

## DAFTAR PUSTAKA

- Adler-Nissen, Jens. 1984. "Control of the Proteolytic Reaction and of the Level of Bitterness in Protein Hydrolysis Processes." *Journal of chemical technology and biotechnology. Biotechnology* 34 B(3): 215–22.
- Aini, Alvina Nur. 2022. "Studi Proteomik Pada Protein Otot Rattus Norvegicus Menggunakan Spektrometri Massa Resolusi Tinggi." *Warta Akab* 46(1): 67–74.
- Anbu, Periasamy, Subash C.B. Gopinath, Bidur Prasad Chaulagain, and Thangavel Lakshmipriya. 2017. "Microbial Enzymes and Their Applications in Industries and Medicine 2016." *BioMed Research International* 2017.
- Ariandi. 2016. "Pengenalan Enzim Amilase (Alpha-Amylase) Dan Reaksi Enzimatiknya Menghidrolisis Amilosa Pati Menjadi Glukosa." *Jurnal Dinamika* 07(1): 74–82.
- Anonim. 2007. "Diagnosis and Classification of Diabetes Mellitus." *Diabetes Care* 30(SUPPL. 1).
- Anonim. 2017. "Idf Diabetes Atlas."
- Anonim. 2020. "Infodatin Tetap Produktif, Cegah, Dan Atasi Diabetes Melitus 2020." *Pusat Data dan Informasi Kementerian Kesehatan RI*: 1–10.
- Asokan, Shibu Marthandam, Ting Wang, Wei-ting Su, and Wan-teng Lin. 2019. "Antidiabetic Effects of a Short Peptide of Potato Protein Hydrolysate in STZ-Induced Diabetic Mice."
- Atmawati, D. R., Z. Andriana, R. T. Swasono, and T. J. Raharjo. 2022. "Antibacterial Peptide From Solid Phase Extraction (SPE) Fractionation on Trypsin Hydrolysis of *Jatropha (Ricinus communis)* Seed Protein Acid Extract." *Rasayan Journal of Chemistry* 15(2): 1288–95.
- Banerjee, Shibdas, and Shyamalava Mazumdar. 2012. "Electrospray Ionization Mass Spectrometry: A Technique to Access the Information beyond the Molecular Weight of the Analyte." *International Journal of Analytical Chemistry* 2012: 1–40.
- Bernaldez, M. J.A., J. B. Billones, and A. Magpantay. 2018. "In Silico Analysis of Binding Interactions between GSK983 and Human DHODH through Docking and Molecular Dynamics." *AIP Conference Proceedings* 2045.
- Bondu, Stéphanie et al. 2015. "Bioassay-Guided Fractionation Approach for Determination of Protein Precursors of Proteolytic Bioactive Metabolites from Macroalgae." *Journal of Applied Phycology* 27(5): 2059–74.
- Buchmann, Leandro et al. 2019. "Pulsed Electric Field Based Cyclic Protein Extraction of Microalgae towards Closed-Loop Biorefinery Concepts." *Bioresource Technology* 291(July): 121870. <https://doi.org/10.1016/j.biortech.2019.121870>.
- Burkhart, Julia Maria et al. 2012. "Systematic and Quantitative Comparison of Digest Efficiency and Specificity Reveals the Impact of Trypsin Quality on MS-Based Proteomics." *Journal of Proteomics* 75(4): 1454–62. <http://dx.doi.org/10.1016/j.jprot.2011.11.016>.
- Byanju, Bibek, Md Mahfuzur Rahman, Milagros P. Hojilla-Evangelista, and Buddhi P.

- Lamsal. 2020. "Effect of High-Power Sonication Pretreatment on Extraction and Some Physicochemical Properties of Proteins from Chickpea, Kidney Bean, and Soybean." *International Journal of Biological Macromolecules* 145: 712–21. <https://doi.org/10.1016/j.ijbiomac.2019.12.118>.
- Bylund, D. B., and E. G. Krebs. 1975. "Effect of Denaturation on the Susceptibility of Proteins to Enzymic Phosphorylation." *Journal of Biological Chemistry* 250(16): 6355–61. [http://dx.doi.org/10.1016/S0021-9258\(19\)41074-0](http://dx.doi.org/10.1016/S0021-9258(19)41074-0).
- Cengiz, S., L. Cavas, and K. Yurdakoc. 2010. "Alpha-Amylase Inhibition Kinetics by *Caulerpenyne*." *Mediterranean Marine Science* 11(1): 93–103.
- Chaudhury, Arun et al. 2017. "Clinical Review of Antidiabetic Drugs: Implications for Type 2 Diabetes Mellitus Management." *Frontiers in Endocrinology* 8(January).
- Cheng, Hui Teng, Xiaoqi Xu, Paik Seong Lim, and Kuan Yu Hung. 2021. "Worldwide Epidemiology of Diabetes-Related End-Stage Renal Disease, 2000-2015." *Diabetes care* 44(1): 89–97.
- Cho, N H et al. 2018. "IDF Diabetes Atlas : Global Estimates of Diabetes Prevalence for 2017 and Projections for 2045." *Diabetes Research and Clinical Practice* 138: 271–81. <https://doi.org/10.1016/j.diabres.2018.02.023>.
- Compagno, L. J V. 1998. 3 *Fao Species Identification Guide For Fishery Purposes Western Central Edited by Norwegian Agency for International Development*.
- Damar, Ibrahim Halil. 2020. "The Role of Macrophage in Atherosclerosis: An Overview." *Erciyes Medical Journal*.
- Damayanti, M. E. 2019. "Kajian Salinitas Terhadap Pertumbuhan, Morfologi Sel Dan Kandungan Proksimat Rumput Laut (*Caulerpa Racemosa*) Di Tambak Bbpap Jepara, Jawa Tengah." Universitas Brawijaya.
- Dean, John R. 2009. "Catalogo Supelco." *Fenxi Huaxue* 28(9): 49–84.
- Dhevika, Sivakumar, and Balaraman Deivasigamani. 2018. "Phytochemical Profiling and GC-MS Analysis of *Caulerpa Racemosa*." *Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences* 4(5): 155–65.
- Duong-Ly, Krisna C., and Sandra B. Gabelli. 2014. 541 *Methods in Enzymology Salting out of Proteins Using Ammonium Sulfate Precipitation*. 1st ed. Elsevier Inc. <http://dx.doi.org/10.1016/B978-0-12-420119-4.00007-0>.
- El-Aneed, Anas, Aljandro Cohen, and Joseph Banoub. 2009. "Mass Spectrometry, Review of the Basics: Electrospray, MALDI, and Commonly Used Mass Analyzers." *Applied Spectroscopy Reviews* 44(3): 210–30.
- Erener, Suheda. 2020. "Diabetes , Infection Risk and COVID-19." *Molecular Metabolism* 39(June): 101044. <https://doi.org/10.1016/j.molmet.2020.101044>.
- Estrada, Jeremiaiah L., Nonnatus S. Bautista, and Maribel L. Dionisio-Sese. 2020. "Morphological Variation of Two Common Sea Grapes (*Caulerpa Lentillifera* and *Caulerpa Racemosa*) from Selected Regions in the Philippines." *Biodiversitas* 21(5): 1823–32.
- Fajriah, Sofa, Ilmi Fadhilah Rizki, and Ellya Sinurat. 2021. "Characterization and Analysis of the Antidiabetic Activities of Sulphated Polysaccharide Extract from *Caulerpa Lentillifera*." *Pharmacia* 68(4): 869–75.

- Fan, Jiyu, Ailing Fu, and Le Zhang. 2019. "Progress in Molecular Docking." *Quantitative Biology* 7(2): 83–89.
- Fekete, Szabolcs, Alain Beck, Jean Luc Veuthey, and Davy Guillarme. 2015. "Ion-Exchange Chromatography for the Characterization of Biopharmaceuticals." *Journal of Pharmaceutical and Biomedical Analysis* 113: 43–55. <http://dx.doi.org/10.1016/j.jpba.2015.02.037>.
- Fikrika, H., L. Ambarsari, and T. Sumaryada. 2016. "Molecular Docking Studies of Catechin and Its Derivatives as Anti-Bacterial Inhibitor for Glucosamine-6-Phosphate Synthase." *IOP Conference Series: Earth and Environmental Science* 31(1).
- Fitri, Ardhista Shabrina, and Yolla Arinda Nur Fitriana. 2020. "Analisis Senyawa Kimia Pada Karbohidrat." *Sainteks* 17(1): 45.
- Fitrianingsih, Peni, Indra Topik Maulana, Ratu Choesrina, and Ratih Aprilliani. 2014. "Uji Aktivitas Penghambatan Alfa Amilase Ekstrak Daun." : 108–15.
- Fuadi, AM, Kun Harismah, and Adi Setiawan. 2015. "Hidrolisis Enzimatis Kertas Bekas Dengan Variasi Pemanasan Awal." *University Research Colloquium*: 1–8.
- de Gaillande, Clara, Claude Payri, Georges Remoissenet, and Mayalen Zubia. 2017. "Caulerpa Consumption, Nutritional Value and Farming in the Indo-Pacific Region." *Journal of Applied Phycology* 29(5): 2249–66.
- Głowacki, Eric Daniel, Mihai Irimia-Vladu, Siegfried Bauer, and Niyazi Serdar Sariciftci. 2013. "Hydrogen-Bonds in Molecular Solids-from Biological Systems to Organic Electronics." *Journal of Materials Chemistry B* 1(31): 3742–53.
- Hao, Huili et al. 2019. "Chemical Composition and Immunostimulatory Properties of Green Alga *Caulerpa Racemosa* Var *Peltata*." *Food and Agricultural Immunology* 30(1): 937–54.
- Heumassy, Alcytha Pascallia, Prelly M Tuapattinaya, and Ine Arini. 2016. "Keanekaragaman dan Pola Distribusi Anggur Laut (*Caulerpa Sp*) Di Desa Letman Kecamatankei Kecil Kabupaten Maluku Tenggara." *BIOPENDIX: Jurnal Biologi, Pendidikan dan Terapan* 2(2): 112–18.
- Hsu, Jue-liang. 2018. "Screening of Angiotensin-I Converting Enzyme Inhibitory Peptides Derived From." *Molecules* 23(11), 30(Cvd): 1–15.
- Hu, Qizhi et al. 2005. "The Orbitrap: A New Mass Spectrometer." *Journal of Mass Spectrometry* 40(4): 430–43.
- Huda, Muhammad Badrul, Endang Astuti, and Tri Joko Raharjo. 2021. "Synthesis of Mono-Ketone Curcumin Analogs from 3-Benzoyloxybenzaldehyde and Their Activity Assay as Inhibitor of  $\alpha$ -Amylase." *Key Engineering Materials* 884: 304–11.
- Ibañez, Elena, and Alejandro Cifuentes. 2013. "Benefits of Using Algae as Natural Sources of Functional Ingredients." *Journal of the Science of Food and Agriculture* 93(4): 703–9.
- Issaq, Haleem J. et al. 2005. "Multidimensional Separation of Peptides for Effective Proteomic Analysis." *Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences* 817(1): 35–47.

- Iyos, Rekha Nova, and Putri Dhea Astuti. 2017. "Pengaruh Ekstrak Daun Sirsak (*Annona Muricata* L.) Terhadap Penurunan Kadar Glukosa Darah." *Jurnal Majority* 6(2): 144–48.
- Juhász, János, Zoltán Gáspári, and Sándor Pongor. 2020. "Structure and Oxidative Folding of AAI, the Major Alfa-Amylase Inhibitor From Amaranth Seeds." *Frontiers in Chemistry* 8(March): 1–7.
- Karimi, Amin. 2020. "Fractionation of Hydrolysate from Corn Germ Protein by Ultrafiltration: In Vitro Antidiabetic and Antioxidant Activity." (February): 2395–2405.
- Kastritis, Panagiotis L, and Alexandre M J J Bonvin. 2012. "Information Sources for Data-Driven HADDOCKing HADDOCK Can Use a Variety of Experimental Information during the Docking of Protein Complexes. Initially Developed to Exploit Chemical Shift Perturbation Data (Measured by NMR Titrations), HADDOCK Slowly "Le." *NMR of Biomolecules: Towards Mechanistic Systems Biology*.
- Khan, Haroon, Seyed Mohammad Nabavi, and Solomon Habtemariam. 2018. "Anti-Diabetic Potential of Peptides : Future Prospects as Therapeutic Agents." *Life Sciences* 193(September 2017): 153–58.  
<https://doi.org/10.1016/j.lfs.2017.10.025>.
- Kumar, Manoj et al. 2021. "Advances in the Plant Protein Extraction: Mechanism and Recommendations." *Food Hydrocolloids* 115(December 2020): 106595.  
<https://doi.org/10.1016/j.foodhyd.2021.106595>.
- Kurniawan, Indra. 2014. "Diabetes Melitus Tipe 2 Pasa Usia Lanjut." *Journal of Gerontological Nursing* 20(11): 55–55.
- Kurniawan, Rudy et al. 2023. "Carotenoids Composition of Green Algae *Caulerpa Racemosa* and Their Antidiabetic, Anti-Obesity, Antioxidant, and Anti-Inflammatory Properties." *Molecules* 28(7).
- Kustiyah, Elvi, Bungaran Saing, Hernowo Widodo, and Viriya Piti. 2019. "Ekstraksi Protein Dari Rhodophyta Dan Chlorophyta Dari Perairan Pulau Pari Sebagai Alternatif Antioksidan." 1(1): 18–25.
- Lebowitz, Jacob, Marc S. Lewis, and Peter Schuck. 2009. "Modern Analytical Ultracentrifugation in Protein Science: A Tutorial Review." *Protein Science* 11(9): 2067–79.
- Liang, Zhibin, and Qing X. Li. 2018. " $\pi$ -Cation Interactions in Molecular Recognition: Perspectives on Pharmaceuticals and Pesticides." *Journal of Agricultural and Food Chemistry* 66(13): 3315–23.
- Lin, Longfei et al. 2015. "Types, Principle, and Characteristics of Tandem High-Resolution Mass Spectrometry and Its Applications." *RSC Advances* 5(130): 107623–36.
- Long, Hairong et al. 2020. "Effects of Bottom Sediment on the Accumulation of Nutrients in the Edible Green Seaweed *Caulerpa Lentillifera* ( Sea Grapes )." : 705–16.
- Ma, Ronald C W. 2018. "Epidemiology of Diabetes and Diabetic Complications in

- China.” : 1249–60.
- Magdugo, Rexie P et al. 2020. “An Analysis of the Nutritional and Health Values of the Philippines.”
- Manadas, Bruno, Vera M. Mendes, Jane English, and Michael J. Dunn. 2010. “Peptide Fractionation in Proteomics Approaches.” *Expert Review of Proteomics* 7(5): 655–63.
- Merentek, Enrico. 2006. “Resistensi Insulin Pada Diabetes Melitus Tipe 2.” *Cermin Dunia Kedokteran* (150): 38–41.
- Michalski, Annette et al. 2011. “Mass Spectrometry-Based Proteomics Using Q Exactive, a High-Performance Benchtop Quadrupole Orbitrap Mass Spectrometer.” *Molecular and Cellular Proteomics* 10(9): M111.011015. <http://dx.doi.org/10.1074/mcp.M111.011015>.
- Niu, Liangjie et al. 2018. “Modified TCA/Acetone Precipitation of Plant Proteins for Proteomic Analysis.” *PLoS ONE* 13(12): 1–13.
- Nofiani, Risa, Sigit Hertanto, Titin Anita Zaharah, and Sutarman Gafur. 2018. “Proximate Compositions and Biological Activities of *Caulerpa lentillifera*.” *Molekul* 13(2): 141.
- Novák, P., and V. Havlíček. 2016. “Protein Extraction and Precipitation.” *Proteomic Profiling and Analytical Chemistry: The Crossroads: Second Edition*: 52–62.
- Olusegun, Olusola Augustine, and Ekun Oluwafemi Emmanuel. 2019. “Alpha-Amylase – Inhibitory Properties and in Vitro Antioxidant Potentials of Cowpea Seed Protein Hydrolysates.” *American Association for Science and Technology* 6(1): 1–12.
- Onoviran, Olusola F, Dongming Li, Sarah Toombs Smith, and Mukaila A Raji. 2019. “Effects of Glucagon-like Peptide 1 Receptor Agonists on Comorbidities in Older Patients with Diabetes Mellitus.” : 1–23.
- Pang, Zhiqiang et al. 2022. “Using MetaboAnalyst 5.0 for LC–HRMS Spectra Processing, Multi-Omics Integration and Covariate Adjustment of Global Metabolomics Data.” *Nature Protocols* 17(8): 1735–61.
- Patil, Shital P, Ashutosh Goswami, Kiran Kalia, and Abhijeet S Kate. 2020. “Plant - Derived Bioactive Peptides : A Treatment to Cure Diabetes.” *International Journal of Peptide Research and Therapeutics* 26(2): 955–68. <https://doi.org/10.1007/s10989-019-09899-z>.
- Permatasari, Happy Kurnia et al. 2021. “Kombucha Tea from Seagrapes (*Caulerpa racemosa*) Potential as a Functional Anti-Ageing Food: In Vitro and in Vivo Study.” *Heliyon* 7(9): e07944. <https://doi.org/10.1016/j.heliyon.2021.e07944>.
- Pettersen, Eric F. et al. 2004. “UCSF Chimera - A Visualization System for Exploratory Research and Analysis.” *Journal of Computational Chemistry* 25(13): 1605–12.
- Pishdad, Reza, Parisa Pishdad, and Gholam Reza Pishdad. 2020. “Acarbose versus Repaglinide in Diabetes Treatment: A New Appraisal of Two Old Rivals.” *American Journal of the Medical Sciences* 359(4): 212–17. <https://doi.org/10.1016/j.amjms.2020.01.011>.
- Prahesti, Diani Ajeng, Sri Pujiyanti, and MG Isworo Rukmi. 2018. “Isolasi, Uji



- Aktivitas, Dan Optimasi Inhibitor  $\alpha$ -Amilase Isolat Kapang Endofit Tanaman Binahong (*Anredera Cordifolia* (Ten.) Steenis).” *Jurnal Biologi* 7(1): 43–51.
- Prasad, Balasubramaniam Jaya, Pazhaniyandi Subramania Sharavanan, and Rengaraj Sivaraj. 2019. “Efficiency of *Oryza Punctata* Extract on Glucose Regulation: Inhibition of  $\alpha$ -Amylase and  $\alpha$ -Glucosidase Activities.” *Grain & Oil Science and Technology* 2(2): 44–48. <https://doi.org/10.1016/j.gaost.2019.04.007>.
- Rafiquzzaman, S. M. et al. 2015. “Characterisation of the Hypoglycaemic Activity of Glycoprotein Purified from the Edible Brown Seaweed, *Undaria Pinnatifida*.” *International Journal of Food Science and Technology* 50(1): 143–50.
- Raharjo, Tri Joko et al. 2021. “Antibacterial Peptides from Tryptic Hydrolysate of *Ricinus Communis* Seed Protein Fractionated Using Cation Exchange Chromatography.” *Indonesian Journal of Pharmacy* 32(1): 74–85.
- Rastini, M. B. O., N. K. M. Giantari, K. D. Adnyani, and N. P. L. Laksmiani. 2019. “Molecular Docking Aktivitas Antikanker Dari Kuersetin Terhadap Kanker Payudara Secara in Silico.” *Jurnal Kimia*: 180.
- Razai, Tengku Said, Imam Pangestiansyah Putra, Fadhliyah Idris, and Try Febrianto. 2019. “Identifikasi, Keragaman Dan Sebaran *Caulerpa* Sp Sebagai Komoditas Potensial Budidaya Pulau Bunguran, Natuna.” *Simbiosis* 8(2): 168.
- Restiani, Ratih. 2017. “Hidrolisis Secara Enzimatis Protein Bungkil Biji Nyamplung (*Calophyllum Inophyllum*) Menggunakan Bromelain.” *Biota : Jurnal Ilmiah Ilmu-Ilmu Hayati* 1(3): 103–10. <https://ojs.uajy.ac.id/index.php/biota/article/view/1226>.
- Rivanor, Renata Line da Conceição et al. 2018. “A Lectin Fraction from Green Seaweed *Caulerpa Cupressoides* Inhibits Inflammatory Nociception in the Temporomandibular Joint of Rats Dependent from Peripheral Mechanisms.” *International Journal of Biological Macromolecules* 115: 331–40. <https://doi.org/10.1016/j.ijbiomac.2018.04.065>.
- Rizko, Nurmalisa et al. 2020. “Isolasi DNA Daun Jeruk Bali Merah (*Citrus Maxima* Merr.) Dengan Modifikasi Metode Doyle and Doyle.” *Berkala Bioteknologi* 3(2): 1–7.
- Rusdi, Mesa Sukmadani. 2020. “Hipoglikemia Pada Pasien Diabetes Melitus.” *Journal Syifa Sciences and Clinical Research* 2(September): 83–90. <http://ejurnal.ung.ac.id/index.php/jsscr>.
- Rutherford, Shane M. 2010. “Methodology for Determining Degree of Hydrolysis of Proteins in Hydrolysates: A Review.” *Journal of AOAC International* 93(5): 1515–22.
- Santi, R A, T C Sunarti, D Santoso, and D A Triwisari. 2012. “KOMPOSISI KIMIA DAN PROFIL POLISAKARIDA RUMPUT LAUT HIJAU.” *Jurnal Akuatika* III(2): 105–14.
- Shao, Shiyong et al. 2016. “Reproducible Tissue Homogenization and Protein Extraction for Quantitative Proteomics Using Micropestle-Assisted Pressure-Cycling Technology.” *Journal of Proteome Research* 15(6): 1821–29.
- Svensson, Birte, Kenji Fukuda, Peter K. Nielsen, and Birgit C. Bønsager. 2004.

- “Proteinaceous  $\alpha$ -Amylase Inhibitors.” *Biochimica et Biophysica Acta - Proteins and Proteomics* 1696(2): 145–56.
- Sweeney, R. A., and P. R. Rexroad. 1987. “Comparison of LECO FP-228 ‘Nitrogen Determinator’ with AOAC Copper Catalyst Kjeldahl Method for Crude Protein.” *Journal - Association of Official Analytical Chemists* 70(6): 1028–30.
- Tapal, Arun, and Purnima Kaul Tiku. 2018. Enzymes in Food Biotechnology: Production, Applications, and Future Prospects *Nutritional and Nutraceutical Improvement by Enzymatic Modification of Food Proteins*. Elsevier Inc. <https://doi.org/10.1016/B978-0-12-813280-7.00027-X>.
- Wang, Ji et al. 2020. “Anti-Diabetic Effect by Walnut (*Juglans Mandshurica* Maxim.)-Derived Peptide LPLLR through Inhibiting  $\alpha$ -Glucosidase and  $\alpha$ -Amylase, and Alleviating Insulin Resistance of Hepatic HepG2 Cells.” *Journal of Functional Foods* 69(2888): 103944. <https://doi.org/10.1016/j.jff.2020.103944>.
- Wardani, Nela Agustin Kusuma. 2018. “Enzim  $\alpha$ -Amilase Inhibitor Pada Ekstrak Air Kacang Merah (*Phaseolus Vulgaris* L.) Untuk Penanggulangan Diabetes Melitus.” *Jurnal Ilmu Pangan dan Hasil Pertanian* 1(2): 50–59.
- Wu, Xiaolin et al. 2014. “Universal Sample Preparation Method Integrating Trichloroacetic Acid/Acetone Precipitation with Phenol Extraction for Crop Proteomic Analysis.” *Nature Protocols* 9(2): 362–74.
- Zhou, Haochun et al. 2023. “Identification of a Novel  $\alpha$ -Amylase Inhibitory Activity Peptide from Quinoa Protein Hydrolysate.” *Food Chemistry* 403(June 2022).
- Zubarev, Roman A., and Alexander Makarov. 2013. “Orbitrap Mass Spectrometry.” *Analytical Chemistry* 85(11): 5288–96.
- Zubia, Mayalen et al. 2020. “Concise Review of the Genus *Caulerpa* J.V. Lamouroux.” *Journal of Applied Phycology* 32(1): 23–39. <http://link.springer.com/10.1007/s10811-019-01868-9>.
- Van Zundert, G. C.P. et al. 2016. “The HADDOCK2.2 Web Server: User-Friendly Integrative Modeling of Biomolecular Complexes.” *Journal of Molecular Biology* 428(4): 720–25. <http://dx.doi.org/10.1016/j.jmb.2015.09.014>.