Sina*, **2(2)**: 270–278.

Avilés, E., Prudhomme, J., Le Roch, K.G., dan Rodríguez, A.D., 2015. Structures, semisyntheses, and absolute configurations of the antiplasmodial α-substituted β-lactam monamphilectines B and C from the sponge *Svenzea flava*. *Tetrahedron*, 73(1): 487-494

Azlin, E., 2004. Obat Anti Malaria. *sari pediatri*, **5**: 3–7.

Baker, M.J., Trevisan, J., Bassan, P., Bhargava, R., Butler, H.J., Dorling, K.M., et al., 2014. Using Fourier transform IR spectroscopy to analyze biological materials. *Nature Protocols*, **9**: 1771–1791.

Basco, L.K., 2007. Field Application of In Vitro Assays for The Sensitivity of Human Malaria Parasites to Antimalarial Drugs. *World Health Organization*, 191.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Baumeister, S., Winterberg, M., Przyborski, J.M., dan Lingelbach, K., 2010. The malaria parasite *Plasmodium falciparum*: Cell biological peculiarities and nutritional consequences. *Protoplasma*, **240**: 3–12.

Beesoo, R., Bhagooli, R., Neergheen-Bhujun, V.S., Li, W.W., Kagansky, A., dan Bahorun, T., 2017. Antibacterial and antibiotic potentiating activities of tropical marine sponge extracts. *Comparative Biochemistry and Physiology Part - C: Toxicology and Pharmacology*, **196**: 81–90.

Bele, A.A. dan Khale., A., 2011. An Overview On Thin Layer Chromatography. *Journal of Pharmaceutical Sciences*, **2**: 256–267.

Benet, L.Z., Hosey, C.M., Ursu, O., dan Oprea, T.I., 2016. BDDCS, the Rule of 5 and drugability. *Advanced Drug Delivery Reviews*, **101**: 89–98.

Blunt, J.W., Copp, B.R., Keyzers, R.A., Munro, M.H.G., dan Prinsep, M.R., 2016. Marine natural products. *Natural Product Reports*, **33**: 382–431.

Botting, J.P. dan Muir, L.A., 2018. Early sponge evolution: A review and phylogenetic framework. *Palaeoworld*, **27**: 1–29.

Bouic, P.J.D., Etsebeth, S., Liebenberg, R.W., Albrecht, C.F., Pegel, K., dan Van Jaarsveld, P.P., 1996. Beta-sitosterol and beta-sitosterol glucoside stimulate human peripheral blood lymphocyte proliferation: Implications for their use as an immunomodulatory vitamin combination. *International Journal of Immunopharmacology*, **18**: 693–700.

Budiyanto, A. dan Amir, I., 1996. Mengenal Spons Laut (Demospongiae) Secara Umum. *Oseana*, **21**: 15–31.

Cai, L., 2014. Thin layer chromatography. *Current Protocols in Essential Laboratory Techniques*, **2014**: 6.3.1-6.3.18.

Campos, P.E., Pichon, E., Moriou, C., Clerc, P., Trépos, R., Frederich, M., et al., 2019. New antimalarial and antimicrobial tryptamine derivatives from the marine sponge *Fascaplysinopsis reticulata*. *Marine Drugs*, **17**: 1–10.

Carlton, J.M., Adams, J.H., Silva, J.C., Bidwell, S.L., Lorenzi, H., Caler, E., et al., 2008. Comparative genomics of the neglected human malaria parasite *Plasmodium vivax*. *Nature*, **455**: 757–763.

Carroll, A.R., Copp, B.R., Davis, R.A., Keyzers, R.A., dan Prinsep, M.R., 2019. Marine natural products. *Natural Product Reports*, **36**: 122–173.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Castañar, L. dan Parella, T., 2015. Recent advances in small molecule NMR: Improved HSQC and HSQMBC experiments. *Annual Reports on NMR Spectroscopy*, **84**: 163–232.

Castro, M.E., Gonzales-Iriarte, M., Barrero, A.F., Salvador-tormo, N., MU˜NOZ-CH´APULI, R., MEDINA, M.A., et al., 2004. Study of Puupehenone and Related Compounds as Inhibitors of Angiogenesis. *int. j. cancer*, **38**: 31–38.

Chang, Y.-C., Tseng, S.-W., Liu, L.-L., Chou, Y., Ho, Y.-S., Lu, M.-C., et al., 2012. Cytotoxic Sesterterpenoids from a Sponge *Hippospongia sp*. *Marine Drugs*, **10**: 987–997.

Chaniad, P., Phuwajaroanpong, A., Techarang, T., Viriyavejakul, P., Chukaew, A., dan Punsawad, C., 2022. Antiplasmodial activity and cytotoxicity of plant extracts from the *Asteraceae and Rubiaceae families*. *Heliyon*, **8**: e08848.

Chaudhary, S., Hisham, H., dan Mohamed, D., 2018. A review on phytochemical and pharmacological potential of watercress plant. *Asian Journal of Pharmaceutical and Clinical Research*, **11**: 102–107.

Ciavatta, M.L., Gresa, M.P.L., Gavagnin, M., Romero, V., Melck, D., Manzo, E., et al., 2007. Studies on puupehenone-metabolites of a *Dysidea sp* .: structure and biological activity. *Tetrahedron*, **63**: 1380–1384.

Collins, W.E., 2012. *Plasmodium knowlesi :* A Malaria Parasite of Monkeys and Humans . *Annual Review of Entomology*, **57**: 107–121.

Collins, W.E. dan Jeffery, G.M., 2007. *Plasmodium malariae*: Parasite and disease. *Clinical Microbiology Reviews*, **20**: 579–592.

Coronado, L., Zhang, X.Q., Dorta, D., Escala, N., Pineda, L.M., Ng, M.G., et al., 2021. Semisynthesis, Antiplasmodial Activity, and Mechanism of Action Studies of Isocoumarin Derivatives. *Journal of Natural Products*, **84**: 1434–1441.

Cowman, A.F., Berry, D., dan Baum, J., 2012. The cellular and molecular basis for malaria parasite invasion of the human red blood cell. *Journal of Cell Biology*, **198**: 961–971.

Damayanti, E., Lisdiyanti, P., Sundowo, A., Ratnakomala, S., Dinoto, A., Widada, J., et al., 2021. Antiplasmodial activity, biosynthetic gene clusters diversity, and secondary metabolite constituent of selected indonesian Streptomyces. *Biodiversitas*, **22**: 3478–3487.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Damayanti, E., Widada, J., Lotulung, P.D.N., Dinoto, A., dan Mustofa, 2020. Bioassay guided fractionation of marine *streptomyces sp*. GMY01 and antiplasmodial assay using microscopic and flow cytometry method. *Indonesian Journal of Pharmacy*, **31**: 281–289.

Dayananda, K.K., Achur, R.N., dan Gowda, D.C., 2018. Epidemiology, drug resistance, and pathophysiology of *Plasmodium vivax* malaria. *j vector borne dis*, **55**: 1–8.

Dinas Perikanan dan Kelautan, 2011. Kajian Cepat Kondisi Kelautan Provinsi Bali 2011.

Diyah Palupi, R., Studi Ilmu Kelautan, P., Perikanan dan Ilmu Kelautan, F., dan Halu Oleo Kampus Hijau Bumi Tridharma Anduonohu Kendari, U., 2016. Potential of species diversity and distribution of sponges in the coastal area of Saponda Laut isle Konawe Regency. *sapa laut*, **1**: 1–9.

Drozdov, A.L. dan Karpenko, A.A., 2013. Spicules of hexactinellid sponges (*Hexactinellida: Porifera*) as natural composite materials. *Russian Journal of Marine Biology*, **39**: 229–237.

Elyashberg, M., 2015. Identification and structure elucidation by NMR spectroscopy. *TrAC - Trends in Analytical Chemistry*, **69**: 88–97.

Erwin, Pusparohmana, W.R., Safitry, R.D., Marliana, E., Usman, dan Kusuma, I.W., 2020. Isolation and characterization of stigmasterol and β-sitosterol from wood bark extract of *baccaurea macrocarpa miq*. Mull. arg. *Rasayan Journal of Chemistry*, **13**: 2552–2558.

Fadlila, R.N.R., 2011. Isolasi dan Identifikasi Senyawa Metabolit Sekunder Ekstrak Etil Asetat dari Kulit Batang Nangka (*Artocarpus heterophylla Lamk*.).

Fattorusso, E., Parapini, S., Campagnuolo, C., Basilico, N., Taglialatela-Scafati, O., dan Taramelli, D., 2002. Activity against *Plasmodium falciparum* of cycloperoxide compounds obtained from the sponge *Plakortis simplex*. *Journal of Antimicrobial Chemotherapy*, **50**: 883–888.

Fitriastuti, D., 2017. Heme Polymerization Inhibition Activity (HPIA) Assay of Synthesized Xanthone Derivative as Antimalarial Compound. *International Conference on Chemistry, Chemical Process and Engineering*, .

Forner, D., Berrué, F., Correa, H., Duncan, K., dan Kerr, R.G., 2013. Chemical dereplication of marine actinomycetes by liquid chromatography-high

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

resolution mass spectrometry profiling and statistical analysis. *Analytica Chimica Acta*, **805**: 70–79.

Foth, B.J., Ralph, S.A., Tonkin, C.J., Struck, N.S., Fraunholz, M., Roos, D.S., et al., 2003. Dissecting apicoplast targeting in the malaria parasite *Plasmodium falciparum*. *Science*, **299**: 705–708.

Fotie, J., 2019. *Marine Natural Products as Strategic Prototypes in the Development of a New Generation of Antimalarial Agents*, Discovery and Development of Therapeutics from Natural Products Against Neglected Tropical Diseases. Elsevier Inc.

Gardiner, D.L., Dixon, M.W.A., Spielmann, T., Skinner-Adams, T.S., Hawthorne, P.L., Ortega, M.R., et al., 2005. Implication of a *Plasmodium falciparum* gene in the switch between asexual reproduction and gametocytogenesis. *Molecular and Biochemical Parasitology*, **140**: 153–160.

Gupta, D., 2015. Methods for determination of antioxidant capacity: A review. *International Journal of Pharmaceutical Sciences and Research*, **6**: 546–566.

Haldar, K., Bhattacharjee, S., Safeukui, I., Diseases, N., Sciences, G.L., dan Dame, N., 2019. Drug resistance in Plasmodium. *HHS Public Access*, **16**: 156–170.

Handojo, K.K., 2006. Distribusi Dan Preferensi Habitat Spons Provinsi Dki Jakarta.

Hassan, W., 2012. New β-Carboline Alkaloid from Marine Sponge *Hyrtios reticulatus*. *Biosciences Biotechnology Research Asia*, **9**: 39–42.

Herdiana, 2013. Isolasi, Identifikasi Dan Uji Bioaktivitas Metabolit Sekunder Ekstrak Kloroform Spons *Petrosia Alfiani* Dari Kepulauan Barrang Lompo. *Journal of Chemical Information and Modeling*, **53**: 1689–1699.

Hikmawan, B.D., 2021. 'Isolasi Dan Identifikasi Senyawa Bioaktif Spons dari Perairan Taman Nasional Bali Barat Indonesia Sebagai Inhibitor Polimerisasi Hem' (tesis). Tersedia di ETD UGM no 432963.

Hikmawan, B.D., Wahyuono, S., dan Setyowati, E.P., 2020. Marine sponge compounds with antiplasmodial properties: Focus on in vitro study against *Plasmodium falciparum*. *Journal of Applied Pharmaceutical Science*, **10**: 142–157.

Hinterberger, V., Damm, C., Haines, P., Guldi, D.M., dan Peukert, W., 2019. Purification and structural elucidation of carbon dots by column chromatography. *Nanoscale*, **11**: 8464–8474.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Hyde, J.E., 2007. Drug-resistant malaria - An insight. *FEBS Journal*, **274**: 4688–4698.

Imada, K., Sakai, E., Kato, H., Kawabata, T., dan Yoshinaga, S., 2013. Reticulatins A and B and hyrtioreticulin F from the marine sponge *Hyrtios reticulatus*. *Tetrahedron*, **69**: 7051–7055.

Indriani, I., Aminah, N.S., dan Puspaningsih, N.N.T., 2020. Antiplasmodial Activity of Stigmastane Steroids from *Dryobalanops oblongifolia* Stem Bark. *Open Chemistry*, **18**: 259–264.

Inman, W.D., Bray, W.M., Gassner, N.C., Lokey, R.S., Tenney, K., Shen, Y.Y., et al., 2010. A β-Carboline Alkaloid from the Papua New Guinea Marine Sponge *Hyrtios reticulatus*. *Journal of Natural Products*, **73**: 255–257.

Jabeen, H., Shafique, S., Burhan, Z.U.N., dan Siddiqui, P.J.A., 2018. Marine Sponge (Porifera: Demospongiae) *Liosina paradoxa Thiele*, 1899 from Sandspit backwater mangroves at Karachi coast, Pakistan. *Indian Journal of Geo-Marine Sciences*, **47**: 1296–1299.

Jensen, J.B. dan Trager, W., 1977. *Plasmodium falciparum* in culture: use of outdated erythrocytes and description of the candle jar method. *Journal of Parasitology*, **63**: 883–886.

Jeong, H., Latif, A., Kong, C.S., Seo, Y., Lee, Y.J., Dalal, S.R., et al., 2019. Isolation and characterization of antiplasmodial constituents from the marine sponge *Coscinoderma sp*. *Zeitschrift fur Naturforschung - Section C Journal of Biosciences*, **74**: 313–318.

Johnson, T.A., Sohn, J., Inman, W.D., Estee, S.A., Loveridge, S.T., Vervoort, H.C., et al., 2011. Natural product libraries to accelerate the high-throughput discovery of therapeutic leads. *Journal of Natural Products*, **74**: 2545–2555.

Kalathenos, P. dan Russel, N.J., 2005. *Ethanol as a Food Preservative.*, Food preservatives.

Kamaraj, C., Rahuman, A.A., Roopan, S.M., Bagavan, A., Elango, G., Zahir, A.A., et al., 2014. Bioassay-guided isolation and characterization of active antiplasmodial compounds from *Murraya koenigii* extracts against *Plasmodium falciparum* and *Plasmodium berghei*. *Parasitology Research*, **113**: 1657–1672.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Kaushik, N.K., Murali, T.S., Sahal, D., dan Suryanarayanan, T.S., 2014. A search for antiplasmodial metabolites among fungal endophytes of terrestrial and marine plants of southern India. *Acta Parasitologica*, **59**: 745–757.

Kemenkes, 2017. Buku Saku Tatalaksana Kasus Malaria. *Buku Saku Tatalaksana Kasus Malaria*, . Indonesia

Kementerian Kesehatan RI, 2019. Pedoman Tatalaksana Kemenkes 1–64.

Kim, J., Tan, Y.Z., Wicht, K.J., Erramilli, S.K., Dhingra, S.K., Okombo, J., et al., 2019. Structure and drug resistance of the *Plasmodium falciparum* transporter PfCRT. *Nature*, **576**: 315–320.

Kirsch, G., Köng, G.M., Wright, A.D., dan Kaminsky, R., 2000. A new bioactive sesterterpene and antiplasmodial alkaloids from the marine sponge *Hyrtios cf. erecta*. *Journal of Natural Products*, **63**: 825–829.

Kumar, G.S., Noorjahan, Reddy, G., Mujahid, S.K., Ashwini, T., dan Chary, V., 2018. Extraction, Phytochemical Studies and In_Vitro Screening of the Leaves and Flowers of *Crossandra infundibuliformis* against *Mycobacterium tuberculosis*. *Asian Journal of Research in Pharmaceutical Science*, **8**: 247–252.

Kumar, S.C.M., 2017. Drug resistance in malaria. *Drug Resistance in Bacteria, Fungi, Malaria, and Cancer*, 429–447.

Kurmukov, A.G., 2013. Phytochemistry of medicinal plants. *Medicinal Plants of Central Asia: Uzbekistan and Kyrgyzstan*, **1**: 13–14.

Ledroit, V., Debitus, C., Ausseil, F., Raux, R., Menou, J.L., dan Hill, B.T., 2004. Heteronemin as a protein farnesyl transferase inhibitor. *Pharmaceutical Biology*, **42**: 454–456.

Lee, M., Liu, Y., Lee, Y., El-shazly, M., dan Lai, K., 2018. Heteronemin, a Marine Sesterterpenoid-Type Metabolite, Induces Apoptosis in Prostate LNcap Cells via Oxidative and ER Stress Combined with the Inhibition of Topoisomerase II and Hsp90. *Marine Drugs*, **16**: 204–228.

Liu, Y., Lee, C.O., dan Jung, J.H., 2002. Cyclitol Derivatives from the Sponge *Sarcotragus Species*. *Bull. Korean Chem. Soc*, **23**: 1467–1469.

Loizou, S., Lekakis, I., Chrousos, G.P., dan Moutsatsou, P., 2010. β-Sitosterol exhibits anti-inflammatory activity in human aortic endothelial cells. *Molecular Nutrition and Food Research*, **54**: 551–558.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Lun, Z.R., Ferreira, P.E., dan Fu, L.C., 2014. Artemisinin resistance in *Plasmodium falciparum*. *The Lancet Infectious Diseases*, **14**: 450–451.

Mahfur, M., Setyowati, E.P., Wahyuono, S., dan Purwantini, I., 2022. Sponge *Hyrtios reticulatus* : Phytochemicals and Bioactivities. *Research J. Pharm. and Tech.*, **15**: 1–7.

Mani, L., Jullian, V., Mourkazel, B., Valentin, A., Dubois, J., Cresteil, T., et al., 2012. New antiplasmodial bromotyrosine derivatives from suberea ianthelliformis lendenfeld, 1888. *Chemistry and Biodiversity*, **9**: 1436–1451.

Mani, L., Petek, S., Valentin, A., Chevalley, S., Folcher, E., Aalbersberg, W., et al., 2011. The invivo anti-plasmodial activity of haliclonacyclamine A, an alkaloid from the marine sponge, *Haliclona sp*. *Natural Product Research*, **25**: 1923–1930.

Marzuki, I., 2018. *Eksplorasi Spons Indonesia : Seputar Kepulauan Spermonde*.

Marzuki, I., Erniaty. 2017. Skrining Spons Potensial Sebagai Biodegradator Hidrokarbon Berdasarkan Data Morfologi. *Prosiding Seminar Nasional Hasil Penelitian (SNP2M).* 1(1):43-48

McCarthy, P.J., Roberts, B.F., Carbonell, A., Roberts, J., Wright, A.E., dan Chakrabarti, D., 2019. Marine microbiome as a source of antimalarials. *Tropical Medicine and Infectious Disease*, **4**: 1–9.

Mckee, T.C., Rabe, D., Bokesch, H.R., Grkovic, T., Whitson, E.L., Diyabalanage, T., et al., 2012. Inhibition of Hypoxia Inducible Factor - 2 Transcription: Isolation of Active Modulators from Marine Sponges. *Journal of Natural Products*, **75**: 1632–1636.

Mehbub, M.F., Lei, J., Franco, C., dan Zhang, W., 2014. Marine sponge derived natural products between 2001 and 2010: Trends and opportunities for discovery of bioactives. *Marine Drugs*, **12**: 4539–4577.

Miller, J.M., 2009. *Chromatography. Digital Encyclopedia of Applied Physics*.

Mungthin, M., Bray, P.G., Ridley, R.G., dan Ward, S.A., 1998. Central role of hemoglobin degradation in mechanisms of action of 4- aminoquinolines, quinoline methanols, and phenanthrene methanols. *Antimicrobial Agents and Chemotherapy*, **42**: 2973–2977.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Murtihapsari, M., Salam, S., Kurnia, D., Darwati, D., Kadarusman, K., Abdullah, F.F., et al., 2019. A new antiplasmodial sterol from Indonesian marine sponge, *Xestospongia sp. Natural Product Research*, **0**: 1–8.

Mustofa, Sholikhah, E.., dan Wahyuono, S., 2007. Antiplasmodial Activity and Cytotoxicity of *Phyllanthus Niruri L. Southeast Asian J Trop Med Public Health*, **38**: 609–615.

Muthiyan, R., Nambikkairaj, B., Mahanta, N., Immanuel, T., Mandal, R.S., Kumaran, K., et al., 2017. Antiproliferative and Proapoptotic Activities of Marine Sponge *Hyrtios erectus* Extract on Breast Carcinoma Cell Line (MCF-7). *Pharmacogn,mag*, **13**: 41–47.

Muti'ah, R., 2013. Penyakit Malaria Dan Mekanisme Kerja Obat-Obat Antimalaria. *Alchemy*, **2**: 80–91.

Natalia, D., 2015. Peranan Trombosit Dalam Patogenesis Malaria. *Majalah Kedokteran Andalas*, **37**: 219.

Naturena, R., Sulastri, S., Widyastuti, D., 2017. Potensi wisata Pulau Menjangan di Taman Nasional Bali Barat. *Konservasi Sumberdaya Hutan Jurnal Ilmu Ilmu Kehutanan*, 1(4):92-113

Novotny, L., Abdel-hamid, M.E., dan Hunakova, L., 2017. International journal of clinical Pharmacology & pharmacotherapy anticancer potential of β-sitosterol. *International Journal of Clinical Pharmacology & Pharmacotherapy*, **2**: 2–5.

Pallela, R. dan Ehrlich, H., 2016. Marine sponges: Chemicobiological and biomedical applications. *Marine Sponges: Chemicobiological and Biomedical Applications*, 1–381.

Paloque, L., Ramadani, A.P., Mercereau-Puijalon, O., Augereau, J.M., dan Benoit-Vical, F., 2016. *Plasmodium falciparum*: multifaceted resistance to artemisinins. *Malaria Journal*, **15**: 1–12.

Parhizgar, A.R., 2017. Introducing new antimalarial analogues of chloroquine and amodiaquine: A narrative review. *Iranian Journal of Medical Sciences*, **42**: 115–128.

Pavia, D.L., Lampman, G.M., Kriz, G.S., dan Vyvyan, J.R., 2001. *Spectroscopy 4th Ed*. washington, United State of America.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Pavia, D.L., Lampman, G.M., Kriz, G.S., dan Vyvyan, J.A., 2014. Introduction to Spectroscopy, 5th edition. ed. Cengage Learning, Stamford, CT

Peng, S., 2009. Methods and Applications of Antimalarial Assays. *Pharmaceutical Bioassays: Methods and Applications*, 397–417.

Philip, K., Cheplogoi, P.K., Elizabeth, M.M., Hoseah, M.A., dan Langat, M.K., 2019. Assessment of Antiplasmodial Activity and Toxicity of Crude Extracts and Isolated Compounds from *Oncoba spinosa* (*Flacourtiaceae)*. *Journal of Advances in Medical and Pharmaceutical Sciences*, **21**: 1–14.

Poostchi, M., Silamut, K., Maude, R., Jaeger, S., dan Thoma, G., 2017. Image Analysis and Machine Learning for Detecting Malaria. *Translational Research*, .

Purwantini, I., Wahyono, Mustofa, Susidarti, R.A., Sholikhah, E.N., dan Hestiyani, R.A.N., 2016. Antiplasmodial activity of endophytic fungi isolated from *Artemisia annua*, L. *International Journal of Pharmaceutical and Clinical Research*, **8**: 341–344.

Putra, M.Y., Murniasih, T., Wibowo, J.T., Hadi, T.A., Untari, F., Nisa, A.C., et al., 2016. Phenolic content, anti-oxidant, anti-plasmodium and cytotoxic properties of the sponge *Acanthella cavernosa*. *Asian Pacific Journal of Tropical Disease*, **6**: 811–815.

Qin, S., Muller, W.E.., dan Cooper, E.L., 2011. *Marine Biotechnology*, Encyclopedia of Ocean Sciences.

Reteng, P., Vrisca, V., Sukarno, I., Djarkoni, I.H., Kalangi, J.A., Jacobs, G.E., et al., 2017. Genetic polymorphisms in *Plasmodium falciparum* chloroquine resistance genes pfcrt and pfmdr1 in North Sulawesi , Indonesia. *BMC Research Notes*, **10**: 1–8.

Roos, D.S., Crawford, M.J., Donald, R.G.K., Fraunholz, M., Harb, O.S., He, C.Y., et al., 2002. Mining the *Plasmodium* genome database to define organellar function: What does the apicoplast do? *Philosophical Transactions of the Royal Society B: Biological Sciences*, **357**: 35–46.

Rosenthal, P.J., 2003. Antimalarial drug discovery: Old and new approaches. *Journal of Experimental Biology*, **206**: 3735–3744.

Rout, S. dan Mahapatra, R.K., 2019. *Plasmodium falciparum*: Multidrug resistance. *Chemical Biology and Drug Design*, **93**: 737–759.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Salmoun, M. dan Devijver, C., 2002. 5-Hydroxytryptamine-Derived Alkaloids from Two Marine Sponges of the Genus *Hyrtios*. *Journal of Natural Products*, **65**: 1173–1176.

Sarker, S.D., Latif, Z., dan Gray, A.I., 2006. *Natural Products Isolation Second Edition*. Humana Press Inc., Totowa, New Jersey.

Sen, A., Dhavan, P., Shukla, K.K., Singh, S., dan Tejovathi, G., 2013. Analysis of IR, NMR and Antimicrobial Activity of β-Sitosterol Isolated from *Momordica charantia*. *Sci Secure J Biotech*, **1**: 9–13.

Setyowati, E.P., Jenie, U.A., Kardono, B., Rahmat, R., dan Meiyanto, E., 2007. Isolasi Senyawa Sitotoksik Spons Kaliapsis Isolation of Cytotoxic Substance From Kaliapsis sponge. *Jurnal Makalah Indonesia*, **18**: 183–189.

Setyowati, E.P., Jenie, U.A., Sudarsono, Kardono, L.B.S., dan Rahmat, R., 2008. Identification of cytotoxic constituent of Indonesian sponge *Kaliapsis sp*. (Bowerbank). *Pakistan Journal of Biological Sciences*, **11**: 2560–2566.

Setyowati, E.P., Jenie, U.A., Sudarsono, Kardono, L.B.S., dan Rahmat, R., 2009. Theonellapeptolide Id: Structure identification of cytotoxic constituent from *Kaliapsis sp*. sponge (Bowerbank) collected from West Bali Sea Indonesia. *Journal of Biological Sciences*, **9**: 29–36.

Setyowati, E.P., Pratiwi, S.U.T., Purwantiningsih, dan Samirana, P.O., 2018. Antimicrobial activity and Identification of fungus associated *Stylissa flabelliformis* sponge collected from Menjangan Island West Bali National Park, Indonesia. *Indonesian Journal of Pharmacy*, **29**: 66–73.

Setyowati, E.P., Sudarsono, S., dan Murwanti, R., 2017. *Penares sp* sponge from Menjangan Island-water West Bali National Park: Isolation of Cytotoxic Compounds. *Majalah Obat Tradisional*, **22**: 153.

Sholikhah, E.N., Wijayanti, M.A., Nurani, L.H., dan Mustofa, M., 2019. Aktivitas Antiplasmodium dan Sitotoksisitas Isolat Akar Pasak Bumi (*Eurycoma longifolia Jack*) secara In Vitro. *Majalah Farmaseutik*, **14**: 54.

Sholikhah, E.N., Wijayanti, M.A., Susidarti, R.A., Purwantini, I., Hestiyani, R.A.N., Yusuf, H., et al., 2016. Stage specificity of eurycomanone isolated from *Eurycoma longifolia* on *Plasmodium falciparum* cycles. *American Journal of Pharmacology and Toxicology*, **11**: 1–7.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Silverstein, R.M., Webster, F.X., dan Kiemle, D.J., 2005. *Spectrometric Identification of Organic Compounds 7th Ed*, 7th edition. Newyork, United State of America.

Silverstein, R.M., Webster, F.X., Kiemle, D.J., dan Bryce, D.L., 2014. Spectrometric Identification of Organic Compounds, 8th edition. ed. Wiley, Hoboken, NJ.

Simeonov, E., Tsibranska, I., dan Minchev, A., 1999. Solid-liquid extraction from plants - experimental kinetics and modelling. *Chemical Engineering Journal*, **73**: 255–259.

Singh, A. dan Thakur, N.L., 2021. Allelopathic interaction among rocky intertidal invertebrates : sponge *Cinachyrella cf . cavernosa* and *Zooxanthellate zoanthids zoanthus*. *Hydrobiologia*, 848, 4647–4659

Song, Y., Qu, Y., Cao, X., Zhang, W., Zhang, F., Linhardt, R.J., et al., 2021. Cultivation of fractionated cells from a bioactive-alkaloid-bearing marine sponge *Axinella sp. In Vitro Cellular and Developmental Biology - Animal*, **57**: 539–549.

Strömstedt, A.A., Felth, J., dan Bohlin, L., 2014. Bioassays in natural product research - Strategies and methods in the search for anti-inflammatory and antimicrobial activity. *Phytochemical Analysis*, **25**: 13–28.

Susidarti, R.A., 2014. In Vitro Antiplasmodial Activity Of Coumarin 8-hydroxyisocapnolactone-2',3'-diol Isolated From *Micromelum Minutum (G. Forst*.) Wight & Arn. *Indonesian Journal of Pharmacy*, **25**: 44.

Syarif, R.A., Wahyuningsih, M.S.H., Mustofa, M., dan Ngatidjan, N., 2018. Antiplasmodial and onset speed of growth inhibitory activities of *Tithonia diversifolia* (Hemsley) A Gray leaf fractions against *Plasmodium falciparum*. *Trop J Pharm Res*, **17**: 2213–2218.

Talapko, J., Škrlec, I., Alebić, T., Jukić, M., dan Včev, A., 2019. Malaria: The past and the present. *Microorganisms*, 7(6): 179.

Tang, Q., Wan, B., Yuan, X., Muscente, A.D., dan Xiao, S., 2019. Spiculogenesis and biomineralization in early sponge animals. *Nature Communications*, **10**: 3348.

Tapilatu, Y.H., 2015. Status of Drug Discovery Research Based on Marine Organisms from Eastern Indonesia. *Procedia Chemistry*, **14**: 484–492.

UNIVERSITAS
GADJAH MADA
Isolasi Senyawa Aktif Antiplasmodium Spons Hyrtios reticulatus dari Perairan Kepulauan Menjangan Taman Nasional Bali Barat
Mahfur, Prof. Dr. apt. Erna Prawita Setyowati, M.Si.; Prof. Dr. apt. Subagus Wahyuono. M. Sc.; Dr. apt. Indah Purwar
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Taşdemir, D., Bugni, T.S., Mangalindan, G.C., Concepción, G.P., Harper, M.K., dan Ireland, C.M., 2003. Bisabolane type sesquiterpenes from a marine *Didiscus* sponge. *Turkish Journal of Chemistry*, **27**: 273–279.

Tjitra, E., Hasugian, A.R., Siswantoro, H., Prasetyorini, B., Ekowatiningsih, R., Yusnita, E.A., et al., 2012. Efficacy and safety of artemisinin-naphthoquine versus dihydroartemisinin- piperaquine in adult patients with uncomplicated malaria: A multi-centre study in Indonesia. *Malaria Journal*, **11**: 1–14.

Tsukamoto, S., Kawabata, T., Kato, H., Ohta, T., Rotinsulu, H., dan Mangindaan, R.E.P., 2007. Naamidines H and I , Cytotoxic Imidazole Alkaloids from the Indonesian Marine Sponge *Leucetta chagosensis*. *Journal of Natural Products*, **70**: 1658–1660.

Ursing, J., Johns, R., Aydin-Schmidt, B., Calçada, C., Kofoed, P.E., Ghanchi, N.K., et al., 2022. Chloroquine-susceptible and -resistant *Plasmodium falciparum* strains survive high chloroquine concentrations by becoming dormant but are eliminated by prolonged exposure. *Journal of Antimicrobial Chemotherapy*, **77**: 1005–1011.

Vigbedor, B.Y., Osei-Owusu, J., Kwakye, R., dan Neglo, D., 2022. Bioassay-Guided Fractionation, ESI-MS Scan, Phytochemical Screening, and Antiplasmodial Activity of *Afzelia africana*. *Biochemistry Research International*, **2022**: .

World Health Organization, 2019. *World Malaria Report 2019*. Jenewa

World Health Organization, 2022. *World Malaria Report 2022*, Jenewa.

Yamanokuchi, R., Imada, K., Miyazaki, M., Kato, H., Watanabe, T., Fujimuro, M., et al., 2012a. Hyrtioreticulins A-E, indole alkaloids inhibiting the ubiquitin-activating enzyme, from the marine sponge *Hyrtios reticulatus*. *Bioorganic and Medicinal Chemistry*, **20**: 4437–4442.

Yamanokuchi, R., Imada, K., Miyazaki, M., Kato, H., Watanabe, T., Watanabe, M., et al., 2012b. Hyrtioreticulins A–E, indole alkaloids inhibiting the ubiquitin-activating enzyme, from the marine sponge *Hyrtios reticulatus*. *Bioorganic & Medicinal Chemistry*, **20**: 4437–4442.

Zhou, W., Wang, H., Yang, Y., Chen, Z.S., Zou, C., dan Zhang, J., 2020. Chloroquine against malaria, cancers and viral diseases. *Drug Discovery Today*, **25**: 2012–2022.