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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

Aguié-Béghin, V., Paës, G., Molinari, M., & and 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*,

UNIVERSITAS
GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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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 kefiri. *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 Standarisasi 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.

UNIVERSITAS
GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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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

UNIVERSITAS
GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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*.

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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

UNIVERSITAS
GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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 (Synbbranchus 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 (Katsuwonous 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

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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., Benbettaïeb, 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 fi lms based on cuttle fi sh (Sepia o ffi cinalis) skin gelatin incorporated with cuttle fi sh 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.

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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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

UNIVERSITAS
GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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.

Mannozzi, 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 KLORIDA 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

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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.

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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/kls.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 fi lms 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

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
Fayza Allya Kallista, Dr. nat. tech. Andriati Ningrum, S.T.P., M.Agr. ; Prof. Dr. Ir. Supriyadi, M.Sc.
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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

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.

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
Fayza Allya Kallista, Dr. nat. tech. Andriati Ningrum, S.T.P., M.Agr. ; Prof. Dr. Ir. Supriyadi, M.Sc.
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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., & Zając, 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

UNIVERSITAS GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
Fayza Allya Kallista, Dr. nat. tech. Andriati Ningrum, S.T.P., M.Agr. ; Prof. Dr. Ir. Supriyadi, M.Sc.
Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

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

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

UNIVERSITAS
GADJAH MADA
PENGARUH PENAMBAHAN HIDROLISAT PROTEIN OKARA DAN ENZIM TRANSGLUTAMINASE DALAM PEMBUATAN EDIBLE FILM GELATIN TUNA SERTA APLIKASINYA PADA DAGING TUNA
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Universitas Gadjah Mada, 2023 | Diunduh dari http://etd.repository.ugm.ac.id/

Xiong, Y., Li, S., Warner, R. D., & Fang, Z. (2020). E ff ect of oregano essential oil and resveratrol nanoemulsion loaded pectin edible coating on the preservation of pork loin in modi fi ed 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