

DAFTAR PUSTAKA

- Abdelhedi, O., Salem, A., Nasri, R., Nasri, M., & Jridi, M. (2022). Food applications of bioactive marine gelatin films. *Current Opinion in Food Science*, 43, 206–215. <https://doi.org/10.1016/j.cofs.2021.12.005>
- Abral, H., Basri, A., Muhammad, F., Fernando, Y., Hafizulhaq, F., Mahardika, M., Sugiarti, E., Sapuan, S. M., Ilyas, R. A., & Stephane, I. (2019). A simple method for improving the properties of the sago starch films prepared by using ultrasonication treatment. *Food Hydrocolloids*, 93(January), 276–283. <https://doi.org/10.1016/j.foodhyd.2019.02.012>
- Adilah, A. N., Jamilah, B., Noranizan, M. A., & Hanani, Z. A. N. (2018). Utilization of mango peel extracts on the biodegradable films for active packaging. *Food Packaging and Shelf Life*, 16(November 2017), 1–7. <https://doi.org/10.1016/j.fpsl.2018.01.006>
- Aguíé-Béghin, V., Paës, G., Molinari, M., & Chabbert, B. (2017). Films and Coatings from Lignocellulosic Polymers. In G. V. Barbosa-Cánovas (Ed.), *Edible Films and Coatings: Fundamentals and Applications* (Food Prese, pp. 1–585). CRC Press (Taylor & Francis Group).
- AL-Hassan, A. A., & Norziah, M. H. (2017). Effect of transglutaminase induced crosslinking on the properties of starch/gelatin films. *Food Packaging and Shelf Life*, 13(May), 15–19. <https://doi.org/10.1016/j.fpsl.2017.04.006>
- Alias, S. A., & Mhd Sarbon, N. (2019). Rheological, physical, and mechanical properties of chicken skin gelatin films incorporated with potato starch. *Npj Science of Food*, 3(1). <https://doi.org/10.1038/s41538-019-0059-3>
- Alinejad, M., Motamedzadegan, A., Rezaei, M., Mac, J., & Meat, C. (2017). Gelatin Films Containing Hydrolysates from Whitecheek Shark (*Carcharhinus dussumieri*) Meat Gelatin Films Containing Hydrolysates from Whitecheek Shark. *Journal of Aquatic Food Product Technology*, 00(00), 1–11. <https://doi.org/10.1080/10498850.2016.1201713>
- Aliotta, L., Gigante, V., Coltelli, M. B., Cinelli, P., & Lazzeri, A. (2019). Evaluation of mechanical and interfacial properties of bio-composites based on poly(lactic acid) with natural cellulose fibers. *International Journal of Molecular Sciences*, 20(4). <https://doi.org/10.3390/ijms20040960>
- Amin, U., Khan, M. U., Majeed, Y., Rebezov, M., Khayrullin, M., Bobkova, E., Shariati, M. A., Chung, I. M., & Thiruvengadam, M. (2021). Potentials of polysaccharides, lipids and proteins in biodegradable food packaging applications. *International Journal of Biological Macromolecules*,

183(February), 2184–2198. <https://doi.org/10.1016/j.ijbiomac.2021.05.182>

Anandito, R. B. K., Nurhartadi, E., & Bukhori, A. (2012). PENGARUH GLISEROL TERHADAP KARAKTERISTIK EDIBLE FILM BERBAHAN DASAR TEPUNG JALI (*Coix lacryma-jobi* L.) EFFECT OF GLYCEROL ON THE CHARACTERISTICS OF EDIBLE FILM FROM JALI (*Coix lacryma-jobi* L.) FLOUR. *Jurnal Teknologi Hasil Pertanian*, *V*(2), 17–23.

Ariyani, F., Kristiningrum, E., Barokah, G. R., & Januar, H. I. (2020). The effects of carbon monoxide treatment on the physical and chemical qualities of tuna steak during iced storage. *Squalen Bulletin of Marine and Fisheries Postharvest and Biotechnology*, *15*(2), 73–79. <https://doi.org/10.15578/squalen.v15i2.456>

Ayrancı, U. G., Şeker, A., Arısoy, S., Çimen, H., & Üstün-Aytekin, Ö. (2019). Antioxidant activity and identification of food proteins by digestive enzyme supplementation and fermentation with *Lactobacillus kefir*. *Czech Journal of Food Sciences*, *37*(3), 155–164. <https://doi.org/10.17221/138/2018-CJFS>

Azizah, F., Nursakti, H., Ningrum, A., & Supriyadi. (2023). Development of Edible Composite Film from Fish Gelatin–Pectin Incorporated with Lemongrass Essential Oil and Its Application in Chicken Meat. *Polymers*, *15*(9). <https://doi.org/10.3390/polym15092075>

Badan Standardisasi Nasional. (2013). Sni 2729:2013. *Badan Standardisasi Nasional Indonesia.*, 1–15.

Baggio, E., Scopel, B. S., Rosseto, M., Rigueto, C. V. T., Dettmer, A., & Baldasso, C. (2021). Transglutaminase effect on the gelatin-films properties. *Polymer Bulletin*, 1–9. <https://doi.org/10.1007/s00289-021-03858-9>

Barbosa, C. H., Andrade, M. A., Vilarinho, F., Fernando, A. L., & Silva, A. S. (2021). Active Edible Packaging. *Encyclopedia*, *1*(2), 360–370. <https://doi.org/10.3390/encyclopedia1020030>

Boran, G., Lawless, H. T., & Regenstein, J. M. (2010). Effects of Extraction Conditions on the Sensory and Instrumental Characteristics of Fish Gelatin Gels. *Journal of Food Science*, *75*(9). <https://doi.org/10.1111/j.1750-3841.2010.01827.x>

Bu, T., Jin, Y., Li, X., Zhang, J., Xu, D., Yang, W., & Lou, Q. (2017). Effect of electron irradiation and bayberry polyphenols on the quality change of yellowfin tuna fillets during refrigerated storage. *Radiation Physics and Chemistry*, *138*(March), 67–71. <https://doi.org/10.1016/j.radphyschem.2017.03.025>

Bu, Y., Han, M., Tan, G., Zhu, W., Li, X., & Li, J. (2022). Changes in quality characteristics of southern bluefin tuna (*Thunnus maccoyii*) during refrigerated storage and their correlation with color stability. *Lwt*, *154*, 112715.

<https://doi.org/10.1016/j.lwt.2021.112715>

- Cai, L., Shi, H., Cao, A., & Jia, J. (2019). Characterization of gelatin/chitosan ploymer films integrated with docosahexaenoic acids fabricated by different methods. *Scientific Reports*, 9(1), 1–11. <https://doi.org/10.1038/s41598-019-44807-x>
- Cerqueira, M. A., Souza, B. W. S., Teixeira, J. A., & Vicente, A. A. (2012). Effect of glycerol and corn oil on physicochemical properties of polysaccharide films - A comparative study. *Food Hydrocolloids*, 27(1), 175–184. <https://doi.org/10.1016/j.foodhyd.2011.07.007>
- Chakka, A. K., Muhammed, A., Sakhare, P. Z., & Bhaskar, N. (2017). Poultry Processing Waste as an Alternative Source for Mammalian Gelatin: Extraction and Characterization of Gelatin from Chicken Feet Using Food Grade Acids. *Waste and Biomass Valorization*, 8(8), 2583–2593. <https://doi.org/10.1007/s12649-016-9756-1>
- Chen, J., Li, L., Yi, R., Xu, N., Gao, R., & Hong, B. (2016). Extraction and characterization of acid-soluble collagen from scales and skin of tilapia (*Oreochromis niloticus*). *LWT - Food Science and Technology*, 66, 453–459. <https://doi.org/10.1016/j.lwt.2015.10.070>
- Chen, M., Liu, F., Chiou, B. Sen, Sharif, H. R., Xu, J., & Zhong, F. (2017). Characterization of film-forming solutions and films incorporating free and nanoencapsulated tea polyphenol prepared by gelatins with different Bloom values. *Food Hydrocolloids*, 72, 381–388. <https://doi.org/10.1016/j.foodhyd.2017.05.001>
- Cheng, J., & Cui, L. (2021). Effects of high-intensity ultrasound on the structural, optical, mechanical and physicochemical properties of pea protein isolate-based edible film. *Ultrasonics Sonochemistry*, 80, 105809. <https://doi.org/10.1016/j.ultsonch.2021.105809>
- Chung, D. (2020). Fish gelatin: Molecular interactions and applications. In *Biopolymer-Based Formulations: Biomedical and Food Applications*. Elsevier Inc. <https://doi.org/10.1016/B978-0-12-816897-4.00003-5>
- Coppola, D., Lauritano, C., Esposito, F. P., Riccio, G., Rizzo, C., & de Pascale, D. (2021). Fish Waste: From Problem to Valuable Resource. *Marine Drugs*, 19(2), 1–39. <https://doi.org/10.3390/MD19020116>
- da Nóbrega Santos, E., Cesar de Albuquerque Sousa, T., Cassiano de Santana Neto, D., Brandão Grisi, C. V., Cardoso da Silva Ferreira, V., & Pereira da Silva, F. A. (2022). Edible active film based on gelatin and Malpighia emarginata waste extract to inhibit lipid and protein oxidation in beef patties. *Lwt*, 154(August 2021). <https://doi.org/10.1016/j.lwt.2021.112837>

- da Rocha, M., Alemán, A., Romani, V. P., López-Caballero, M. E., Gómez-Guillén, M. C., Montero, P., & Prentice, C. (2018). Effects of agar films incorporated with fish protein hydrolysate or clove essential oil on flounder (*Paralichthys orbignyanus*) fillets shelf-life. *Food Hydrocolloids*, 81, 351–363. <https://doi.org/10.1016/j.foodhyd.2018.03.017>
- Daliri, H., Ahmadi, R., Pezeshki, A., Hamishehkar, H., Mohammadi, M., Beyrami, H., Khakbaz Heshmati, M., & Ghorbani, M. (2021). Quinoa bioactive protein hydrolysate produced by pancreatin enzyme- functional and antioxidant properties. *Lwt*, 150(May), 111853. <https://doi.org/10.1016/j.lwt.2021.111853>
- de Figueiredo, V. R. G., Justus, A., Pereira, D. G., Georgetti, S. R., Ida, E. I., & Kurozawa, L. E. (2019). Production of hydrolysate of okara protein concentrate with high antioxidant capacity and aglycone isoflavone content. *Brazilian Archives of Biology and Technology*, 62, 1–13. <https://doi.org/10.1590/1678-4324-2019180478>
- de Figueiredo, V. R. G., Yamashita, F., Vanzela, A. L. L., Ida, E. I., & Kurozawa, L. E. (2018). Action of multi-enzyme complex on protein extraction to obtain a protein concentrate from okara. *Journal of Food Science and Technology*, 55(4), 1508–1517. <https://doi.org/10.1007/s13197-018-3067-4>
- de Lima, F. S., & Ida, E. I. (2014). Optimisation of soybean hydrothermal treatment for the conversion of β -glucoside isoflavones to aglycones. *LWT - Food Science and Technology*, 56(2), 232–239. <https://doi.org/10.1016/j.lwt.2013.12.006>
- Di Bernardini, R., Harnedy, P., Bolton, D., Kerry, J., O'Neill, E., Mullen, A. M., & Hayes, M. (2011). Antioxidant and antimicrobial peptidic hydrolysates from muscle protein sources and by-products. *Food Chemistry*, 124(4), 1296–1307. <https://doi.org/10.1016/j.foodchem.2010.07.004>
- Echeverría, I., López-Caballero, M. E., Gómez-Guillén, M. C., Mauri, A. N., & Montero, M. P. (2018). Active nanocomposite films based on soy proteins-montmorillonite- clove essential oil for the preservation of refrigerated bluefin tuna (*Thunnus thynnus*) fillets. *International Journal of Food Microbiology*, 266(February 2017), 142–149. <https://doi.org/10.1016/j.ijfoodmicro.2017.10.003>
- Fallah, M., Rouhi, M., Soltani, M., Mohammadifar, M. A., Bahrami, R., Davachi, S. M., Abbaspourrad, A., & Mohammadi, R. (2021). Physico-mechanical, Antimicrobial, and Antioxidant Properties of Gelatin Edible Films Incorporated with Olibanum Essential Oil and Sodium Hexametaphosphate on the Rainbow Trout Fillet Under Refrigerated Conditions. *Journal of Polymers and the Environment*, 29(7), 2174–2184. <https://doi.org/10.1007/s10924-020-02027-9>
- FAO, F. D. (2019). *Fishery and Aquaculture Statistics*.

- FDA, F. & D. A. (2018). *Refrigerator & Freezer Storage Chart*.
<https://www.fda.gov/food/people-risk-foodborne-illness/refrigerator-freezer-chart-food-safety-moms-be>
- Feng, Z., Wu, G., Liu, C., Li, D., Jiang, B., & Zhang, X. (2018). Edible coating based on whey protein isolate nanofibrils for antioxidation and inhibition of product browning. *Food Hydrocolloids*, 79, 179–188.
<https://doi.org/10.1016/j.foodhyd.2017.12.028>
- Firdausiah, S., Madya, N., Seniwati, & Rapak, M. T. (2021). Chemical Properties of Fish Gelatin from Skin and Bone of Yellowfin Tuna (*Thunnus Albacares*). *Indonesia Chimica Acta*, 14(2), 38–42.
- Fu, B., Mei, S., Su, X., Chen, H., Zhu, J., Zheng, Z., Lin, H., Dai, C., Luque, R., & Yang, D. P. (2021). Integrating waste fish scale-derived gelatin and chitosan into edible nanocomposite film for perishable fruits. *International Journal of Biological Macromolecules*, 191(August), 1164–1174.
<https://doi.org/10.1016/j.ijbiomac.2021.09.171>
- Gamarro, E., Orawattanamateekul, W., Sentina, J., & Gopal, S. (2013). By-products of tuna processing. *GLOBEFISH Research Programme FAO.*, 112, 3.
- Gaspar, A. L. C., & De Góes-Favoni, S. P. (2015). Action of microbial transglutaminase (MTGase) in the modification of food proteins: A review. *Food Chemistry*, 171, 315–322. <https://doi.org/10.1016/j.foodchem.2014.09.019>
- GMIA. (2012). *Gelatin Handbook*. 1–25.
- Gómez-Guillén, M. C., Ihl, M., Bifani, V., Silva, A., & Montero, P. (2007). Edible films made from tuna-fish gelatin with antioxidant extracts of two different murta ecotypes leaves (*Ugni molinae* Turcz). *Food Hydrocolloids*, 21(7), 1133–1143.
<https://doi.org/10.1016/j.foodhyd.2006.08.006>
- Griffiths, S. P., Leadbitter, D., Willette, D., Kaymaram, F., & Moazzam, M. (2020). Longtail tuna, *Thunnus tonggol* (Bleeker, 1851): a global review of population dynamics, ecology, fisheries, and considerations for future conservation and management. In *Reviews in Fish Biology and Fisheries* (Vol. 30, Issue 1). Springer International Publishing. <https://doi.org/10.1007/s11160-019-09589-5>
- Hadidi, M., Jafarzadeh, S., Forough, M., Garavand, F., Alizadeh, S., Salehabadi, A., Khaneghah, A. M., & Jafari, S. M. (2022). Plant protein-based food packaging films; recent advances in fabrication, characterization, and applications. *Trends in Food Science and Technology*, 120(January), 154–173.
<https://doi.org/10.1016/j.tifs.2022.01.013>
- Hafsa, J., Smach, M. ali, Ben Khedher, M. R., Charfeddine, B., Limem, K., Majdoub, H., & Rouatbi, S. (2016). Physical, antioxidant and antimicrobial properties of

chitosan films containing Eucalyptus globulus essential oil. *LWT - Food Science and Technology*, 68, 356–364. <https://doi.org/10.1016/j.lwt.2015.12.050>

Hajji, S., Kchaou, H., Bkhairia, I., Ben Slama-Ben Salem, R., Boufi, S., Debeaufort, F., & Nasri, M. (2021). Conception of active food packaging films based on crab chitosan and gelatin enriched with crustacean protein hydrolysates with improved functional and biological properties. *Food Hydrocolloids*, 116(August 2020). <https://doi.org/10.1016/j.foodhyd.2021.106639>

Hammam, A. R. A. (2019). Technological, applications, and characteristics of edible films and coatings: a review. *SN Applied Sciences*, 1(6), 1–11. <https://doi.org/10.1007/s42452-019-0660-8>

Hidayati, A., Santoso, J., & Desniar. (2019). Aktivitas Antioksidan Hidrolisat Protein Miofibril Belut (*Synbranchus bengalensis*) yang Dihidrolisis dengan Enzim Papain. *Jurnal Teknologi Industri Pertanian*, 29(3), 247–259. <https://doi.org/10.24961/j.tek.ind.pert.2019.29.3.247>

Hoque, M. S. (2011). *Improvement of Properties of Edible Film Based on Gelatin from Cuttlefish (Sepia pharanois) Skin*.

Hosseini, S. F., Rezaei, M., Zandi, M., & Ghavi, F. F. (2013). Preparation and functional properties of fish gelatin-chitosan blend edible films. *Food Chemistry*, 136(3–4), 1490–1495. <https://doi.org/10.1016/j.foodchem.2012.09.081>

Hou, X., Li, S., Luo, Q., Shen, G., Wu, H., Li, M., Liu, X., Chen, A., Ye, M., & Zhang, Z. (2019). Discovery and identification of antimicrobial peptides in Sichuan pepper (*Zanthoxylum bungeanum* Maxim) seeds by peptidomics and bioinformatics. *Applied Microbiology and Biotechnology*, 103(5), 2217–2228. <https://doi.org/10.1007/s00253-018-09593-y>

Huang, T., Tu, Z. cai, Shangguan, X., Sha, X., Wang, H., Zhang, L., & Bansal, N. (2019). Fish gelatin modifications: A comprehensive review. *Trends in Food Science and Technology*, 86(November 2017), 260–269. <https://doi.org/10.1016/j.tifs.2019.02.048>

Intarasirisawat, R., Benjakul, S., Visessanguan, W., & Wu, J. (2012). Antioxidative and functional properties of protein hydrolysate from defatted skipjack (*Katsuwonus pelamis*) roe. *Food Chemistry*, 135(4), 3039–3048. <https://doi.org/10.1016/j.foodchem.2012.06.076>

Jamróz, E., Kulawik, P., Krzyściak, P., Talaga-Ćwiertnia, K., & Juszczak, L. (2019). Intelligent and active furcellaran-gelatin films containing green or pu-erh tea extracts: Characterization, antioxidant and antimicrobial potential. *International Journal of Biological Macromolecules*, 122, 745–757. <https://doi.org/10.1016/j.ijbiomac.2018.11.008>

- Justus, A., Pereira, D. G., Ida, E. I., & Kurozawa, L. E. (2019). Combined uses of an endo- and exopeptidase in okara improve the hydrolysates via formation of aglycone isoflavones and antioxidant capacity. *Lwt*, 115(November 2018), 108467. <https://doi.org/10.1016/j.lwt.2019.108467>
- Karami, Z., & Akbari-adergani, B. (2019). Bioactive food derived peptides: a review on correlation between structure of bioactive peptides and their functional properties. *Journal of Food Science and Technology*, 56(2), 535–547. <https://doi.org/10.1007/s13197-018-3549-4>
- Karim, A. A., & Bhat, R. (2009). Fish gelatin: properties, challenges, and prospects as an alternative to mammalian gelatins. *Food Hydrocolloids*, 23(3), 563–576. <https://doi.org/10.1016/j.foodhyd.2008.07.002>
- Kchaou, H., Benbettaieb, N., Jridi, M., Abdelhedi, O., Karbowiak, T., Brachais, C. H., Léonard, M. L., Debeaufort, F., & Nasri, M. (2018). Enhancement of structural, functional and antioxidant properties of fish gelatin films using Maillard reactions. *Food Hydrocolloids*, 83, 326–339. <https://doi.org/10.1016/j.foodhyd.2018.05.011>
- Kchaou, H., Jridi, M., Benbettaieb, N., & Debeaufort, F. (2020). *Bioactive films based on cuttle fish (Sepia officinalis) skin gelatin incorporated with cuttle fish protein hydrolysates : Physicochemical characterization and antioxidant properties*. 24(January). <https://doi.org/10.1016/j.fpsl.2020.100477>
- Khedri, S., Sadeghi, E., Rouhi, M., Delshadian, Z., Mortazavian, A. M., de Toledo Guimarães, J., Fallah, M., & Mohammadi, R. (2021). Bioactive edible films: Development and characterization of gelatin edible films incorporated with casein phosphopeptides. *Lwt*, 138(November 2020). <https://doi.org/10.1016/j.lwt.2020.110649>
- KKP, K. K. dan P. (2021). *Komitmen KKP Kelola Perikanan Tuna Berkelanjutan Dan Terukur*. <https://kkp.go.id/djpt/ditpsdi/artikel/37038-komitmen-kkp-kelola-perikanan-tuna-berkelanjutan-dan-terukur>
- KKP RI, K. P. dan K. R. I. (2022). *Statistik Produksi Perikanan Indonesia*. Produksi Perikanan Kelautan Dan Perikan. https://statistik.kkp.go.id/home.php?m=prod_ikan_prov&i=2#panel-footer
- Koli, J. M., Sagar, B. V, Kamble, R. S., & Sharangdhar, S. T. (2014). Functional Properties of Gelatin Extracted From Four Different Types of Fishes : a Comparative Study. *Indian Journal of Fundamental and Applied Life Sciences*, 4(4), 322–327.
- Kuai, L., Liu, F., Chiou, B. Sen, Avena-Bustillos, R. J., McHugh, T. H., & Zhong, F. (2021). Controlled release of antioxidants from active food packaging: A review.

- Food Hydrocolloids*, 120(June), 106992.
<https://doi.org/10.1016/j.foodhyd.2021.106992>
- Kumari, M., Mahajan, H., Joshi, R., & Gupta, M. (2017). Development and structural characterization of edible films for improving fruit quality. *Food Packaging and Shelf Life*, 12, 42–50. <https://doi.org/10.1016/j.fpsl.2017.02.003>
- Lacroix, M., & Vu, K. D. (2013). Edible Coating and Film Materials: Proteins. In *Innovations in Food Packaging: Second Edition*. Elsevier Ltd.
<https://doi.org/10.1016/B978-0-12-394601-0.00011-4>
- Lahreche, T., Uçar, Y., Kosker, A. R., Hamdi, T. M., & Ozogul, F. (2019). Combined impacts of oregano extract and vacuum packaging on the quality changes of frigate tuna muscles stored at 3±1°C. *Veterinary World*, 12(1), 155–164.
<https://doi.org/10.14202/vetworld.2019.155-164>
- Leceta, I., Etxabide, A., Cabezudo, S., De La Caba, K., & Guerrero, P. (2014). Bio-based films prepared with by-products and wastes: Environmental assessment. *Journal of Cleaner Production*, 64, 218–227.
<https://doi.org/10.1016/j.jclepro.2013.07.054>
- Lee, J. H., Yang, H. J., Lee, K. Y., & Song, K. Bin. (2016). Physical properties and application of a red pepper seed meal protein composite film containing oregano oil. *Food Hydrocolloids*, 55, 136–143.
<https://doi.org/10.1016/j.foodhyd.2015.11.013>
- Li, J., Ye, F., Liu, J., & Zhao, G. (2015). Effects of octenylsuccination on physical, mechanical and moisture-proof properties of stretchable sweet potato starch film. *Food Hydrocolloids*, 46, 226–232. <https://doi.org/10.1016/j.foodhyd.2014.12.017>
- Li, X., Tu, Z., Sha, X., Li, Z., Li, J., & Huang, M. (2022). Effect of coating on flavor metabolism of fish under different storage temperatures. *Food Chemistry: X*, 13(December 2021), 100256. <https://doi.org/10.1016/j.fochx.2022.100256>
- Lin, D., Zheng, Y., Huang, Y., Ni, L., Zhao, J., Huang, C., Chen, X., Chen, X., Wu, Z., Wu, D., Chen, H., Zhang, Q., Qin, W., & Xing, B. (2020). Investigation of the structural, physical properties, antioxidant, and antimicrobial activity of chitosan-nano-silicon aerogel composite edible films incorporated with okara powder. *Carbohydrate Polymers*, 250(April), 116842.
<https://doi.org/10.1016/j.carbpol.2020.116842>
- Lin, J., Wang, Y., Pan, D., Sun, Y., Ou, C., & Cao, J. (2018). Physico-mechanical properties of gelatin films modified with Lysine, Arginine and Histidine. *International Journal of Biological Macromolecules*, 108, 947–952.
<https://doi.org/10.1016/j.ijbiomac.2017.11.015>
- Lin, L., Regenstein, J. M., Lv, S., Lu, J., & Jiang, S. (2017). An overview of gelatin

- derived from aquatic animals: Properties and modification. *Trends in Food Science and Technology*, 68, 102–112. <https://doi.org/10.1016/j.tifs.2017.08.012>
- Lu, Y., Luo, Q., Chu, Y., Tao, N., Deng, S., Wang, L., & Li, L. (2022). Application of Gelatin in Food Packaging: A Review. *Polymers*, 14(3). <https://doi.org/10.3390/polym14030436>
- Lv, L. C., Huang, Q. Y., Ding, W., Xiao, X. H., Zhang, H. Y., & Xiong, L. X. (2019). Fish gelatin: The novel potential applications. *Journal of Functional Foods*, 63(September). <https://doi.org/10.1016/j.jff.2019.103581>
- Machin, A. (2012). The Potency of Tempe Hydrolysate As a Flavor Enhancer by Utilization of the Pineapple Extract. *Biosantifika*, 4(2), 71–77.
- Mannozi, C., Cecchini, J. P., Tylewicz, U., Siroli, L., Patrignani, F., Lanciotti, R., Rocculi, P., Dalla Rosa, M., & Romani, S. (2017). Study on the efficacy of edible coatings on quality of blueberry fruits during shelf-life. *LWT - Food Science and Technology*, 85, 440–444. <https://doi.org/10.1016/j.lwt.2016.12.056>
- Masrukan, M., Pranoto, Y., & Santoso, U. (2016). PENGARUH KONSENTRASI ASAM KLOORIDA DAN LAMA PERENDAMAN TERHADAP SIFAT FISIK DAN KIMIA GELATIN TULANG IKAN TUNA (*Thunnus albacare*). *Agrotech : Jurnal Ilmiah Teknologi Pertanian*, 1(1), 34–42. <https://doi.org/10.37631/agrotech.v1i1.6>
- Mellinas, C., Valdes, A., Ramos, M., Burgos, N., Garrigos, M. del C., & Jimenez, A. (2016). Active edible films: Current state and future trends. *Journal of Applied Polymer Science*, 133(2), 1–15. <https://doi.org/10.1002/app.42971>
- Miglioranza, B. M. G., Spinelli, F. R., Stoffel, F., & Piemolini-Barreto, L. T. (2021). Biodegradable film for raisins packaging application: Evaluation of physico-chemical characteristics and antioxidant potential. *Food Chemistry*, 365(July), 130538. <https://doi.org/10.1016/j.foodchem.2021.130538>
- Mohamed, S. A. A., El-Sakhawy, M., & El-Sakhawy, M. A. M. (2020). Polysaccharides, Protein and Lipid -Based Natural Edible Films in Food Packaging: A Review. *Carbohydrate Polymers*, 238(February), 116178. <https://doi.org/10.1016/j.carbpol.2020.116178>
- Monsur, H. A., Jaswir, I., Salleh, H. M., & Alkahtani, H. A. (2014). Effects of pretreatment on properties of gelatin from perch (*Lates Niloticus*) skin. *International Journal of Food Properties*, 17(6), 1224–1236. <https://doi.org/10.1080/10942912.2012.685676>
- Mukne, A. P., Viswanathan, V., & Phadatare, A. G. (2011). Structure pre-requisites for isoflavones as effective antibacterial agents. *Pharmacognosy Reviews*, 5(9), 13–18. <https://doi.org/10.4103/0973-7847.79095>

- Naghdi, S., Lorenzo, J. M., Mirnejad, R., Ahmadvand, M., & Moosazadeh Moghaddam, M. (2023). Bioactivity Evaluation of Peptide Fractions from Bighead Carp (*Hypophthalmichthys nobilis*) Using Alcalase and Hydrolytic Enzymes Extracted from *Oncorhynchus mykiss* and Their Potential to Develop the Edible Coats. *Food and Bioprocess Technology*, 16(5), 1128–1148. <https://doi.org/10.1007/s11947-022-02986-y>
- Ning, H. Q., Li, Y. Q., Tian, Q. W., Wang, Z. S., & Mo, H. Z. (2019). The apoptosis of *Staphylococcus aureus* induced by glycinin basic peptide through ROS oxidative stress response. *Lwt*, 99(September 2018), 62–68. <https://doi.org/10.1016/j.lwt.2018.09.028>
- Ningrum, A., Wardani, D. W., Vanidia, N., Manikharda, Sarifudin, A., Kumalasari, R., Ekafitri, R., Kristanti, D., Setiaboma, W., & Munawaroh, H. S. H. (2023). Evaluation of Antioxidant Activities from a Sustainable Source of Okara Protein Hydrolysate Using Enzymatic Reaction. *Molecules*, 28(13), 4974. <https://doi.org/10.3390/molecules28134974>
- Ningrum, A., Wardani, D. W., Vanidia, N., Sarifudin, A., Kumalasari, R., Ekafitri, R., Kristanti, D., Setiaboma, W., & Munawaroh, H. S. H. (2022). In Silico Approach of Glycinin and Conglycinin Chains of Soybean By-Product (Okara) Using Papain and Bromelain. *Molecules*, 27(20), 1–11. <https://doi.org/10.3390/molecules27206855>
- Ningrum, A., Widyastuti Perdani, A., Supriyadi, Siti Halimatul Munawaroh, H., Aisyah, S., & Susanto, E. (2021). Characterization of Tuna Skin Gelatin Edible Films with Various Plasticizers-Essential Oils and Their Effect on Beef Appearance. *Journal of Food Processing and Preservation*, 45(9), 0–2. <https://doi.org/10.1111/jfpp.15701>
- Noman, A., Wang, Y., Zhang, C., Yin, L., & Abed, S. M. (2022). Fractionation and purification of antioxidant peptides from Chinese sturgeon (*Acipenser sinensis*) protein hydrolysates prepared using papain and. *Arabian Journal of Chemistry*, 15(12), 104368. <https://doi.org/10.1016/j.arabjc.2022.104368>
- Nurdiani, R., Yufidasari, H. S., & Sherani, J. S. (2019). KARAKTERISTIK EDIBLE FILM DARI GELATIN KULIT IKAN KAKAP MERAH (*Lutjanus argentimaculatus*) DENGAN PENAMBAHAN PEKTIN. *Jphpi*, 22(1).
- Odeyemi, O. A., Burke, C. M., Bolch, C. C. J., & Stanley, R. (2018). Seafood spoilage microbiota and associated volatile organic compounds at different storage temperatures and packaging conditions. *International Journal of Food Microbiology*, 280(August 2017), 87–99. <https://doi.org/10.1016/j.ijfoodmicro.2017.12.029>
- Pavlath, A. E., & Orts, W. (2009). Edible Films and Coatings for Food Applications.

Edible Films and Coatings for Food Applications, 1–23.

<https://doi.org/10.1007/978-0-387-92824-1>

- Perdani, A. W. (2020). *Karakteristik Edible Film Gelatin Kulit Tuna Sirip Kuning (Thunnus albacares) dengan Variasi Plasticizer dan Minyak Atsiri Serta Pengaruhnya Terhadap Kenampakan Daging*. Universitas Gadjah Mada.
- Pranoto, Y., Marseno, D. W., & Rahmawati, H. (2011). Characteristics of gelatins extracted from fresh and sun-dried seawater fish skins in Indonesia. *International Food Research Journal*, 18(4), 1335–1341.
- Rai, M., Pandit, R., Gaikwad, S., & Kövics, G. (2016). Antimicrobial peptides as natural bio-preservative to enhance the shelf-life of food. *Journal of Food Science and Technology*, 53(9), 3381–3394. <https://doi.org/10.1007/s13197-016-2318-5>
- Ramianti, R. P. (2023). *Karakterisasi Edible Film dari Komposit Gelatin Ikan dan Hidrolisat Okara sebagai Pengemas Kopi Instan*. Universitas Gadjah Mada.
- Rapisarda, M., Valenti, G., Carbone, D. C., Rizzarelli, P., Recca, G., La Carta, S., Paradisi, R., & Fincchiaro, S. (2018). Strength, fracture and compression properties of gelatins by a new 3D printed tool. *Journal of Food Engineering*, 220, 38–48. <https://doi.org/10.1016/j.jfoodeng.2017.05.016>
- Rather, J. A., Akhter, N., Ashraf, Q. S., Mir, S. A., Makroo, H. A., Majid, D., Barba, F. J., Khaneghah, A. M., & Dar, B. N. (2022). A comprehensive review on gelatin: Understanding impact of the sources, extraction methods, and modifications on potential packaging applications. *Food Packaging and Shelf Life*, 34(September), 100945. <https://doi.org/10.1016/j.fpsl.2022.100945>
- Ratnayani, K., Ratnayani, O., & Pane, I. A. (2022). Antioxidant Activity and Amino Acid Composition of Okara Protein Hydrolysate. *KnE Life Sciences*, 2022, 352–357. <https://doi.org/10.18502/cls.v7i3.11140>
- Rezaee, M., Askari, G., Emamdjomeh, Z., & Salami, M. (2018). International Journal of Biological Macromolecules Effect of organic additives on physiochemical properties and anti-oxidant release from chitosan-gelatin composite films to fatty food simulant. *International Journal of Biological Macromolecules*, 114, 844–850. <https://doi.org/10.1016/j.ijbiomac.2018.03.122>
- Sabbah, M., Al-Asmar, A., Younis, D., Al-Rimawi, F., Famiglietti, M., & Mariniello, L. (2023). Production and Characterization of Active Pectin Films with Olive or Guava Leaf Extract Used as Soluble Sachets for Chicken Stock Powder. *Coatings*, 13(7). <https://doi.org/10.3390/coatings13071253>
- Said, N. S., Howell, N. K., & Sarbon, N. M. (2021). A Review on Potential Use of Gelatin-based Film as Active and Smart Biodegradable Films for Food Packaging

- Application. In *Food Reviews International*. Bellwether Publishing, Ltd.
<https://doi.org/10.1080/87559129.2021.1929298>
- Said, N. S., & Sarbon, N. M. (2022). Physical and Mechanical Characteristics of Gelatin-Based Films as a Potential Food Packaging Material: A Review. *Membranes*, 12(5). <https://doi.org/10.3390/membranes12050442>
- Santos, D. C. dos, Oliveira Filho, J. G. de, Silva, J. de S., Sousa, M. F. de, Vilela, M. da S., Silva, M. A. P. da, Lemes, A. C., & Egea, M. B. (2019). Okara flour: its physicochemical, microscopical and functional properties. *Nutrition and Food Science*, 49(6), 1252–1264. <https://doi.org/10.1108/NFS-11-2018-0317>
- Silva-Weiss, A., Ihl, M., Sobral, P. J. A., Gómez-Guillén, M. C., & Bifani, V. (2013). Natural Additives in Bioactive Edible Films and Coatings: Functionality and Applications in Foods. *Food Engineering Reviews*, 5(4), 200–216. <https://doi.org/10.1007/s12393-013-9072-5>
- Sohaib, M., Anjum, F. M., Sahar, A., Arshad, M. S., Rahman, U. U., Imran, A., & Hussain, S. (2017). Antioxidant proteins and peptides to enhance the oxidative stability of meat and meat products: A comprehensive review. *International Journal of Food Properties*, 20(11), 2581–2593. <https://doi.org/10.1080/10942912.2016.1246456>
- Suhag, R., Kumar, N., Petkoska, A. T., & Upadhyay, A. (2020). Film formation and deposition methods of edible coating on food products: A review. *Food Research International*, 136(July), 109582. <https://doi.org/10.1016/j.foodres.2020.109582>
- Sun, J., Rutherford, S. T., Silhavy, T. J., & Huang, K. C. (2022). Physical properties of the bacterial outer membrane. *Nature Reviews Microbiology*, 20(4), 236–248. <https://doi.org/10.1038/s41579-021-00638-0>
- Sutrisno, E., Ningrum, A., Supriyadi, Munawaroh, H. S. H., Aisyah, S., & Susanto, E. (2021). Characterization of tuna (*Thunnus albacares*) skin gelatin edible film incorporated with clove and ginger essential oils and different surfactants. *Food Research*, 5(2), 440–450. [https://doi.org/10.26656/fr.2017.5\(2\).285](https://doi.org/10.26656/fr.2017.5(2).285)
- Taghizadeh, M., Mohammadifar, M. A., Sadeghi, E., Rouhi, M., Mohammadi, R., Askari, F., Mortazavian, A. M., & Kariminejad, M. (2018). Photosensitizer-induced cross-linking: A novel approach for improvement of physicochemical and structural properties of gelatin edible films. *Food Research International*, 112(May), 90–97. <https://doi.org/10.1016/j.foodres.2018.06.010>
- Tesfay, S. Z., & Magwaza, L. S. (2017). Evaluating the efficacy of moringa leaf extract, chitosan and carboxymethyl cellulose as edible coatings for enhancing quality and extending postharvest life of avocado (*Persea americana* Mill.) fruit. *Food Packaging and Shelf Life*, 11, 40–48.

<https://doi.org/10.1016/j.fpsl.2016.12.001>

- Thiansilakul, Y., Benjakul, S., & Richards, M. P. (2011). The effect of different atmospheric conditions on the changes in myoglobin and colour of refrigerated Eastern little tuna (*Euthynnus affinis*) muscle. *Journal of the Science of Food and Agriculture*, 91(6), 1103–1110. <https://doi.org/10.1002/jsfa.4290>
- Thiansilakul, Y., Benjakul, S., & Richards, M. P. (2013). Effect of phenolic compounds in combination with modified atmospheric packaging on inhibition of quality losses of refrigerated Eastern little tuna slices. *LWT - Food Science and Technology*, 50(1), 146–152. <https://doi.org/10.1016/j.lwt.2012.06.009>
- Tkaczewska, J., Morawska, M., Kulawik, P., & Zajac, M. (2018). Characterization of carp (*Cyprinus carpio*) skin gelatin extracted using different pretreatments method. *Food Hydrocolloids*, 81, 169–179. <https://doi.org/10.1016/j.foodhyd.2018.02.048>
- Tongnuanchan, P., Benjakul, S., & Prodpran, T. (2013). Characteristics and antioxidant activity of leaf essential oil-incorporated fish gelatin films as affected by surfactants. *International Journal of Food Science and Technology*, 48(10), 2143–2149. <https://doi.org/10.1111/ijfs.12198>
- Tsironi, T., Houhoula, D., & Taoukis, P. (2020). Hurdle technology for fish preservation. *Aquaculture and Fisheries*, 5(2), 65–71. <https://doi.org/10.1016/j.aaf.2020.02.001>
- Umaraw, P., Munekata, P. E. S., Verma, A. K., Barba, F. J., Singh, V. P., Kumar, P., & Lorenzo, J. M. (2020). Edible films/coating with tailored properties for active packaging of meat, fish and derived products. *Trends in Food Science and Technology*, 98(February), 10–24. <https://doi.org/10.1016/j.tifs.2020.01.032>
- V. Kumar, A., Hasan, M., Mangaraj, S., M, P., Verma, D. K., & Srivastav, P. P. (2022). Trends in Edible Packaging Films and its Prospective Future in Food: A Review. *Applied Food Research*, 2(1), 100118. <https://doi.org/10.1016/j.afres.2022.100118>
- Valcarcel, J., Hermida-Merino, C., Piñeiro, M. M., Hermida-Merino, D., & Vázquez, J. A. (2021). Extraction and characterization of gelatin from skin by-products of seabream, seabass and rainbow trout reared in aquaculture. *International Journal of Molecular Sciences*, 22(22). <https://doi.org/10.3390/ijms222212104>
- Verma, A. K., Chatli, M. K., Mehta, N., & Kumar, P. (2018). Assessment of physico-chemical, antioxidant and antimicrobial activity of porcine blood protein hydrolysate in pork emulsion stored under aerobic packaging condition at 4 ± 1 °C. *LWT - Food Science and Technology*, 88, 71–79. <https://doi.org/10.1016/j.lwt.2017.10.002>

- Vogelsang-O'Dwyer, M., Sahin, A. W., Arendt, E. K., & Zannini, E. (2022). Enzymatic Hydrolysis of Pulse Proteins as a Tool to Improve Techno-Functional Properties. *Foods*, 11(9), 1307. <https://doi.org/10.3390/foods11091307>
- Vong, W. C., & Liu, S. Q. (2016). Biovalorisation of okara (soybean residue) for food and nutrition. *Trends in Food Science and Technology*, 52, 139–147. <https://doi.org/10.1016/j.tifs.2016.04.011>
- Wang, Q., Wang, H., & Xie, M. (2010). Antibacterial mechanism of soybean isoflavone on *Staphylococcus aureus*. *Archives of Microbiology*, 192(11), 893–898. <https://doi.org/10.1007/s00203-010-0617-1>
- Wang, Y., Liu, A., Ye, R., Wang, W., & Li, X. (2015). Transglutaminase-induced crosslinking of gelatin-calcium carbonate composite films. *Food Chemistry*, 166, 414–422. <https://doi.org/10.1016/j.foodchem.2014.06.062>
- Ward, A. G., & Courts, A. (1977). The science and technology of gelatin. In *Academic Press (AP) London, New York*. [https://doi.org/10.1016/0021-9797\(78\)90323-5](https://doi.org/10.1016/0021-9797(78)90323-5)
- Wei, P., Zhu, K., Cao, J., Dong, Y., Li, M., Shen, X., Duan, Z., & Li, C. (2021). The inhibition mechanism of the texture deterioration of tilapia fillets during partial freezing after treatment with polyphenols. *Food Chemistry*, 335(July 2020), 127647. <https://doi.org/10.1016/j.foodchem.2020.127647>
- Weng, W., & Zheng, H. (2015). Effect of transglutaminase on properties of tilapia scale gelatin films incorporated with soy protein isolate. *Food Chemistry*, 169, 255–260. <https://doi.org/10.1016/j.foodchem.2014.08.012>
- Wodi, S. I. M., Trilaksani, W.-, & Nurilmala, M.-. (2014). Perubahan Mioglobin Tuna Mata Besar Selama Penyimpanan Suhu Chilling. *Jurnal Pengolahan Hasil Perikanan Indonesia*, 17(3), 215–224.
- Wu, J., Chen, S., Ge, S., Miao, J., Li, J., & Zhang, Q. (2013). Preparation, properties and antioxidant activity of an active film from silver carp (*Hypophthalmichthys molitrix*) skin gelatin incorporated with green tea extract. *Food Hydrocolloids*, 32(1), 42–51. <https://doi.org/10.1016/j.foodhyd.2012.11.029>
- Xie, J., Wang, Z., Wang, S., & Qian, Y. F. (2020). Textural and quality changes of hairtail fillets (*Trichiurus haumela*) related with water distribution during simulated cold chain logistics. *Food Science and Technology International*, 26(4), 291–299. <https://doi.org/10.1177/1082013219888306>
- Xiong, Y., Kamboj, M., Ajlouni, S., & Fang, Z. (2021). Incorporation of salmon bone gelatine with chitosan, gallic acid and clove oil as edible coating for the cold storage of fresh salmon fillet. *Food Control*, 125(January), 107994. <https://doi.org/10.1016/j.foodcont.2021.107994>

- Xiong, Y., Li, S., Warner, R. D., & Fang, Z. (2020). Effect of oregano essential oil and resveratrol nanoemulsion loaded pectin edible coating on the preservation of pork loin in modified atmosphere packaging. *Food Control*, 114(March), 107226. <https://doi.org/10.1016/j.foodcont.2020.107226>
- Yang, J., Sun, G. J., Li, Y. Q., Cui, K. Y., & Mo, H. Z. (2016). Antibacterial characteristics of glycinin basic polypeptide against *Staphylococcus aureus*. *Food Science and Biotechnology*, 25(5), 1477–1483. <https://doi.org/10.1007/s10068-016-0229-x>
- Zhang, Q., Tong, X., Sui, X., Wang, Z., Qi, B., Li, Y., & Jiang, L. (2018). Antioxidant activity and protective effects of Alcalase-hydrolyzed soybean hydrolysate in human intestinal epithelial Caco-2 cells. *Food Research International*, 111(May), 256–264. <https://doi.org/10.1016/j.foodres.2018.05.046>
- Zhao, Q., He, L., Wang, X., Ding, X., Li, L., Tian, Y., & Huang, A. (2022). Characterization of a Novel Antimicrobial Peptide Isolated from *Moringa oleifera* Seed Protein Hydrolysates and Its Membrane Damaging Effects on *Staphylococcus aureus*. *Journal of Agricultural and Food Chemistry*, 70(20), 6123–6133. <https://doi.org/10.1021/acs.jafc.2c01335>
- Zhao, Y., Qiu, J., Xu, J., Gao, X., & Fu, X. (2017). Effects of crosslinking modes on the film forming properties of kelp mulching films. *Algal Research*, 26(July), 74–83. <https://doi.org/10.1016/j.algal.2017.07.006>
- Zheng, H., Zhao, M., Dong, Q., Fan, M., Wang, L., & Li, L. (2022). Extruded transglutaminase-modified gelatin–beeswax composite packaging film. *Food Hydrocolloids*, 132(May). <https://doi.org/10.1016/j.foodhyd.2022.107849>