

DAFTAR PUSTAKA

- Abdul Mudalip, S. K., Khatiman, M. N., Hashim, N. A., Che Man, R., & Arshad, Z. I. M. (2019). A short review on encapsulation of bioactive compounds using different drying techniques. *Materials Today: Proceedings*, 42, 288–296. <https://doi.org/10.1016/j.matpr.2021.01.543>
- Aldiyan Rizky. (2022). No Title העינים לנגד שבאמת מה את לראות קשה הכי. *הארץ*, 2(8.5.2017), 2003–2005. <https://lib.unnes.ac.id/20002/>
- Alrosan, M., Al-Rabadi, N., Alu'datt, M. H., Al-Qaisi, A., Al-Shunnaq, E. E., Abu-Khalaf, N., Maghaydah, S., Assaf, T., Hidmi, T., Tan, T. C., Bawadi, H., Almajwal, A. M., & obeidat, H. J. (2025). Complex Coacervation of Plant-Based Proteins and Polysaccharides: Sustainable Encapsulation Techniques for Bioactive Compounds. *Food Engineering Reviews*, 17(4), 1059–1082. <https://doi.org/10.1007/s12393-025-09408-7>
- Anton, N., & Vandamme, T. F. (2011). Nano-emulsions and micro-emulsions: Clarifications of the critical differences. *Pharmaceutical Research*, 28(5), 978–985. <https://doi.org/10.1007/s11095-010-0309-1>
- Arniah Dali, La Harimu LM, & Cinong Simbiti. (2015). Pengaruh Kecepatan Putar Pengadukan dan Waktu Pendiaman terhadap Rendemen dan Kualitas Minyak Kelapa Murni (VCO). *Al Kimia*, 3(1), 48–58.
- Ballesteros Martínez, M. Á., & Gaukel, V. (2023). Using Computation Fluid Dynamics to Determine Oil Droplet Breakup Parameters during Emulsion Atomization with Pressure Swirl Nozzles. *Fluids*, 8(10). <https://doi.org/10.3390/fluids8100277>
- Bonnie, T. Y. P., & Choo, Y. M. (2000). Valuable minor constituents of commercial red palm olein: carotenoids, vitamin E, ubiquinones and sterols. In *Journal of Oil Palm Research* (Vol. 12, Issue 1, pp. 14–24).
- Can Karaca, A., Low, N., & Nickerson, M. (2013). Encapsulation of flaxseed oil using a benchtop spray dryer for legume protein-maltodextrin microcapsule preparation. *Journal of Agricultural and Food Chemistry*, 61(21), 5148–5155. <https://doi.org/10.1021/jf400787j>
- Candraningrum, R. G. S., Setiowati, A. D., & Hidayat, C. (2023). Electrostatic-Maillard formation of coconut protein Concentrate-Pectin conjugate for Oil-in-Water Emulsion: Effects of Ratio, Temperature, and pH. *Journal of the Saudi Society of Agricultural Sciences*, 22(1), 18–24. <https://doi.org/10.1016/j.jssas.2022.05.004>
- Correia-Filho, L. C., Lourenço, M. M., Moldão-Martins, M., & Alves, V. D. (2019). Microencapsulation of β -Carotene by Spray Drying: Effect of Wall Material Concentration and Drying Inlet Temperature. *International Journal of Food Science*, 2019. <https://doi.org/10.1155/2019/8914852>

- de Oliveira, F. C., Coimbra, J. S. dos R., de Oliveira, E. B., Zuñiga, A. D. G., & Rojas, E. E. G. (2016). Food Protein-polysaccharide Conjugates Obtained via the Maillard Reaction: A Review. *Critical Reviews in Food Science and Nutrition*, 56(7), 1108–1125. <https://doi.org/10.1080/10408398.2012.755669>
- Díaz-Montes, E. (2023). Wall Materials for Encapsulating Bioactive Compounds via Spray-Drying: A Review. *Polymers*, 15(12). <https://doi.org/10.3390/polym15122659>
- Dickinson, E. (2006). Food emulsions: principles, practices, and techniques. Boca Raton. *Food Hydrocolloids*, 20(1), 137. <https://doi.org/10.1016/j.foodhyd.2005.05.001>
- Dursun Capar, T., & Yalcin, H. (2021). Protein/polysaccharide conjugation via Maillard reactions in an aqueous media: Impact of protein type, reaction time and temperature. *Lwt*, 152(August), 112252. <https://doi.org/10.1016/j.lwt.2021.112252>
- Edam, M., Kumolontang, N., & Mandei, J. (2019). Metode Pemecahan Emulsi Krim Santan untuk Produksi Konsentrat Protein Blondo. *Jurnal Riset Teknologi Industri*, 13(2), 173. <https://doi.org/10.26578/jrti.v13i2.5183>
- Ellouze, M., Lajnaf, R., Zouari, A., Attia, H., Ayadi, M. A., & Vial, C. (2020). Camel α -lactalbumin at the oil–water interface: Effect of protein concentration and pH change on surface characteristics and emulsifying properties. *Colloids and Surfaces B: Biointerfaces*, 189(January), 110654. <https://doi.org/10.1016/j.colsurfb.2019.110654>
- fakhry, O. Z., Hassan, M. H., Galal, A. T., elhameed, B. T. A., Abdel-Rahman, I. A. M., Amin, Y. A., Ouies, S. M., & Ahmed, M. abd E. B. (2026). Protective effects of coenzyme Q10 and Pluchea lanceolata against proton pump inhibitor-induced nephrotoxicity: Biochemical, histological, and ultrastructural evaluation. *Tissue and Cell*, 98(August 2025), 103176. <https://doi.org/10.1016/j.tice.2025.103176>
- Goneril, D., Hidayat, D. S. N., & Septiani, E. (2025). Minyak sawit merah: karakteristik nutrisi, bioaktif, potensi kesehatan, dan aplikasi dalam pangan fungsional sumber antioksidan. *LIPIDA: Jurnal Teknologi Pangan Dan Agroindustri Perkebunan*, 5(2), 61–73.
- Han, S., Chen, Y., Lyu, S., Chen, Z., Wang, S., & Fu, F. (2020). Effects of processing conditions on the properties of paraffin/melamine-urea-formaldehyde microcapsules prepared by in situ polymerization. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 585(April 2019), 124046. <https://doi.org/10.1016/j.colsurfa.2019.124046>
- Han, Y., Li, L., Wei, F., Zhang, F., Pan, Z., Wei, Y., & Wang, L. (2024). Dandelion polysaccharides improve the emulsifying properties and antioxidant

- capacities of emulsions stabilized by whey protein isolate. *Food Chemistry: X*, 21(August 2023), 101218. <https://doi.org/10.1016/j.fochx.2024.101218>
- Hoon, J., Cha, J., Kim, T., Choi, Y., & Won, H. (2021). Effects of a defatting process on the thermal stabilities and volatile compound profiles of proteins isolated from *Protaetia brevitarsis* larvae. *LWT*, 151(June), 112095. <https://doi.org/10.1016/j.lwt.2021.112095>
- Huang, L. X., Kumar, K., & Mujumdar, A. S. (2006). A comparative study of a spray dryer with rotary disc atomizer and pressure nozzle using computational fluid dynamic simulations. *Chemical Engineering and Processing: Process Intensification*, 45(6), 461–470. <https://doi.org/10.1016/j.cep.2005.11.004>
- Hussain, S. A., Hameed, A., Nazir, Y., Naz, T., Wu, Y., Suleria, H. A. R., & Song, Y. (2018). Microencapsulation and the characterization of polyherbal formulation (PHF) rich in natural polyphenolic compounds. *Nutrients*, 10(7). <https://doi.org/10.3390/nu10070843>
- Janik, M., Khachatryan, K., Khachatryan, G., Krystijan, M., Źarska, S., & Ciesielski, W. (2023). Preparation and Characterisation of Acid–Base-Change-Sensitive Binary Biopolymer Films with Olive Oil and Ozonated Olive Oil Nano/Microcapsules and Added Hibiscus Extract. *International Journal of Molecular Sciences*, 24(14). <https://doi.org/10.3390/ijms241411502>
- Ji, Y., Yang, X., Ji, Z., Zhu, L., Ma, N., Chen, D., Jia, X., Tang, J., & Cao, Y. (2020). DFT-Calculated IR Spectrum Amide I, II, and III Band Contributions of N-Methylacetamide Fine Components. *ACS Omega*, 5(15), 8572–8578. <https://doi.org/10.1021/acsomega.9b04421>
- Kamble, M.G., Singh, A., Singh, S., Kamble, M.G., Sagar, N.A., & Rani, N. (2025). Nanotechnology for encapsulation of bioactive components: a review. *Discover Food*, 5. (n.d.). *No Title*. <https://www.semanticscholar.org/paper/Nanotechnology-for-encapsulation-of-bioactive-a-Kamble-Singh/e0c449794cb45e91c29b4d21e065bbb4c68be660>
- Kan, X., Chen, G., Zhou, W., & Zeng, X. (2021). Application of protein-polysaccharide Maillard conjugates as emulsifiers: Source, preparation and functional properties. *Food Research International*, 150(PA), 110740. <https://doi.org/10.1016/j.foodres.2021.110740>
- Kim, T., In, H., Kim, Y., Jung, S., & Kim, H. (2021). Effects of organic solvent on functional properties of defatted proteins extracted from *Protaetia brevitarsis* larvae. *Food Chemistry*, 336(March 2020), 127679. <https://doi.org/10.1016/j.foodchem.2020.127679>

- Kupikowska-stobba, B., & Domagała, J. (2024). *applied sciences Critical Review of Techniques for Food Emulsion Characterization*. 1–50.
- Kupikowska-Stobba, B., & Kasprzak, M. (2021). Fabrication of nanoparticles for bone regeneration: new insight into applications of nanoemulsion technology. *Journal of Materials Chemistry B*, 9(26), 5221–5244. <https://doi.org/10.1039/d1tb00559f>
- Kurniawati, A. D., Hidayat, C., & Setiowati, A. D. (2023). Formation of Coconut Oil By-Product Protein Concentrate-Pectin Through Electrostatic Interaction to Improve Emulsifying Properties. *AgriHealth: Journal of Agri-Food, Nutrition and Public Health*, 4(1), 1. <https://doi.org/10.20961/agrihealth.v4i1.70577>
- Kusumastuti, M. R., Yuliani, S., Hidayat, C., & Setiowati, A. D. (2024). Modification techno-functional properties of spirulina protein concentrates (Arthrospira Platensis) as O/W emulsifier by conjugation and electrostatic complexations. *Innovative Food Science and Emerging Technologies*, 95(May), 103727. <https://doi.org/10.1016/j.ifset.2024.103727>
- Liu, X., Shen, L., Zhao, S., & Zhang, H. (2021). Formation and emulsification properties of self-assembled potato protein microgel particles under different pH conditions. *International Journal of Food Science and Technology*, 56(6), 2864–2875. <https://doi.org/10.1111/ijfs.14923>
- Ma, T., Zhao, H., Wang, J., & Sun, B. (2019). Effect of processing conditions on the morphology and oxidative stability of lipid microcapsules during complex coacervation. *Food Hydrocolloids*, 87(11), 637–643. <https://doi.org/10.1016/j.foodhyd.2018.08.053>
- Madoromae, H., & Lertcanawanichakul, M. (2025). Red Palm Oil: Nutritional Composition, Bioactive Properties, and Potential Applications in Health and Cosmetics: A Narrative Review. *Molecules*, 30(22). <https://doi.org/10.3390/molecules30224402>
- Mastuti, T. S., & Gunawan, A. M. (2025). *Karakteristik Mikroenkapsulat Minyak Buah Merah* (. 9(1), 74–90. [file:///C:/Users/LENOVO/Downloads/Karakteristik_Mikroenkapsulat_Minyak_Buah_Merah_Pa\(1\).pdf](file:///C:/Users/LENOVO/Downloads/Karakteristik_Mikroenkapsulat_Minyak_Buah_Merah_Pa(1).pdf)
- Miadonye, A., & Amadu, M. (2023). Theoretical Interpretation of pH and Salinity Effect on Oil-in-Water Emulsion Stability Based on Interfacial Chemistry and Implications for Produced Water Demulsification. *Processes*, 11(8). <https://doi.org/10.3390/pr11082470>
- Milanesi, A., Diana, G., Candiani, A., Sodano, A., Rassè, P., Foglio Bonda, A., Bari, E., Torre, M. L., Segale, L., & Giovannelli, L. (2025). Spray drying: From a traditional technology to modern biotechnological applications.

- International Journal of Pharmaceutics*: *X*, 10(November).
<https://doi.org/10.1016/j.ijpx.2025.100449>
- Mohammed, N. K., Tan, C. P., Manap, Y. A., Muhialdin, B. J., & Hussin, A. S. M. (2020). Spray Drying for the Encapsulation of Oils—A Review. *Molecules*, 25(17), 1–16. <https://doi.org/10.3390/molecules25173873>
- Mshayisa, V. V., & Van Wyk, J. (2021). Hermetia illucens Protein Conjugated with Glucose via Maillard Reaction: Antioxidant and Techno-Functional Properties. *International Journal of Food Science*, 2021. <https://doi.org/10.1155/2021/5572554>
- Mukherjee, S., Chakrabarty, S., Mishra, P. C., & Chaudhuri, P. (2020). Transient heat transfer characteristics and process intensification with Al₂O₃-water and TiO₂-water nanofluids: An experimental investigation. *Chemical Engineering and Processing - Process Intensification*, 150(March), 107887. <https://doi.org/10.1016/j.cep.2020.107887>
- Nagendran, B., Unnithan, U. R., Choo, Y. M., & Sundram, K. (2000). Characteristics of red palm oil, a carotene- and vitamin E-rich refined oil for food uses. *Food and Nutrition Bulletin*, 21(2), 189–194. <https://doi.org/10.1177/156482650002100213>
- Nickolov, Z. S., Paruchuri, V., Shah, D. O., & Miller, J. D. (2004). FTIR-ATR studies of water structure in reverse micelles during the synthesis of oxalate precursor nanoparticles. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 232(1), 93–99. <https://doi.org/10.1016/j.colsurfa.2003.10.009>
- Nunes, A. N., Monte, J., Rodríguez-Rojo, S., Nogueira, I. D., Gouveia, L. F., Brazinha, C., & Matias, A. A. (2024). Development of a Carotenoid-Rich Microalgae Colorant by Microencapsulation. *Colorants*, 3(1), 39–52. <https://doi.org/10.3390/colorants3010003>
- O’Sullivan, J. J., Norwood, E. A., O’Mahony, J. A., & Kelly, A. L. (2019). Atomisation technologies used in spray drying in the dairy industry: A review. *Journal of Food Engineering*, 243(August 2018), 57–69. <https://doi.org/10.1016/j.jfoodeng.2018.08.027>
- Obayomi, O. V., Edo, G. I., Dada, A. O., & Dokouhaki, M. (2026). Advanced encapsulation technologies for functional foods: Enhancing stability, bioavailability, and controlled release of nutraceuticals and bioactives. *Applied Food Research*, 6(1), 101622. <https://doi.org/10.1016/j.afres.2025.101622>
- Olivares-Tenorio, M. L., Cortes-Prieto, C. M., Londoño-Univio, N. C., Rojas-Díaz, D. A., Quintanilla-Carvajal, M. X., Tibaquira-Perez, L. N., Ricaurte-Puentes, L. Y., Rada-Bula, A. I., Romero, H. M., & Garcia-Nuñez, J. A. (2024).

Bioactive compounds in palm oil: A comprehensive review of recent advances in physicochemical characteristics, health-promoting properties and technologies for extraction, concentration, fractionation, encapsulation and functional food applications. *Journal of Food Composition and Analysis*, 132(70). <https://doi.org/10.1016/j.jfca.2024.106306>

Processing Manual for Virgin Coconut Oil, its Products and By-products for Pacific Island Countries and Territories. (n.d.).

Purnama, K. O., Setyaningsih, D., Hambali, E., & Taniwiryo, D. (2020). *Processing, Characteristics, and Potential Application of Red Palm Oil - a review*. 3(2), 40–55.

Raei, M., Rafe, A., & Shahidi, F. (2018). Rheological and structural characteristics of whey protein-pectin complex coacervates. *Journal of Food Engineering*, 228, 25–31. <https://doi.org/10.1016/j.jfoodeng.2018.02.007>

Ravindran, S., Williams, M. A. K., Ward, R. L., & Gillies, G. (2018). Understanding how the properties of whey protein stabilized emulsions depend on pH, ionic strength and calcium concentration, by mapping environmental conditions to zeta potential. *Food Hydrocolloids*, 79, 572–578. <https://doi.org/10.1016/j.foodhyd.2017.12.003>

Rutz, J. K., Borges, C. D., Zambiasi, R. C., Da Rosa, C. G., & Da Silva, M. M. (2016). Elaboration of microparticles of carotenoids from natural and synthetic sources for applications in food. *Food Chemistry*, 202, 324–333. <https://doi.org/10.1016/j.foodchem.2016.01.140>

Salgado, P. R., López-caballero, M. E., Gómez-guillén, M. C., Mauri, A. N., & Montero, M. P. (2012). Food Hydrocolloids Exploration of the antioxidant and antimicrobial capacity of two sunflower protein concentrate films with naturally present phenolic compounds. *Food Hydrocolloids*, 29(2), 374–381. <https://doi.org/10.1016/j.foodhyd.2012.03.006>

Sanka, I., Bartkova, S., Pata, P., Smolander, O. P., & Scheler, O. (2021). Investigation of Different Free Image Analysis Software for High-Throughput Droplet Detection. *ACS Omega*, 6(35), 22625–22634. <https://doi.org/10.1021/acsomega.1c02664>

Santangelo, D., Halahlah, A., Adesanya, I. O., Mikkonen, K. S., Coda, R., & Ho, T. M. (2024). Protective Effects of Polysaccharides on Antifungal Activity of Bread Waste-derived Bioactive Peptides During Freeze Drying. *Food and Bioprocess Technology*, 17(12), 5208–5220. <https://doi.org/10.1007/s11947-024-03443-8>

Sekhvatizadeh, S. S., Ganje, M., Hashemi, S. S., & Mozafarian, M. R. (2025). Encapsulation of bioactive compounds from *Sargassum ilicifolium*: Influence of wall material type and loading content on the physicochemical and

- structural properties of microparticles. *Heliyon*, 11(1), e41652. <https://doi.org/10.1016/j.heliyon.2025.e41652>
- Setyani, H., Setiowati, A. D., Rahayoe, S., Hidayat, C., & Saputro, A. D. (2025). Microencapsulation of red palm oil with soy protein concentrate–carrageenan conjugates for compound dark chocolate applications. *Sustainable Food Technology*, 3(6), 2337–2351. <https://doi.org/10.1039/d5fb00278h>
- Susilowati, T. (2012). Kajian Metode Pengasaman Dalam Proses Produksi Minyak Kelapa Ditinjau Dari Mutu Produk Dan Komposisi Asam Amino Blondo. *Jurnal Dinamika Penelitian Industri*, 23(2), 124–130.
- Szewczyk, K., Chojnacka, A., & Górnicka, M. (2021). Tocopherols and tocotrienols bioactive dietary compounds. *International Journal of Molecular Sciences*, 22(12).
- Wang, Z., Hu, D., He, W., Qing, J., Zhu, Z., Yu, H., Wang, R., Shan, Y., Li, H., & Ding, S. (2025). Improving solubility and stability of pea protein isolate by conjugation with high methoxyl pectin via ultrasound-assisted maillard reaction for the efficient delivery of nobiletin. *Food Chemistry: X*, 30(August), 102910. <https://doi.org/10.1016/j.fochx.2025.102910>
- Wen, C., Zhang, J., Qin, W., Gu, J., Zhang, H., Duan, Y., & Ma, H. (2020). Structure and functional properties of soy protein isolate-lentinan conjugates obtained in Maillard reaction by slit divergent ultrasonic assisted wet heating and the stability of oil-in-water emulsions. *Food Chemistry*, 331(May), 127374. <https://doi.org/10.1016/j.foodchem.2020.127374>
- Whetstine, M. E. C., Croissant, A. E., & Drake, M. A. (2005). Characterization of Dried Whey Protein Concentrate and Isolate Flavor. *Journal of Dairy Science*, 88(11), 3826–3839. [https://doi.org/10.3168/jds.S0022-0302\(05\)73068-X](https://doi.org/10.3168/jds.S0022-0302(05)73068-X)
- Wijayanti, H. B., Bansal, N., Sharma, R., & Deeth, H. C. (2014). Effect of sulphhydryl reagents on the heat stability of whey protein isolate. *Food Chemistry*, 163, 129–135. <https://doi.org/10.1016/j.foodchem.2014.04.094>
- Wu, C. lin, Qi, J. ru, Liao, J. song, Liu, Z. wei, & He, C. ai. (2024). Study on low methoxyl pectin (LMP) with varied molecular structures cross-linked with calcium inducing differences in the gel properties. *Food Hydrocolloids*, 146(PA), 109271. <https://doi.org/10.1016/j.foodhyd.2023.109271>
- Yazicioglu, B., Sahin, S., & Sumnu, G. (2015). Microencapsulation of wheat germ oil. *Journal of Food Science and Technology*, 52(6), 3590–3597. <https://doi.org/10.1007/s13197-014-1428-1>
- Zeng, L., & Zhang, Y. (2016). Impact of short-chain alcohols on the formation and stability of nano-emulsions prepared by the spontaneous emulsification method. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 509, 591–600. <https://doi.org/10.1016/j.colsurfa.2016.09.001>

- Zhang, L., Cao, Z., Hong, Y., He, H., Chen, L., Yu, Z., & Gao, Y. (2024). Squalene Epoxidase: Its Regulations and Links with Cancers. *International Journal of Molecular Sciences*, 25(7), 1–28. <https://doi.org/10.3390/ijms25073874>
- Zhang, X., Han, F., Yang, Q., Zhao, X., & Jiang, J. (2025). Quercetin conjugated xylan nanomicelles with P-gp inhibition and enhancement of oral bioavailability of insoluble drug Coenzyme Q10. *European Polymer Journal*, 239(July), 114299. <https://doi.org/10.1016/j.eurpolymj.2025.114299>