

DAFTAR PUSTAKA

- Adapa, S., Schmidt, K. A., Jeon, I. J., Herald, T. J., and Flores, R. A. 2000. *Mechanisms of ice crystallization and recrystallization in ice cream: a review. Food Reviews International*, 16(3), 259–271. <https://doi.org/10.1081/FRI-100100289>
- Afzaal, M., Khan, A. U., Saeed, F., Arshad, M. S., Khan, M. A., Saeed, M., Maan, A. A., Khan, M. K. I., Ismail, Z., Ahmed, A., Tufail, T., Ateeq, H., and Anjum, F. M. 2020. *Survival and stability of free and encapsulated probiotic bacteria under simulated gastrointestinal conditions and in ice cream. Food Science and Nutrition*, 8(3), 1649–1656. <https://doi.org/10.1002/FSN3.1451>
- Afzaal, M., Saeed, F., Arshad, M. U., Nadeem, M. T., Saeed, M., and Tufail, T. 2019. *The Effect of Encapsulation on The Stability of Probiotic Bacteria in Ice Cream and Simulated Gastrointestinal Conditions. Probiotics and Antimicrobial Proteins*, 11(4), 1348–1354. <https://doi.org/10.1007/S12602-018-9485-9>
- Agustin, D. A dan A. A. Wibowo. 2021. *Teknologi Enkapsulasi: Teknik dan Aplikasinya. DISTILAT: Jurnal Teknologi Separasi*, 7(2), 202-209.
- Aini, M., S. Rahayuni., V. Mardina., Quranayati dan N. Asiah. 2021. *Bakteri Lactobacillus spp dan Perannya bagi Kehidupan. Jurnal Jeumpa. Vol. 8 No. 2. Hal : 614-624.*
- Akalin, A., S. Kesenkas., H. Dinkci., N. Unal., G. Ozer and E. Kinik. 2017. *Enrichment of probiotic ice cream with different dietary fibers: Structural characteristics and culture viability. Departement of Dairy Technology. Faculty of Agriculture. University of Ege*. 101: 1-10.
- Akarca, G., Kilinç, M., and Denizkara, A. J. 2023. *Quality specification of ice creams produced with different homofermentative lactic acid bacteria. https://doi.org/10.1002/fsn3.3762*
- Alamprese, C., Foschino, R., Rossi, M., Pompei, C., and Corti, S. 2005. *Effects of Lactobacillus rhamnosus GG addition in ice cream. International Journal*

of *Dairy Technology*, 58(4), 200–206. <https://doi.org/10.1111/J.1471-0307.2005.00214.X>

Anal, A. K., and Singh, H. 2007. *Recent advances in microencapsulation of probiotics for industrial applications and targeted delivery*. *Trends in Food Science and Technology*, 18(5), 240–251. <https://doi.org/10.1016/j.tifs.2007.01.004>

AOAC. 2005. *Official Methods of Analysis of Association of Official Analytical Chemists*. Benjamin Franklin Station, Washington.

Astawan M. 2011. *Pangan Fungsional untuk Kesehatan yang Optimal*. Fakultas Teknologi Pertanian IPB, Bogor.

Astawan, M. 2008. *Sehat Dengan Hidangan Hewani*. Jakarta. Penebar swadaya.

Azura, A. R., Diantini, A., Farmasi, F., dan Padjadjaran, U. 2019. *Farmaka Farmaka*. 17, 209–221.

Badan Standarisasi Nasional. 1995. SNI 01-3713-1995. Es Krim. BSN, Jakarta.

Banyuaji, A., Rahayu, E. S., dan Utami, T. 2012. Viabilitas *Lactobacillus acidophilus* SNP 2 dalam Kapsul dan Aplikasinya dalam Es Krim. 29(4). <https://doi.org/10.22146/AGRITECH.9693>

Başıyigit, G., Kuleaşan, H., and Gül Karahan, A. 2006. *Viability of human-derived probiotic lactobacilli in ice cream produced with sucrose and aspartame*. *Journal of Industrial Microbiology and Biotechnology*, 33(9), 796–800. <https://doi.org/10.1007/S10295-006-0128-X>

Bi, D., Yang, X., Yao, L., Hu, Z., Lin, H., Xu, X., and Lu, J. 2022. *Potential Food and Nutraceutical Applications of Alginate: A Review*. *Marine Drugs*, 20(9), 564. <https://doi.org/10.3390/md20090564>

Bilang, M., Tahir, M., and Haedar, D. 2018. *Mempelajari Viabilitas Enkapsulasi Sel Probiotik (*Lactobacillus plantarum* dan *Streptococcus Thermophilus*) Pada Es Krim: (Studi Viabilitas Enkapsulasi Sel Probiotik (*Lactobacillus**

- plantarum* dan *Streptococcus thermophilus*) pada Es Krim). Jurnal Canrea: Jurnal Teknologi Pangan, Gizi, dan Kuliner, 41-52
- BPOM. 2005. Peraturan Kepala BPOM RI nomor HK 00.05.52.0685. Peraturan Kepala Badan Pengawas Obat Dan Makanan Republik Indonesia, 1–13.
- Burgain, C., Gaiani, C., Linder, M and Scher, J. 2011. *Encapsulation of probiotic living cells: from laboratory scale to industrial applications. Journal of Food Engineering* 104:467-483. DOI:10.1016/j.jfoodeng.2010.12.031.
- Burgain, J., Corgneau, M., Scher, J., and Gaiani, C. 2015. *Encapsulation of Probiotics in Milk Protein Microcapsules* (pp. 391–406). Academic Press. <https://doi.org/10.1016/B978-0-12-800350-3.00019-4>
- Cabrera-Canales, Z. E., C. A. Gómez-Aldapa., J. Castro-Rosas., L. Díaz-Batalla., R. O. Navarro-Cortez., N. Calcáneo Martínez and R. N. Falfán-Cortés. 2023. *Development and application of gelatinized starches as wall materials for Lacticaseibacillus paracasei encapsulation. International Journal of Polymer Analysis and Characterization*, 28(7), 684-696.
- Chaikhram, P. 2015. *Stability of probiotics encapsulated with Thai herbal extracts in fruit juices and yoghurt during refrigerated storage. Food Bioscience*, 12, 61-66.
- Chan, E. S., Lee, B. B., Ravindra, P., and Poncelet, D. 2011. *Prediction models for shape and size of Ca-alginat macrobeads produced through extrusion–dripping method. Journal of Colloid and Interface Science*, 338(1), 63–72. [https://doi.org/10.1016/S0926-6690\(00\)00064-9](https://doi.org/10.1016/S0926-6690(00)00064-9)
- Chaplin, M. (2006). Struktur Molekul Amilosa dan Amilopektin. Foodtech Binus.
- Chavarri, M., M. C. Villaran and I. Maranon. 2012. *Encapsulation technology to protect probiotic bacteria. Chapter 23: 501-540. Intech Open, UK. DOI: 10.5772/50046.*
- Chung, S. J., Heymann, H., and Grün, I. U. 2003. *Temporal Release of Flavor Compounds from Low-fat and High-fat Ice Cream During Eating. Journal*

of *Food Science*, 68(6), 2150–2156. <https://doi.org/10.1111/J.1365-2621.2003.TB07035.X>

Cook, M. T., G. Tzortzis., V. V. Khutoryanskiy and D. Charalampopoulos. 2013. *Layer-by-layer coating of alginat matrices with chitosan–alginat for the improved survival and targeted delivery of probiotic bacteria after oral administration. Journal of Materials Chemistry B*, 1(1), 52-60.

Cook, M. T., Tzortzis, G., Charalampopoulos, D., and Khutoryanskiy, V. V. 2012. *Microencapsulation of probiotics for gastrointestinal delivery. Journal of controlled release*, 162(1), 56-67. <https://doi.org/10.1016/j.jconrel.2012.06.003>

Desai, K. G. H and H. J. Park. 2005. *Recent developments in microencapsulation of food ingredients. Drying Technol*; 23:1361– 94.

Dewi, N. S., H. R. P. Nur dan R. Achmad. 2012. Karakteristik Sifat Fisikokimia Tepung Bengkuang (*Pachyrhizus erosus*) Dimodifikasi Secara Asetilasi Dengan Variasi Konsentrasi Asam Asetat Selama Perendaman. *Jurnal Teknologi Pangan Hasil Pertanian*, Vol. 05 (2).

Diana, A., and Purwanti, T. 2019. *Utilization of Lactobacillus Acidophilus FNCC-0051 Microencapsulation: Potential Benefit of Giving Combination of Sodium Alginat and Gelatin to Attributes and Role of Probiotic Against Staphylococcus Aureus. Indian Journal of Public Health Research and Development*, 10(9). <https://doi.org/10.5958/0976-5506.2019.02645.7>

Diez-Libreros, Y., Grisales-Cataño, L. M., and Ramírez-Navas, J. S. 2025. *Impact of prebiotic fibre on the attributes of probiotic ice cream. Revista Facultad De Ingenieria-Universidad De Antioquia*, 115. <https://doi.org/10.17533/udea.redin.20250153>

Dinas Pertanian Kota Padang. 2020. Laporan Tanaman Sayuran dan Buah-buahan Semusim.

- Ding, W. K., and Shah, N. P. 2008. Survival of free and microencapsulated probiotic bacteria in orange and apple juices. *International Food Research Journal*, 15(2), 219-232.
- Djaenudin, D., Budianto, E., Saepudin, E., and Nasir, M. 2020. *The encapsulation of Lactobacillus casei probiotic bacteria based on sodium alginat and chitosan*. 483(1), 012043. <https://doi.org/10.1088/1755-1315/483/1/012043>
- Djaenudin, E., and Saepudin, M. 2021. *Microencapsulation of Probiotic Lactobacillus casei based on Alginat and Chitosan Materials*. *Asian Journal of Applied Sciences*, 9(2). <https://doi.org/10.24203/AJAS.V9I2.6564>
- Dorneles, M. S., Azevedo, E. S. de, and Zapata Noreña, C. P. 2024. *Effect of incorporating modified pinhão starch in alginat-based hydrogel beads for encapsulation of bioactive compounds by hydrodynamic electrospray ionization jetting*. *International Journal of Biological Macromolecules*, 131555. <https://doi.org/10.1016/j.ijbiomac.2024.131555>
- Draget, K. I., Skjåk-Bræk, G., and Smidsrød, O. 2006. *Alginat-based new materials*. *International Journal of Biological Macromolecules*, 38(1), 41–48. [https://doi.org/10.1016/S0141-8130\(97\)00040-8](https://doi.org/10.1016/S0141-8130(97)00040-8)
- Dusso, D., and Salomon, C. J. 2023. *Solving the delivery of Lactococcus lactis: Improved survival and storage stability through the bioencapsulation with different carriers*. *Journal of Food Science*. <https://doi.org/10.1111/1750-3841.16538>
- English, M. M., Okagu, O. D., Stephens, K. M., Goertzen, A. D., and Udenigwe, C. C. 2023. *Flavour encapsulation: A comparative analysis of relevant techniques, physiochemical characterisation, stability, and food applications*. *Frontiers in Nutrition*, 10. <https://doi.org/10.3389/fnut.2023.1019211>
- Etchepare, M. D. A., Barin, J. S., Cichoski, A. J., Jacob-Lopes, E., Wagner, R., Fries, L. L. M., and Menezes, C. R. D. 2015. *Microencapsulation of probiotics using sodium alginate*. *Ciência Rural*, 45, 1319-1326. <https://doi.org/10.1590/0103-8478cr20140938>

- European Commission. 2010. *Functional foods*. In European Union. Publications Office of the European Union. [https://doi.org/10.1016/S0140-6736\(99\)80007-5](https://doi.org/10.1016/S0140-6736(99)80007-5).
- Fahimdanesh, M., Mohammadi, N., Ahari, H., Zanjani, M. K., Hargalani, F. Z., and Behrouz Nasab, K. 2012. Effect of microencapsulation plus resistant starch on survival of *Lactobacillus casei* and *Bifidobacterium bifidum* in mayonnaise sauce. *African Journal of Microbiology Research*, 6(40), 6853-6858.
- Faizal, R. R., dan W. Syarif. 2021. Pengaruh Substitusi Tepung Bengkuang Terhadap Kualitas Sponge Cake (*Doctoral dissertation*, Universitas Negeri Padang).
- Fang, B., Watanabe, H., Isobe, K., Handa, A., and Nakagawa, K. 2021. *The manufacturing of lactobacillus microcapsules by freezing with egg yolk: The analysis of microstructure and the preservation effect against freezing and acid treatments*. 6, 100221. <https://doi.org/10.1016/J.JAFR.2021.100221>
- Fávaro-Trindade, C. S., Comunian, T. A., de Souza, V. B., dos Santos, M. G., and de Oliveira, M. S. 2016. *Encapsulation of Active/Bioactive/Probiotic Agents* (pp. 363–378). CRC Press. <https://doi.org/10.1201/9781315373713-29>
- George, M., and Abraham, T. E. 2006. Polyionic hydrocolloids for the intestinal delivery of protein drugs: alginate and chitosan—a review. *Journal of controlled release*, 114(1), 1-14.
- Gullo, M., and Zotta, T. 2022. *Probiotics in dairy products: microencapsulation and delivery* (pp. 271–285). <https://doi.org/10.1016/b978-0-323-85793-2.00032-1>
- Hao, Y., W. Zhao., L. Zhang., X. Zeng., Z. Sun., D. Zhang and Q. Zhou. 2020. *Bio-multifunctional alginat/chitosan/fucoidan sponges with enhanced angiogenesis and hair follicle regeneration for promoting full-thickness wound healing*. *Materials and Design*, 193, 108863.

- Harel, M., and Tang, Q. 2014. Protection and Delivery of Probiotics for Use in Foods (pp. 469–484). Academic Press. <https://doi.org/10.1016/B978-0-12-404568-2.00036-4>
- Harini N., Warkoyo dan D. Hermawan. 2015. Pangan Fungsional Makanan untuk Kesehatan. Universitas Muhammadiyah Malang.
- He, Y., W. Zhao., Z. Dong., Y. Ji., M. Li., Y. Hao and Q. Zhou. 2021. A biodegradable antibacterial alginat/carboxymethyl chitosan/Kangfuxin sponges for promoting blood coagulation and full-thickness wound healing. *International journal of biological macromolecules*, 167, 182-192.
- Hernández-Gallegos, M. A., Solorza-Feria, J., Cornejo-Mazón, M., Velázquez-Martínez, J. R., Rodríguez-Huezo, M. E., Gutiérrez-López, G. F., and Hernández-Sánchez, H. 2023. Protective effect of alginate microcapsules with different rheological behavior on *Lactiplantibacillus plantarum* 299v. *Gels*, 9(9), 682.. <https://doi.org/10.3390/gels9090682>
- Hill, C., F. Guarner., G. Reid., G. R. Gibson., D. J. Merenstein., B. Pot and M. E. Pot. 2014. Expert consensus document: the international scientific association for probiotic and prebiotic consensus statement on the scope and appropriate use of the term probiotic. *Nature review gastroenterology and hepatology*. Vol. 11. No. 506-514.
- Homayouni, A., A. Azizi., M. R. Ehsani., M. Yarmand and S. H. Razavi. 2008. Effect of microencapsulation and resistant starch on the probiotic survival and sensory properties of synbiotic ice cream. *Food chemistry*, 111(1), 50-55.
- Homayouni, A., Azizi, A., Ehsani, M. R., Yarmand, M. S., and Razavi, S. H. 2008. Effect of microencapsulation and resistant starch on the probiotic survival and sensory properties of synbiotic ice cream. *Food chemistry*, 111(1), 50-55. <https://doi.org/10.1016/j.foodchem.2008.03.036>
- Homayouni, A., Ehsani, M. R., Azizi, A., Yarmand, M. S., and Razavi, S. H. 2007. Effect of lecithin and calcium chloride solution on the microencapsulation

process yield of calcium alginat beads. *Iranian Polymer Journal*, 16(9), 597–606.

Huq, T., Khan, A., Khan, R. A., Riedl, B., and Lacroix, M. 2013. *Encapsulation of Probiotic Bacteria in Biopolymeric System. Critical Reviews in Food Science and Nutrition*, 53(9), 909–916.
<https://doi.org/10.1080/10408398.2011.573152>

Jain, V., and Rai, D. C. 2018. *Physicochemical properties of reduced fat, low calorie and protein rich ice cream. Journal of Pharmacognosy and Phytochemistry*, 7(6), 2631–2636.
<https://www.phytojournal.com/archives/2018.v7.i6.6656/physicochemical-properties-of-reduced-fat-low-calorie-and-protein-rich-ice-cream>

Jayanudin, J., dan Rochmadi. 2017. Pengaruh perbedaan bahan penyalut terhadap efisiensi. *Jurnal Penelitian Kimia*. Vol 13(2). Hal 275-287

Jyothi, N. V. N., P. M. Prasanna., S. N. Sakarkar., K. S. Prabha., P. S. Ramaiah and G. Y Srawan. 2010, *Microencapsulation techniques, factors influencing encapsulation efficiency, Journal of Microencapsulation*, Vol. 27, No. 3, 187–197.

Kailasapathy, K. 2009. *Encapsulation technologies for functional foods and nutraceutical product development. CABI Reviews*, (2009), 1-19.

Kailasapathy, K., Perera, C., and Phillips, M. 2006. Evaluation of alginate-starch polymers for preparation of enzyme microcapsules. *International Journal of Food Engineering*, 2(2).

Kailasapathy, K., Perera, C., and Phillips, M. 2006. *Evaluation of Alginat-Starch Polymers for Preparation of Enzyme Microcapsules. International Journal of Food Engineering*, 2(2). <https://doi.org/10.2202/1556-3758.1109>

Kamisyah, S., Sapar, A., Brilliantoro, R., dan Sayekti, E. 2020. Isolasi dan karakterisasi alginat dari rumput laut (*Sargassum polycystum*) asal Perairan Singkawang Kalimantan Barat. *Jurnal Kimia Khatulistiwa*, 8(3), 62-71.

- Karthikeyan, N., Elango, A., and Kumaresan, G. 2014. *Enhancement of probiotic viability in ice cream by microencapsulation*. <https://www.ijset.net/journal/259.pdf>
- Khorshidi, M., A. Heshmati., M. Taheri., M. Karami and R. Mahjub. 2021. *Effect of whey protein-and xanthan-based coating on the viability of microencapsulated Lactobacillus acidophilus and physiochemical, textural, and sensorial properties of yogurt*. *Food Science and Nutrition*, 9(7), 3942-3953.
- Khosravi Zanjani, M. A., Ehsani, M. R., Ghiassi Tarzi, B., and Sharifan, A. 2018. *Promoting Lactobacillus casei and Bifidobacterium adolescentis survival by microencapsulation with different starches and chitosan and poly L-lysine coatings in ice cream*. *Journal of Food Processing and Preservation*, 42(1). <https://doi.org/10.1111/JFPP.13318>
- Kim, J. U., Kim, B., Shahbaz, H. M., Lee, S. H., Park, D., and Park, J. 2017. *Encapsulation of probiotic Lactobacillus acidophilus by ionic gelation with electrostatic extrusion for enhancement of survival under simulated gastric conditions and during refrigerated storage*. *International Journal of Food Science and Technology*, 52(2), 519–530. <https://doi.org/10.1111/IJFS.13308>
- Kubota, S., Tamura, Y., Morioka, K., and Itoh, Y. 2003. *Variable Pressure-scanning Electron Microscopic Observation of Walleye Pollack Surimi Gel*. *Journal of Food Science*, 68(1), 307–311. <https://doi.org/https://doi.org/10.1111/j.1365-2621.2003.tb14157.x>
- Kumar, B.V., S. V. N. Vijayendra and O. V. S. Reddy. 2015. *Trends in dairy and non-dairy probiotic products-a review*. *J. Food Sci. Technol*, 52(10), 6112–6124.
- Lai, J. T., K. W. Lai., L. Y. Zhu., K. L. Nyam and L. P. Pui. 2020. *Microencapsulation of Lactobacillus plantarum 299v and its storage in kuini juice*. *Malaysian Journal of Microbiology*, 16(4), 235–244. <https://doi.org/10.21161/mjm.190398>.

- Lai, J., Azad, A. K., Sulaiman, W. M. A. W., Kumarasamy, V., Subramaniyan, V and Alshehade, S. A. 2024. *Alginate-based encapsulation fabrication technique for drug delivery: an updated review of particle type, formulation technique, pharmaceutical ingredient, and targeted delivery system. Pharmaceutics*, 16(3), 370.
- Lai, P. Y., Y. H. How and L. P. Pui. 2022. *Microencapsulation of Bifidobacterium lactis Bi-07 with galactooligosaccharides using co-extrusion technique. Journal of microbiology, biotechnology and food sciences*, 11(6), e2416-e2416.
- Lee, K. Y., and Mooney, D. J. 2012. *Alginate: Properties and biomedical applications. Progress in Polymer Science*, 37(1), 106–126. <https://doi.org/10.1016/j.progpolymsci.2011.06.003>
- Lee, P. P. 2010. *survival kinetics of lactobacillus species during exposure to simulated gastric fluid. https://eprints.ums.edu.my/6498/*
- Le-Tien, C., Le-Tien, C., Millette, M., Mateescu, M.-A., and Lacroix, M. 2004. *Modified alginate and chitosan for lactic acid bacteria immobilization. Biotechnology and Applied Biochemistry*, 39(3), 347–354. <https://doi.org/10.1042/BA20030158>
- Liu, Q., Lin, C., Yang, X., Wang, S., Yang, Y., Liu, Y., Xiong, M., Xie, Y., Bao, Q., and Yuan, Y. 2023. *Improved Viability of Probiotics via Microencapsulation in Whey-Protein-Isolate-Octenyl-Succinic-Anhydride-Starch-Complex Coacervates. Molecules*, 28. <https://doi.org/10.3390/molecules28155732>
- Lopes, M. M., L. A. Lodi., C. A. D. Oliveira-Paiva and C. S. Farinas. 2024. *Emulsion/Cross-Linking Encapsulation of Bacillus in Starch/PVA-Based Microparticles for Agricultural Applications. ACS Agricultural Science and Technology*, 4(4), 490-499.
- Lopes, S., Bueno, L. A., De Aguiar Junior, F., & Luna Finkler, C. 2019. Preparation and characterization of alginate and gelatin microcapsules containing *Lactobacillus rhamnosus*. <https://doi.org/10.6084/m9.figshare.11313836>

- Luca, L., and Oroian, M. 2021. *Influence of different prebiotics on viability of Lactobacillus casei, Lactobacillus plantarum and Lactobacillus rhamnosus encapsulated in alginat microcapsules*. *Foods*, 10(4), 710.
- Ludwig, A. 2023. *Alginat in Gene and Vaccine Delivery*. doi: 10.1007/978-981-19-6937-9_14.
- Mahardika, M., Abrial, H., Kasim, A., Arief, S., and Asrofi, M. 2018. *FTIR and Moisture Absorption of Yam Bean Starch Biocomposites with Yam Bean (Pachyrhizus erosus) Bagasse Fibers as Reinforcement*. 19(2), 93. <https://doi.org/10.19184/JID.V19I2.7255>
- Martirosyan, D. M., and Singharaj, B. 2016. Health claims and functional food: The future of functional foods under FDA and EFSA regulation. *Functional Foods for Chronic Diseases*; Food Science Publisher: Dallas, TX, USA, 410-424.
- Meena, K. K., Taneja, N. K., Ojha, A., and Meena, S. S. 2023. *Application of spray-drying and freeze-drying for microencapsulation of lactic acid bacteria: A review*. *Annals of Phytomedicine*. <https://doi.org/10.54085/ap.2023.12.1.76>
- Melala, E.R. 2000. Pengaruh Perendaman Dengan Formaldehid (HCOH) dan Pengendapan Asam Alginat Dengan HCL Terhadap Sifat Fisikokimia Natrium Alginat dari Rumpun Laut Coklat (Phaeophyceae). (Skripsi). Fakultas Teknologi Pertanian, Institut Pertanian Bogor, Bogor, 65 hlm.
- Melia, S., N. A. Salam., I. Juliyarsi., F. K. Yulianti., Rusdimansyah and O. H. Vira. 2022. *The screening of probiotic lactic acid bacteria from honey of stingless bee from West Sumatra, Indonesia and using as starter culture*. *Biodiversitas Journal of Biological Diversity*, 23(12). <https://doi.org/10.13057/biodiv/d231235>.
- Minervini, F., Angelis, M. D., and Gobbetti, M. 2017. *Functional dairy products including pro/pre/symbiotics*. *Advances in Dairy Products*, 216-247.
- Mirawati, M., Prasetyorini, T., and Irmadhani, F. 2023. *The Effect of Jicama (Pachyrhizus erosus) Concentration on the Growth of C Staphylococcus*

aureus Bacteria in Solid Media. *Meditory: The Journal of Medical Laboratory*, 11(2), 190–197. <https://doi.org/10.33992/meditory.v11i2.3093>

Mirzaei, H., Pourjafar, H., and Homayouni, A. 2012. Effect of calcium alginate and resistant starch microencapsulation on the survival rate of *Lactobacillus acidophilus* La5 and sensory properties in Iranian white brined cheese. *Food chemistry*, 132(4), 1966–1970.

Mishra, M. K. 2016. *Overview of Encapsulation and Controlled Release*, in *Handbook of Encapsulation and Controlled Released*, Mishra, M. K. (editor), CRC Press: Boca Raton, 1–22.

Mohammadi, R., Mortazavian, A. M., Khosrokhavar, R., and Cruz, A. G. 2011. *Probiotic ice cream: viability of probiotic bacteria and sensory properties*. *Annals of Microbiology*, 61(3), 411–424. <https://doi.org/10.1007/S13213-010-0188-Z>

Mokarram, R. R., S. A. Mortazavi., M. B. H. Najafi and F. Shahidi. 2009. *The influence of multi stage alginat coating on survivability of potential probiotic bacteria in simulated gastric and intestinal juice*. *Food Research International* 42:1040-1045. DOI:10.1016/j.foodres.2009. 04.023.

Mokarram, R.R., Mortazavi, S.A., Najafi, M.B.H., Shahidi, F. 2009. The influence of multi stage alginate coating on survivability of potential probiotic bacteria in simulated gastric and intestinal juice. *Food Research Inter*

Mortensen, G., Bertelsen, G., Mortensen, B. K., and Stapelfeldt, H. 2004. *Light-induced changes in packaged cheeses-a review*. *International Dairy Journal*, 14(2), 85-102.

Mourtzinou, I and C. G. Biliaderis. 2017. *Principles and Applications of Encapsulation Technologies to Food Material*, in *Thermal and Nonthermal Encapsulation Methods*, Krokida, M. K. (editor), CRC Press: Boca Raton, 1–38.

- Murtaza, M. A., Din, G. M. U., Huma, N., Shabbir, M. A., and Mahmood, S. 2004. *Quality Evaluation of Ice Cream Prepared with Different Stabilizers/Emulsifier Blends*.
- Muthukumarasamy, P and R. A. Holley. 2006. *Microbiological and sensory quality of dry fermented sausages containing alginat microencapsulated Lactobacillus reuteri*. *Int. J. Food Microbiol.* 111(2):164-169.
- Nezamdoost-Sani, N., M. A. Khaledabad., S. Amiri and A. M. Khaneghah. 2023. *Hidrogel alginat dan turunannya dalam enkapsulasi bakteri probiotik: Tinjauan terbaru*. *Food Bioscience*, 52 , 102433.
- Ngov, S. 2014. *Enhancement of probiotic survival in low pH and bile salt condition using alginat-hi-maize starch encapsulation*. *Asia-Pacific Journal of Science and Technology*, 19, 141–147.
- Ningtyas, D. W., Bhandari, B., Bansal, N., and Prakash, S. 2019. *The viability of probiotic Lactobacillus rhamnosus (non-encapsulated and encapsulated) in functional reduced-fat cream cheese and its textural properties during storage*. *Food Control*, 100, 8-16.
- Noda, M., M. Maruyama., N. Danshiitsoodol., F. Higashikawa and M. Sugiyama. 2020. *Improvement of Alcohol-Poisoning Symptoms in Mice by the Oral Administration of Live Lactobacillus plantarum SN13T Cells*. *International journal of molecular sciences*, 21(5), 1896. <https://doi.org/10.3390/ijms21051896>.
- Okamoto, T., S. Sugimoto., M. Noda., T. Yokooji., N. Danshiitsoodol., F. Higashikawa and M. Sugiyama. 2020. *Interleukin-8 Release Inhibitors Generated by Fermentation of Artemisia princeps Pampanini Herb Extract With Lactobacillus plantarum SN13T*. *Frontiers in microbiology*, 11, 1159. <https://doi.org/10.3389/fmicb.2020.01159>.
- Oksilia, M. I., Syahfutri dan E, Lidiasari. 2012. *Karakteristik es krim hasil modifikasi dengan formulasi bubur timun suri (Curcumis melo L.) dan sari kedelai*. *Jurnal Teknologi dan Industri Pangan*. 23 (1).pp.17-22.

- Olivares, A., Silva, P., and Altamirano, C. 2017. *Microencapsulation of probiotics by efficient vibration technology*. *Journal of Microencapsulation*, 34(7), 667–674. <https://doi.org/10.1080/02652048.2017.1390005>
- Orellana-Palma, P., Macias-Bu, L., Carvajal-Mena, N., Petzold, G., and Guerra-Valle, M. 2023. *Encapsulation of Concentrated Solution Obtained by Block Freeze Concentration in Calcium Alginat and Corn Starch Calcium Alginat Hydrogel Beads*. *Gels*, 9(5), 374. <https://doi.org/10.3390/gels9050374>
- Padaga, M dan M. E. Sawitri. 2005. *Membuat Es Krim Yang Sehat*. Trubus Agrisarana.Surabaya
- Pangesti, Y. D., Parnanto, N. H. R., dan Ridwan, A. A. 2014. *Kajian Sifat Fisikokimia Tepung Bengkuang (Pachyrhizus erosus) Dimodifikasi Secara Heat Moisture Treatment (HMT) Dengan Variasi Suhu*. 3(3), 143238. <https://jurnal.uns.ac.id/teknosains-pangan/article/download/4664/404>
- Paramita, A. H. dan W. D. R. Putri. 2015. *Pengaruh Penambahan Tepung Bengkuang Dan Lama Pengukusan Terhadap Karakteristik Fisik, Kimia Dan Organoleptik Flake Talas*. *Jurnal Pangan dan Agroindustri* Vol. 3 No 3p.1071-1082. Universitas Brawijaya. Malang
- Park, C. J and Han, J. S. 2015. *Hypoglycemic effect of jicama (Pachyrhizus erosus) extract on streptozotocin-induced diabetic mice*. *Preventive nutrition and food science*, 20(2), 88.
- Park, C. J., H. A. Lee and J. S. Han. 2016. *Jicama (Pachyrhizus erosus) extract increases insulin sensitivity and regulates hepatic glucose in C57BL/Ksj-db/db mice*. *Journal of Clinical Biochemistry and Nutrition*, 58(1), 56-63.
- Patel, A. K., Singhanian, R. R., Pandey, A., and Chincholkar, S. B. 2010. *Probiotic bile salt hydrolase: current developments and perspectives*. *Applied Biochemistry and Biotechnology*, 162(1), 166–180. <https://doi.org/10.1007/S12010-009-8738-1>

- Prasertsiriphan, S., and Kusump, S. 2015. *Impact of selected cultures of probiotics on quality of vanilla low fat ice cream during storage*. 17 (3), 19-27. https://www.ubu.ac.th/web/files_up/08f2015060417145077
- Purwati, E., N. S. Salam., S. Melia., I. Juliyarsi dan H. Purwanto. 2016. Manfaat Probiotik Bakteri Asam Laktat Dadiah Menunjang Kesehatan Masyarakat. Lembaga Literasi Dayak (LLD). Palangka Raya.
- Putriyana, R. S., I. Abdulah., I. Purwaningsih and L. Silvia. 2018. Sintesis Natrium Alginat dari *Sargassum sp.* dengan Proses *Leaching*. In *Prosiding Industrial Research Workshop and National Seminar*, 9, 89–93.
- Putriyanti, D. 2009. 100% Cantik Dibalik Buah dan Sayur. Yogyakarta. Penerbit Best Publisher. Hal. 36.
- Puttarat, N., Thangrongthong, S., Kasemwong, K., Kerdsup, P., and Taweechotipatr, M. 2021. *Spray-drying microencapsulation using whey protein isolate and nano-crystalline starch for enhancing the survivability and stability of Lactobacillus reuteri TF-7*. *Food Science and Biotechnology*, 30(2), 245–256. <https://doi.org/10.1007/S10068-020-00870-Z>
- Rahmawati, I., Firsta, N. C., Purwandhani, S. N., and Suladra, M. 2022. Enkapsulasi *Lactobacillus acidophilus* SNP 2 Menggunakan Alginat dan Susu Skim Metode Emulsi Serta Pengaruhnya Terhadap Viabilitas Sel Pada Berbagai Suhu dan pH. *AGROTECH: Jurnal Ilmiah Teknologi Pertanian*, 4(2), 27-35.
- Rahmawati, R. D. 2012. “Tingkat Penambahan Bahan Pengembang pada Pembuatan Es Krim Instan Ditinjau dari Mutu Organoleptik dan Tingkat Kelarutan”. Skripsi. Universitas Brawijaya Malang. Malang.
- Raja, M. K., Karthikeyan, M., Sabitha, R., and C, Anusha. 2012. *Formulation, characterization and evaluation of aceclofenac - alginat/potato starch micro beads*. <http://ijbpr.com/viewcount2.php?a=138>

- Rajam, R., P. Karthik., S. Parthasarathi., G. S. Joseph and C. J. J. O. F. F. Anandharamakrishnan. 2012. *Effect of whey protein–alginate wall systems on survival of microencapsulated Lactobacillus plantarum in simulated gastrointestinal conditions. Journal of Functional Foods*, 4(4), 891-898.
- Ramdhan, T., Ching, S. H., Prakash, S., and Bhandari, B. 2020. *Physical and mechanical properties of alginate based composite gels. Trends in Food Science and Technology*, 106, 150–159. <https://doi.org/10.1016/J.TIFS.2020.10.002>
- Ramos, P. E., P. Silva., M. M. Alario., L. M. Pastrana., J. A. Teixeira., M. A. Cerqueira and A. A. Vicente. 2018. *Effect of alginate molecular weight and M/G ratio in beads properties foreseeing the protection of probiotics. Food Hydrocolloids*, 77, 8-16.
- Restuhadi, F., Rossi, E., and Hasibuan, A. I. 2014. *Sago-Alginate Microencapsulation Protective Effects on Novel Probiotic Viability of Lactobacillus plantarum TMW 1.1623 in Ice Cream During Frozen Storage.*
- Rhim, J. W., Park, H. M., and Ha, C. S. 2013. *Bio-nanocomposites for food packaging applications. Progress in Polymer Science*, 38(10–11), 1629–1652. <https://doi.org/10.1016/j.progpolymsci.2013.05.008>
- Rokka, S., and Rantamäki, P. 2010. *Protecting probiotic bacteria by microencapsulation: challenges for industrial applications. European Food Research and Technology*, 231(1), 1-12.
- Rossi, E., F. Restuhadi., R. Efendi and Y. K. Dewi. 2021. *Physicochemical and microbiological properties of yogurt made with microencapsulation probiotic starter during cold storage. Biodiversitas Journal of Biological Diversity*, 22(4).
- Ruas-Madiedo, P., Hugenholtz, J., and Zoon, P. 2002. *An overview of the functionality of exopolysaccharides produced by lactic acid bacteria. International dairy journal*, 12(2-3), 163-171. [https://doi.org/10.1016/S0958-6946\(01\)00160-1](https://doi.org/10.1016/S0958-6946(01)00160-1)

- Sabikhi, L., Babu, R., Thompson, D. K., and Kapila, S. 2010. *Resistance of Microencapsulated Lactobacillus acidophilus LA1 to Processing Treatments and Simulated Gut Conditions*. *Food and Bioprocess Technology*, 3(4), 586–593. <https://doi.org/10.1007/S11947-008-0135-1>
- Santoso, P., A. Amelia and R. Rahayu. 2019. *Jicama (Pachyrhizus erosus) fiber prevents excessive blood glucose and body weight increase without affecting food intake in mice fed with high-sugar diet*. *Journal of Advanced Veterinary and Animal Research*, 6(2), 222.
- Santoso, P., Maliza, R., Fadhilah, Q., and Insani, S. J. 2019. *Beneficial Effect of Pachyrhizus erosus Fiber as a Supplemental Diet to Counteract High Sugar-Induced Fatty Liver Disease in Mice*. *Romanian Journal of Diabetes Nutrition and Metabolic Diseases*, 26(4), 353–360. <https://doi.org/10.2478/RJDNMD-2019-0038>
- Santoso, P., Maliza, R., Rahayu, R. H., Astrina, Y., Syukri, F., and Maharani, S. A. 2022. *Extracted yam bean (Pachyrhizus erosus (L.) Urb.) fiber counteracts adiposity, insulin resistance, and inflammation while modulating gut microbiota composition in mice fed with a high-fat diet*. *Research in Pharmaceutical Sciences*, 17(5), 558–571. <https://doi.org/10.4103/1735-5362.355213>
- Sedefoğlu, S., Ortakci, F., and Sert, S. 2022. *Enkapsüle Edilmiş ve Serbest Formda Probiyotik Lactobacillus acidophilus ATCC 4356 Suşunun Dondurma Depolama Periyodunda Stabilitésinin İncelenmesi*. *Journal of the Faculty of Agriculture*, 53(1), 14–23. <https://doi.org/10.17097/ataunizfd.913445>
- Setyaningsih, D., A. Apriyantono., dan M.P. Sari. 2010. *Analisis Sensori untuk Industri Pangan dan Agro*. IPB Press. Bogor.
- Shah, N. P. 2000. *Probiotic bacteria: selective enumeration and survival in dairy foods*. *Journal of dairy science*, 83(4), 894–907. [https://doi.org/10.3168/jds.S0022-0302\(00\)74953-8](https://doi.org/10.3168/jds.S0022-0302(00)74953-8)

- Sikorski, P., Mo, F., Skjåk-Bræk, G., and Stokke, B. T. 2007. *Evidence for egg-box-compatible interactions in calcium– alginat gels from fiber X-ray diffraction. Biomacromolecules*, 8(7), 2098-2103.
- Smith, J and E. Charter. 2010. *Functional Food Product Development*. Wiley-Blackwell Publishin.
- Solanki, H.K., Pawar, D.D., Shah, D.A., Prajapati, V.D., Jani, G.K., Mulla, A.M., Thakar, P.M. 2013. *Development of microencapsulation delivery system for long-term preservation of probiotics as biotherapeutics agent. BioMed Research International*, 1-21.
- Sridar, R., Nguyen, M., and Kailasapathy, K. 2003. *Studies on the effect of encapsulation on the survival of probiotic microorganisms under high acid and bile conditions. Journal of Food Science and Technology-Mysore*, 40(5), 458–460.
- Suave, J. 2006. *Microencapsulação: inovação em diferentes áreas. Revista Saúde e Ambiente*, v.7, n.2, p.12-20, doi: ISSN 2175-1641.
- Subaryano. 2010. *Modifikasi Alginat dan Pemanfaatannya. Squalen*. Vol. 5 N0. 1.
- Suciati, F dan L. S. Safitri. 2021. *Pangan Fungsional Berbasis Susu dan Produk Turunannya. Journal of Sustainable Research In Management of Agroindustry (SURIMI)*, 1(1), 13-19.
- Suharyanisa, S., Roslianizar, S., and Harefa, M. 2023. *Uji Aktivitas Antibakteri Ekstrak Etanol Bengkuang (Pachyrhizus erosus) Terhadap Staphylococcus epidermidis dan Staphylococcus aureus. Jurnal Farmanesia*. <https://doi.org/10.51544/jf.v10i2.4594>
- Sulistiani. 2017. *Senyawa Antibakteri yang Diproduksi oleh Lactobacillus plantarum dan Aplikasinya untuk Pengawetan Bahan Ikan. Jurnal Biologi Indonesia* 13(2): 233-240.
- Sultana, M., E. S. Chan., J. Pushpamalar and W. S. Choo. 2022. *Advances in extrusion-dripping encapsulation of probiotics and omega-3 rich oils. Trends in Food Science and Technology*, 123, 69-86.

- Sumarsih, S., B. Sulistiyanto., C. I. Sutrisno dan E. S. Rahayu. 2012. Peran probiotik bakteri asam laktat terhadap produktivitas unggas. Jurnal Litbang Provinsi Jawa Tengah. Vol. 10. No. 1. Hal : 1-9.
- Sun, W., Q. D. Nguyen., G. Sipiczki., S. R. Ziane., K. Hristovski., L. Friedrich and E. Bujna. 2022. *Microencapsulation of Lactobacillus plantarum 299v strain with whey proteins by lyophilization and its application in production of probiotic apple juices. Applied Sciences*, 13(1), 318.
- Suter, I. K. 2013. Pangan fungsional dan prospek pengembangannya. In Teknologi Pangan. Seminar Sehari dengan tema” Seminar Sehari dengan tema” Pentingnya Makanan Alamiah (Natural Food) Untuk Kesehatan Jangka Panjang (pp. 1-17).
- Suyono, M. N., Sunarti, T. C., and Meryandini, A. 2024. Pemanfaatan Bakteri Asam Laktat (BAL) Amilolitik untuk Fermentasi Tepung Terigu dan Gandum. Jurnal Sumberdaya Hayati, 10(2), 61–66. <https://doi.org/10.29244/jsdh.10.2.61-66>
- Syed, Q. A., Anwar, S., Shukat, R., and Zahoor, T. 2018. *Effects of different ingredients on texture of ice cream. Journal of Nutritional Health and Food Engineering*, 8(6). <https://doi.org/10.15406/JNHFE.2018.08.00305>
- Syukur, S dan E. Purwati. 2013. Bioteknologi Probiotik, untuk Kesehatan Masyarakat. Andi, Yogyakarta.
- Ta, L. P., E. Bujna., S. Kun., D. Charalampopoulos and V. V. Khutoryanskiy. 2021. *Electrosprayed mucoadhesive alginat-chitosan microcapsules for gastrointestinal delivery of probiotics. International Journal of Pharmaceutics*, 597, 120342.
- Thangrongthong, S., Puttarat, N., Ladda, B., Itthisoponkul, T., Pinket, W., Kasemwong, K., and Taweechotipatr, M. 2020. *Microencapsulation of probiotic Lactobacillus brevis ST-69 producing GABA using alginat supplemented with nanocrystalline starch. Food Science and Biotechnology*, 29(11), 1475–1482. <https://doi.org/10.1007/S10068-020-00812-9>

- Tiamwong, S., Yukhajon, P., Noisong, P., Subsadsana, M., and Sansuk, S. 2023. *Eco-Friendly Starch Composite Supramolecular Alginate–Ca²⁺ Hydrogel as Controlled-Release P Fertilizer with Low Responsiveness to Multiple Environmental Stimuli*. *Gels*, 9(3), 204. <https://doi.org/10.3390/gels9030204>
- Trimudita, R. F., dan Djaenudin, D. 2021. Enkapsulasi Probiotik Lactobacillus Sp. Menggunakan Dua Tahap Proses. *Jurnal Serambi Engineering*, 6(2), 1832-1841.
- Urkek, B., Gürmeriç, H. E., Şengül, M., and Baltacı, C. 2022. *Preliminary investigations of ice creams for the determination of the physico chemical properties and aroma compounds by GC-MS produced from cow, sheep, goat, and buffalo milk*. *Journal of Food Safety and Food Quality*, 4, 120-127.
- Vivek, K., S. Mishra., R. C. Pradhan., M. Nagarajan., P. K. Kumar., S. S. Singh and N. N. Gowda. 2023. *A comprehensive review on microencapsulation of probiotics: technology, carriers and current trends*. *Applied Food Research*, 3(1), 100248. <https://doi.org/10.1016/j.afres.2022.100248>.
- Waltra, P., Wouters, J. T. M., and Geurts, T. J. 2006. *Dairy Science and Technology*. CRC Press.
- Wang, L., H. M. Liu., A. J. Xie., X. D. Wang., C. Y. Zhu and G. Y. Qin. 2018. *Chinese quince (Chaenomeles sinensis) seed gum: Structural characterization*. *Food Hydrocolloids*, 75, 237-245.
- Waysima, A., dan Dede, R. 2010. *Evaluasi sensori* (Cetakan ke-5). Bogor: Fakultas Teknologi Pertanian Institut Pertanian Bogor.
- WHO F. 2001. *Health and Nutritional Properties of Probiotics in Food Including Powder Milk with Live Lactic Acid Bacteria—Joint FAO/WHO Expert Consultation*. Available online: <https://www.fao.org/3/a0512e/a0512e>.
- Wibowo, A. A., A. S. Suryandari., E. Naryono., V. M. Pratiwi., M. Suharto and N. Adiba. 2021. Encapsulation of Clove Oil withn Ca-Alginat-Gelatine

Complex : Effect of Process Variables on Encapsulation Efficiency, Jurnal Teknik Kimia dan Lingkungan, Vol. 5, No. April, 71–77.

Widaningrum, Miskiyah, Indrasti and Hidayat. 2018. *Improvement of viability of Lactobacillus casei and Bifidobacterium longum with several encapsulating materials using extrusion method*. Jurnal Ilmu Ternak dan Veteriner 23(4): 189-201. DOI 10.14334/jitv.v23i4.1547.

Wijayanti, L., Nuryanto., A. Rahadiyanti., D. Y. Fitranti., F. F. Dieny and G. Anjani. 2020. *Analysis of glycemic index, glycemic load and acceptability of enteral formulas based on tempeh flour and jicama flour as innovations for hyperglycemic patients*. Food Research.2020;4(3):46-53. doi: 10.26656/fr.2017.4(S3).S19.

Yarullina, D. R., Damshkaln, L. G., Bruslik, N. L., Konovalova, O. A., Ilinskaya, O. N., and Lozinsky, V. I. 2015. *Towards effective and stable probiotics*. The International Journal of Risk and Safety in Medicine, 27, 65–66. <https://doi.org/10.3233/JRS-150692>

Yeni, G., Failisnur dan Firdausni. 2014. *Membuat aneka olahan bengkuang*. pp. 1–79, 2014.

Zadeikė, D., Gaižauskaitė, Ž., Bašinskienė, L., Žvirdauskienė, R., and Čižeikienė, D. 2024. *Exploring Calcium Alginate-Based Gels for Encapsulation of Lactobacillus paracasei to Enhance Stability in Functional Breading*. Gels, 10(10), 641. <https://doi.org/10.3390/gels10100641>

Zakaria, F. R. 2015. *Pangan Nabati, Utuh dan Fungsional sebagai Penyusun Diet Sehat*. Bogor. (ID). Orasi Ilmiah Guru Besar Institut Pertanian Bogor.

Zanjani, M. A. K., B. G. Tarzi., A. Sharifan and N. Mohammadi. 2014. *Microencapsulation of probiotics by calcium alginate-gelatinized starch with chitosan coating and evaluation of survival in simulated human gastrointestinal condition*. Iranian Journal of Pharmaceutical Research, 13(3), 843–852. <https://doi.org/10.22037/ijpr.2014.1550>

Zhang, S., Zhang, L., and Han, X. 2015. *Lactic acid bacteria proteinase and quality of fermented dairy products--A review. Acta Microbiologica Sinica*, 55(12), 1530–1536. <https://pubmed.ncbi.nlm.nih.gov/27101694/>

Zou, W., Yu, L., Liu, X., Chen, L., Zhang, X., Qiao, D., and Zhang, R. 2012. *Effects of amylose/amylopectin ratio on starch-based superabsorbent polymers. Carbohydrate Polymers*, 87(2), 1583–1588. <https://doi.org/https://doi.org/10.1016/j.carbpol.2011.09.060>

Zuidam, N. J and E. Shimoni. 2010. *Overview of Microencapsulates for Use in Food Products or Processes and Methods to Make Them, in Encapsulation Technologies for Active Food Ingredients and Food Processing*, Zuidam, N. J., and Nedovic, V. A. (editors), Springer: New York, 3–30.

