

DAFTAR PUSTAKA

- Agung, L. A., D. Hermawan, M. Herjayanto. 2024. Identifikasi awal bakteri kandidat probiotik asal usu ikan nila dengan metode uji gram menggunakan KOH 3%. *Journal of Local Food Security* 5(1) : 3969-373.
- Al-Hammam, M. Y., M. P. Putra, A. H. Mardinsyah, G. Cahyati, dan I. D. Puspita. 2023. The antibacterial activity of *Lactobacillus* sp. GMP1 and *Weissella* sp. GMP12 against some foodborne disease-causing bacteria. *Jurnal Pengolahan Hasil Perikanan Indonesia* 26(2): 206–215.
- An, Y., X. Cai, L. Cong, Y. Hu, R. Liu, S. Xiong, X. & Hu. 2022. Quality improvement of zhayu, a fermented fish product in china: effects of inoculated fermentation with three kinds of lactic acid bacteria. *Foods*, 11(18): 1-17.
- Ammor, M. S., A. B. Flórez, dan B. Mayo. 2007. Antibiotic resistance in non-enterococcal lactic acid bacteria and bifidobacteria. *Food Microbiology* 24(6): 559–570.
- Aristyan, I., R. Ibrahim, dan L. Rianingsih. 2014. Pengaruh perbedaan kadar garam terhadap mutu organoleptik dan mikrobiologis terasi rebon (*Acetes* sp.). *Jurnal Pengolahan dan Bioteknologi Hasil Perikanan* 3(2): 60–66.
- Ashikhmina, M. S., P. V. Nesterov, V. S. Filozop, M. O. Volodarskiy, O. Y. Orlova, M. Nosonovsky, & E. V. Skorb. 2025. DFT-based evaluation of cryoprotectants and their role in lyophilization success. *Cryobiology*, 120, 105282.
- Batubara, P.A.P., Desniar, I. Setyaningsih. 2019. Pengaruh starter bakteri asam laktat probiotik terhadap perubahan kimiawi dan mikrobiologis rusip. *Jurnal Teknologi dan Industri Pangan* 30 (1): 28-35
- Bhattacharya, S. 2018. Cryoprotectants and their usage in cryopreservation process. *Cryopreservation Biotechnology in Biomedical and Biological Sciences*.
- Cai, H., L. Tao, X. Zhou, Y. Liu, D. Sun, Q. Ma, Y. Zhongjie & W. Jiang. 2024. Lactic acid bacteria in fermented fish: Enhancing flavor and ensuring safety. *Journal of Agriculture and Food Research*, 16: 101206.
- Chen, B., X. Wang, P. Li, X. Feng, Z. Mao, J. Wei, X. Lin, X. Li, dan L. Wang. 2023. Exploring the protective effects of freeze-dried *Lactobacillus rhamnosus* under optimized cryoprotectants formulation. *LWT* 173: 114295.
- Chen, H., Q. H. Zhang, Q. Luo, & G. W. Shu. 2013. Effect of five materials including sucrose, lactose, skim milk, yeast, vitamin B2 on survival of *Lactobacillus bulgaricus* during freeze-drying. *Advanced Materials Research*, 700: 255-258.
- Cheng, Z., X. Yan, J. Wu, P. Weng, dan Z. Wu. 2022. Effects of freeze drying in complex lyoprotectants on the survival, and membrane fatty acid composition of *Lactobacillus plantarum* L1 and *Lactobacillus fermentum* L2. *Cryobiology* 105: 1–9.

- Claesson, M. J., D. Van Sinderen, dan P. W. O'Toole. 2007. The genus *Lactobacillus* a genomic basis for understanding its diversity. *FEMS Microbiology Letters* 269(1): 22–28.
- Clarizza, V. 2015. Pengaruh konsentrasi cryoprotectant susu skim terhadap viabilitas *Lactobacillus plantarum* Dad 13 selama pembekuan, freeze drying dan penyimpanan. Disertasi, Universitas Gadjah Mada.
- Domínguez-Gutiérrez, G. A. 2023. Inhibition of *Aspergillus carbonarius* growth and ochratoxin A production using lactic acid bacteria cultivated in an optimized medium. *International Journal of Food Microbiology* 404: 110320.
- Eden, R. 2014. *Enterobacteriaceae, coliforms and E. coli*: Classical and modern methods for detection and enumeration.
- Engelhardt, H. 2018. *Lactobacillus*-evolution and kultur geschichte: microbe des Jahres 2018. *Biologie in Unserer Zeit* 48(6) : 400-406.
- Ernitasari, E., F. Nur, dan H. Hafsan. 2023. Ikan fermentasi nusantara: Tradisi, manfaat gizi, dan kekayaan budaya. *Teknosains: Media Informasi Sains dan Teknologi* 17(3): 372–381.
- Fonseca, F., S. Cenard, dan S. Passot. 2015. Freeze-drying of lactic acid bacteria. *Cryopreservation and Freeze-Drying Protocols* 477: 488–512.
- Fu, N., F. Hao, S. Zhang, H. Mao, W. Lu, X. D. Chen, dan W. D. Wu. 2024. The survival and stability of *Lactobacillus rhamnosus* GG as affected by particle formation during spray drying and spray freeze drying. *Journal of Food Engineering*, 112252.
- Ge, S., J. Han, Q. Sun, Z. Ye, Q. Zhou, P. Li, dan Q. Gu. 2024. Optimization of cryoprotectants for improving the freeze-dried survival rate of potential probiotic *Lactococcus lactis* ZFM559 and evaluation of its storage stability. *LWT* 198: 116052.
- Gwak, H. J., Lee, J. H., Kim, T. W., Choi, H. J., Jang, J. Y., Lee, S. I., & Park, H. W. (2015). Protective effect of soy powder and microencapsulation on freeze-dried *Lactobacillus brevis* WK12 and *Lactococcus lactis* WK11 during storage. *Food Science and Biotechnology*, 24(6): 2155-2160.
- Haas, J., B. J. Kim, Z. Atamer, C. Wu, dan D. C. Dallas. 2024. Effects of spray drying and freeze drying on the protein profile of whey protein concentrate. *Journal of Food Science* 89(11): 7477–7493.
- Habibi, N. A., S. Fathia, dan C. T. Utami. 2019. Perubahan karakteristik bahan pangan pada keripik buah dengan metode freeze drying. *Jurnal Sains Terapan* 5(2): 67–76.
- Haeuser, C., P. Goldbach, J. Huwyler, W. Friess, dan A. Allmendinger. 2020. Excipients for room temperature stable freeze-dried monoclonal antibody formulations. *Journal of Pharmaceutical Sciences* 109(1): 807–817.

- Hamidah, M. N., L. Rianingsih, dan R. Romadhon. 2019. Aaktivitas antibakteri isolat bakteri asam laktat dari peda dengan jenis ikan berbeda terhadap *E. coli* dan *S. aureus*. *Jurnal Ilmu dan Teknologi Perikanan* 1(2) : 11-21.
- Han, D. J., S. J. Jun, B. H. Lee, dan S. H. Yoo. 2022. Cryoprotective effect of turanose on lyophilized *Lactobacillus paracasei* subsp. *paracasei*, *L. casei* 431. *Food Science and Biotechnology* 31(3): 343–347.
- Jiang J., C. Ma, X. Song, J. Zeng, L. Zhang, dan P. Gong. 2022. Spray drying co-encapsulation of lactic acid bacteria and lipids: a riview. *Trends in Food Science and Technology* 129 :134-143
- Kaatze, U. 2018. Water: Why is it so special?.12th International Conference on Electromagnetic Wave Interaction with Water and Moist Substances (ISEMA): 1–9. IEEE.
- Khoramnia, A., N. Abdullah, S. L. Liew, C. C. Sieo, K. Ramasamy, dan Y. W. Ho. 2011. Enhancement of viability of a probiotic *Lactobacillus* strain for pourltry freeze-drying and storage using the response surface methodology. *Animal science journal* 82 (1): 127-135.
- Kieliszek, M., K. Pobiega, K. Piwowarek, dan A. M. Kot. 2021. Characteristics of the proteolytic enzymes produced by lactic acid bacteria. *Molecules* 26(7): 1858.
- Kim, M., D. G. Nam, S. B. Kim, P. Im, , J. S. Choe, & A. J. Choi. 2018. Enhancement of viability, acid, and bile tolerance and accelerated stability in lyophilized *Weissella cibaria* JW 15 with protective agents. *Food Science & Nutrition*, 6(7):1904-1913.
- Kusmarwati, A., E.S. Heruwati, T. Utami, E.S. Rahayu. 2011. Pengaruh penambahan *Pediococcus acidilactici* F-11 sebagai kultur starter terhadap kualitas rusip teri (*stolephorus sp.*). *Jurnal Pascapanen Bioteknologi Kelautan Perikanan* 6: 13-26.
- Li, B., F. Tian, X. Liu, J. Zhao, H. Zhang, dan W. Chen. 2011. Effects of cryoprotectants on viability of *Lactobacillus reuteri* CICC6226. *Applied Microbiology and Biotechnology* 92(3): 609–616.
- Li, X. M., L. H. Che, Y. Wu, C. Li, dan B. C. Xu. 2024. An effective strategy for improving the freeze-drying survival rate of *Lactobacillus curvatus* and its potential protective mechanism. *Food Bioscience* 58: 103794.
- Mahmoodian, S., S. S. A. Fatemi, M. Shamsara, M. Chaharmahali, A. Meimandipour, dan S. A. Maniee. 2024. Impact of protectants and method of preservation on the stability of potentially probiotic bacteria. *Cryobiology* 116: 104912
- Mahulette, F. N. R. Mubarik, A. Suwanto, dan Widanarni. 2018. Diversity of lactic acide bacteria in inasua fermentation. *Iranian Journal of Microbiology* 10(5):258-265.
- Majidzadeh Heravi, R., M. Ghiasvand, E. Rezaei, dan F. Kargar. 2022. Assessing the viability of three *Lactobacillus* bacterial species protected in the cryoprotectants containing whey and maltodextrin during freeze-drying process. *Letters in Applied Microbiology* 74(4): 505–512.

- Mendoza, G. M., S. Psteris, M. Otero, dan M. F. Nader-Macias. 2013. Survival and beneficial properties of lactic acid bacteria from rancultur subjected to freeze drying and storage. *Journal of Applied Microbiology* 116 (1): 157-166.
- Merivaara, A., J. Zini, E. Koivunotko, S. Valkonen, O. Korhonen, F. M. Fernandes, dan M. Yliperttula. 2021. Preservation of biomaterials and cells by freeze-drying: Change of paradigm. *Journal of Controlled Release* 336: 480–498.
- Mortazavian, A. M., M. R. Ehsani, S. M. Mousavi, K. Rezaei, S. Sohrabvandi, dan J. A. Reinheimer. 2007. Effect of refrigerated storage temperature on the viability of probiotic micro-organisms in yogurt. *International Journal of Dairy Technology* 60(2): 123–127.
- Mussatto, S. I., M. Fernandes, I. M. Mancilha, dan I. C. Roberto. 2008. Effects of medium supplementation and pH control on lactic acid production from brewer's spent grain. *Biochemical Engineering Journal* 40(3): 437–444.
- Nair, P. K., dan M. Corredig. 2024. Time dependent aggregation of casein micelle concentrates. *Journal of Dairy Science* 104 (1): 92-101.
- Ojha, A. K., N. P. Shah, dan V. Mishra. 2021. Conjugal transfer of antibiotic resistances in *Lactobacillus* spp. *Current Microbiology* 78(8): 2839–2849.
- Panesar, P. S., J. F. Kennedy, D. N. Gandhi, dan K. Bunko. 2007. Bioutilisation of whey for lactic acid production. *Food Chemistry* 105(1): 1–14.
- Pangestu, A. D., K. Kurniawan, dan S. Supriyadi. 2021. Pengaruh variasi suhu dan lama penyimpanan terhadap viabilitas bakteri asam laktat (BAL) dan nilai pH yoghurt. *Borneo Journal of Medical Laboratory Technology* 3(2): 231–236.
- Peiren, J., J. Buyse, P. De Vos, E. Lang, D. Clermont, S. Hamon, E. Begaud, C. Bizet, J. Pascual, M. A. Ruvira, M. C. Macian, dan D. R. Arahal. 2015. Improving survival and storage stability of bacteria recalcitrant to freeze-drying: A coordinated study by European culture collections. *Applied Microbiology and Biotechnology* 99: 3559–3571.
- Pisano, R., D. Fissore, dan A. A. Barresi. 2011. Heat transfer in freeze-drying apparatus. *Developments in Heat Transfer* 10: 23799.
- Pratana, M. V., V. I. Meitiniarti, dan A. B. A. Sukmana. 2019. Uji viabilitas bakteri asam laktat dalam enkapsulasi menggunakan alginat dan susu skim secara kering dingin. *Simposium Nasional Ilmiah & Call for Paper Unindra (Simponi)* 1(1).
- Putra, M. M. P., M. Yaafi., A. H. Mardinsyah, dan I. D Puspita. 2023. Evaluation of antibacterial activity produced by *Weissella* sp. GMP12 and its potency as a starter to enhance fish fermented products quality. *Khulna University Studies*, 131–139.
- Pyar, A. H. H., dan K. K. Peh. 2016. Investigation of cryoprotection on the viability of freeze dried probiotics. *Malaysian Journal of Microbiology* 353–358.
- Qu, Y., Yu, C., T. Gan, B. Huang, S. Huang, J. Yu, & P. Song. 2023. Protective effect of crop by-products on *Lactobacillus gasserii* H87 during freeze-drying and storage. *Drying Technology*, 41(10): 1595-1604.

- Rachmat, S. S., dan M. Shovitri. 2022. Studi literatur tentang teknik liofilisasi untuk preservasi bakteri. *Jurnal Sains dan Seni ITS* 10(2): E17–E22.
- Ratnaningtyas, S., D. Wahyudi, D. Wulansari, dan W. P. Utami. 2023. Deteksi cemaran *Salmonella* sp. pada komoditas tuna, tongkol, dan cakalang (TTC) yang dijual di Pasar Inpres di Daerah Istimewa Yogyakarta. *Jurnal Ilmu Biologi dan Terapan* 7(1): 1–7.
- Riadi, S., dan D. Setiyawati. 2020. Isolasi dan uji potensi bakteri asam laktat asal kimchii dan teh kombucha dalam menghambat bakteri patogen. *Jurnal Kesmas Prima Indonesia* 4(1): 25–29.
- Rizki, Z., F. Fitriana, dan A. Jumadewi. 2022. Identifikasi jumlah angka kuman pada dispenser metode TPC (Total Plate Count). *Jurnal SAGO Gizi dan Kesehatan* 4(1): 38–43.
- Rohman, Z., N. Hindratiningrum, dan S. R. Zulaikhah. 2022. Keasaman, pH, dan viskositas yoghurt buah naga merah dengan penambahan beberapa level sukrosa. *Indonesian Journal of Food Technology* 1(1): 1–10.
- Roos, Y., dan M. Karel. 1991. Plasticizing effect of water on thermal behavior and crystallization of amorphous food models. *Journal of Science* 56(1): 38–43.
- Saarela, M., I. Virkajärvi, H. L. Alakomi, P. Sigvart-Mattila, dan J. Mättö. 2006. Stability and functionality of freeze-dried probiotic *Bifidobacterium* cells during storage in juice and milk. *International Dairy Journal* 16(12): 1477–1482.
- Schoug, Å., D. Mahlin, M. Jonson, dan S. Håkansson. 2010. Differential effects of polymers PVP90 and Ficoll400 on storage stability and viability of *Lactobacillus coryniformis* Si3 freeze-dried in sucrose. *Journal of Applied Microbiology* 108(3): 1032–1040.
- Schoug, Å., J. Fischer, H. J. Heipieper, J. Schnürer, dan S. Håkansson. 2008. Impact of fermentation pH and temperature on freeze-drying survival and membrane lipid composition of *Lactobacillus coryniformis* Si3. *Journal of Industrial Microbiology and Biotechnology* 35(3): 175–181.
- Schwab, C., R. Vogel, dan M. G. Gänzle. 2007. Influence of oligosaccharides on the viability and membrane properties of *Lactobacillus reuteri* TMW1.106 during freeze-drying. *Cryobiology* 55(2): 108–114.
- Shiby, V. K., & H. N. Mishra. 2013. Fermented milks and milk products as functional foods A review. *Critical reviews in food science and nutrition*, 53(5), 482–496.
- Siciliano, R. A., G. Pannella, R. Lippolis, A. Ricciardi, M. F. Mazzeo, dan T. Zotta. 2019. Impact of aerobic and respirative lifestyle on *Lactobacillus casei* N87 protome. *International Journal of Food Microbiology*.
- Sionek, B., A. Szydłowska, M. Trzaskowska, dan D. Kołożyn-Krajewska. 2024. The impact of physicochemical conditions on lactic acid bacteria survival in food products. *Fermentation* 10(6): 298.

- Siroli, L., G. Braschi, S. Rossi, D. Gottardi, F. Patrignani, dan R. Lanciotti. 2020. *Lactobacillus paracasei* A13 and high-pressure homogenization stress response. *Microorganisms* 8(3): 439.
- Stefanello, R. F., et al. 2019. Survival and stability of *Lactobacillus fermentum* and *Wickerhamomyces anomalus* strains upon lyophilisation with different cryoprotectant agents. *Food Research International* 115: 90–94.
- Suo, X., S. Huang, J. Wang, N. Fu, R. Jeantet, dan X. D. Chen. 2021. Effect of culturing lactic acid bacteria with varying skim milk concentration on bacteria survival during heat treatment. *Journal of Food Engineering* 294: 110396.
- Susilowati, A. Y., S. N. Jannah, H. P. Kusumaningrum, dan S. S. Sulistiani. 2022. Isolasi dan identifikasi bakteri asam laktat dari susu kambing sebagai antagonis *Listeria monocytogenes* dan *Escheria coli* penyebab foodborne disease. *Jurnal Teknologi Pangan* 6(2): 24-31.
- Tuyen, D. T., L.V. Tahng, dan G. Boukharev. 2022. Effect of freezing treatments and protective agent on the stability of *Weissella cabria* TSL24.10 after freeze drying. *Moscow University Biological Science Bulletin* 77(4): 272-278.
- Wang, G. Q., J. Pu, X. Q. Yu, Y. J. Xia, dan L. Z. Ai. 2020. Influence of freezing temperature before freeze-drying on the viability of various *Lactobacillus plantarum* strains. *Journal of Dairy Science* 103(4): 3066–3075.
- Xie, L., Y. Ding, P. Xu, K. Hua, dan X. Zhang. 2024. Effects of sucrose, trehalose, and fructose on whole ovarian cryopreservation in a rat model. *Clinical and Experimental Obstetrics & Gynecology* 51(4): 90.
- Yang, L., L. Chen, H. Li, Z. Deng, dan J. Liu. 2022. Lactic acid production from mesophilic and thermophilic fermentation of food waste at different pH. *Journal of Environmental Management* 304: 114312.
- Yeo, S., H. S. Shin, H. W. Lee, D. Hong, H. Park, W. Holzappel, E. B. Kim, dan C. S. Huh. 2018. Determination of optimized growth medium and cryoprotectant additives to enhance the growth and survival of *Lactobacillus salivarius*. *Journal of Microbiology and Biotechnology* 28 (5): 718-731.
- Yu, G., R. Li, dan A. Hubel. 2018. Interfacial interactions of sucrose during cryopreservation detected by Raman spectroscopy. *Langmuir* 35(23): 7388–7395.
- Yuliana, A., L. Nurdianti, R. R. Shaleha, dan R. A. Wildan. 2023. Pembuatan serbuk instan minuman probiotik labu kuning (*Cucurbita moschata*) dengan variasi jenis susu. *Prosiding Seminar Nasional Diseminasi Penelitian Volume 3*(1).
- Yuniati, F. A. A., dan D. A. C. Rasmi. 2014. Fermentasi ikan kembung (*Rastrelliger* sp.) dalam pembuatan peda dengan penambahan bakteri asam laktat (BAL) yang terkandung dalam terasi empang pada berbagai konsentrasi garam. *Jurnal Biologi Tropis*.
- Zhang, M., Y. H. Liu, C. Yin, dan J. Qian. 2023. Effects of different packaging forms and storage temperature on storage viability of *Lactobacillus plantarum* LN66.

Zineddine, B. A., M. Anas., H. A. Rizk, H. J. Eddine, dan K. Mebrouk. 2011. Identification and characterization of functional and technological *Lactobacillus plantarum* strains isolated from raw goat and camel milk collected in Algeria. *Journal Of Pure And Applied Microbiology* 5(2): 553-566.