UNIVERSITAS
GADJAH MADA
Pengaruh Krioprotektan dan Suhu Penyimpanan terhadap Viabilitas Probiotik dalam Serbuk Susu Fermentasi Hasil Freeze Drying
OKTARINA NURWIDYANINGSIH, Prof. Sang Kompiang Wirawan, S.T., M.T., Ph.D. ; Prof. Dr. Ir. Aswati Mindaryani,
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

DAFTAR PUSTAKA

Baral, K. C., Bajracharya, R., Lee, S. H., and Han, H. K. (2021). Advancements in the Pharmaceutical Applications of Probiotics: Dosage Forms and Formulation Technology. *International Journal of Nanomedicine*. 16:7535–7556.

Behnsen, Judith, Elisa Deriu, Martina Sassone-Corsi, and Manuela Raffatellu. (2013). "Probiotics: Properties, Examples, and Specific Applications." *Cold Spring Harbor Perspectives in Biology* 5(4):1–15. doi: 10.1101/cshperspect.a010074.

Buahom, J., Pathom-aree, W., Tanamool, V., and Thongkratok, R. (2023). Survivability of Freeze- and Spray-Dried Probiotics and Their Effects on the Growth and Health Performance of Broilers. *Veterinary World*. 16(9):1849–1856.

Bustos, A. Y., Gerez, C. L., Font de Valdez, G., and Raya, R. R. (2024). Recent Advances in the Understanding of Stress Resistance Mechanisms in Probiotics: Relevance for the Design of Functional Food Systems. *Probiotics and Antimicrobial Proteins*. 16(1):1–15.

Carvalho Ana S., Joana Silva, Peter Ho, Paula Teixeira, F.Xavier Malcata, Paul Gibbs. (2004). *Relevant factors for the preparation of freeze-dried lactic acid bacteria. International Dairy Journal 14 (2004) 835-847.*

Chávarri, M., Marañón, I., and Carmen, M. (2012). Encapsulation Technology to Protect Probiotic Bacteria. In: Rigobelo, A. A. (Ed.). *Probiotics*. InTech Open, London.

Corradini, M. G., and Peleg, M. (2007). Shelf-Life Estimation from Accelerated Storage Data. *Trends in Food Science & Technology*. 18(1):37–47. doi: 10.1016/j.tifs.2006.07.003.

Crowe, J. H., Carpenter, J. F., and Crowe, L. M. (1998). The Role of Vitrification in Anhydrobiosis. *Annual Review of Physiology*. 60:73–103.

Damayanthi, E., Chiba, S., and Akimitsu, K. (2025). Viability of the Probiotic. *BIO Web of Conferences*. 171:03011.

Dima, P., Kockelmann, J., Knoerzer, K., and Augustin, M. A. (2022). Electrohydrodynamic Drying of Probiotics. *Innovative Food Science and Emerging Technologies*. 82:103201.

Enciso-Sáenz, S. (2018). Lemongrass (*Cymbopogon citratus* (DC) Stapf) Essential Oil Encapsulation by Freeze-Drying. *Revista Mexicana de Ingeniería Química*. 17(2):407–420.

FAO/WHO. (2002). *Guidelines for the Evaluation of Probiotics in Food*. Joint FAO/WHO Working Group Report. London, Ontario, Canada.

Pengaruh Krioprotektan dan Suhu Penyimpanan terhadap Viabilitas Probiotik dalam Serbuk Susu Fermentasi Hasil Freeze Drying
OKTARINA NURWIDYANINGSIH, Prof. Sang Kompiang Wirawan, S.T., M.T., Ph.D. ; Prof. Dr. Ir. Aswati Mindaryani,
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Ferdousi, Rohollah, Millad Rouhi, Reza Mohammadi, Amir Mohamad Mortazavian, Kianosh Khosravi-Darani, and Aziz Homayouni Rad. (2013b). *Evaluation of Probiotic Survivability in Yoghurt Exposed To Cold Chain Interruption*. Vol. 12:139-144.

Gaidhani K.A.Lyophilization.(2015). *Freeze drying*. World Journal of Pharmaceutical Research;4(8). 516-543.

Gharsallaoui, A., Roudaut, G., Chambin, O., Voilley, A., and Saurel, R. (2007). Applications of Spray-Drying in Microencapsulation of Food Ingredients: An Overview. *Food Research International*. 40(9):1107–1121. doi: 10.1016/j.foodres.2007.07.004.

Haindl Regina, Alexandra Neumayr, Anika Frey and Ulrich Kulozik. (2020). *Impact of cultivation strategy, freeze-drying process, and storage conditions on survival, membrane integrity, and inactivation kinetics of Bifidobacterium longum.* Folla Microbiologica (2020) 65:1039-1050.

Haq, S. R., Shafiyurrahman, M. F., Kurniawan, A., Prasetyo, Y., Prasetyo, I., and Jeon, S. (2025). Thermogravimetric Analysis of Indonesian Low-Rank Coal: Optimization of Drying Temperature and Kinetic Modeling. *Jurnal Rekayasa Proses*. 19(1):31–41.

Hasler CM. Functional foods: benefits, concerns and challenges-a position paper from the american council on science and health. J Nutr. 2002 Dec;132(12):3772-81. doi: 10.1093/jn/132.12.3772. PMID: 12468622.

Hou, B., Zhang, J., Wu, J., and Zhang, L. (2016). Production for High-Vitality Starter Culture of *Lactobacillus plantarum* NDC 75017 by High Cell-Density Cultivation and Low-Temperature Vacuum Drying. *Food Science and Technology Research*. 22(4):519–527.

Jannah, Syerina Raihatul, Endang Sutriswati Rahayu, Rini Yanti, Dian Anggraini Suroto, and Rachma Wikandari. (2022). S*tudy of Viability, Storage Stability, and Shelf Life of Probiotic Instant Coffee Lactiplantibacillus plantarum Subsp. plantarum Dad-13 in Vacuum and Nonvacuum Packaging at Different Storage Temperatures*. International Journal of Food Science Volume 2022(7):1663772. doi : 10.1155/2022/1663772

Karrar, Emad, Amer Ali Mahdi, Sujitraj Sheth, Isam A. Mohamed Ahmed, Muhammad Faisal Manzoor, Wei Wei, and Xingguo Wang. 2021. "Effect of Maltodekstrin Combination with Gum Arabic and Whey Protein Isolate on the Microencapsulation of Gurum Seed Oil Using a Spray-Drying Method." *International Journal of Biological Macromolecules* 171:208–16. doi: 10.1016/j.ijbiomac.2020.12.045.

Labuza, T. P. (1971). The Effect of Water Activity on Reaction Kinetics of Food Deterioration. *Food Technology*. 25(5):543–550.

Pengaruh Krioprotektan dan Suhu Penyimpanan terhadap Viabilitas Probiotik dalam Serbuk Susu Fermentasi Hasil Freeze Drying
OKTARINA NURWIDYANINGSIH, Prof. Sang Kompiang Wirawan, S.T., M.T., Ph.D. ; Prof. Dr. Ir. Aswati Mindaryani,
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Levine, H., and Slade, L. (1988). Principles of Cryostabilization Technology from Structure/Property Relationships of Carbohydrate/Water Systems—A Review. *Cryo-Letters*. 9:21–63.

Morazzoni, Carlota, Madle Sirel, Serena Allesina, Marta Veses Garcia, Kasper Kragh, Marco Pane, and Katrin Beilharz. (2024). *Proof of concept: real-time viability and metabolic profiling of probiotics with isothermal microcalorimetry*. *Front. Microbiol.* 15:1391688. doi: 10.3389/fmicb.2024.1391688

Ranadheera, C. S., Baines, S. K., & Adams, M. C. (2010). Importance of food in probiotic efficacy. *Food Research International*, 43(1), 1–7. https://doi.org/10.1016/j.foodres.2009.09.009

Roos, Y. H. (1995). *Phase Transitions in Foods*. San Diego: Academic Press.

Santivarangka C, U. Kulozik and P. Foerst. (2008). *Inactivation mechanisms of lactic acid starter cultures preserved by drying processes.* Journal of Applied Microbiology ISSN 1364-5072.

Semyonov, David, Ory Ramon, Zoya Kaplun, Luba Levin-Brener, Nadya Gurevich, and Eyal Shimoni. 2010. "Microencapsulation of Lactobacillus Paracasei by Spray *Freeze drying*." *Food Research International* 43(1):193–202. doi: 10.1016/j.foodres.2009.09.028

Wang, A., & Zhong, Q. (2024). *Drying of probiotics to enhance the viability during preparation, storage, food application, and digestion: A review*. Comprehensive Reviews in Food Science and Food Safety, 23(1), e13287. https://doi.org/10.1111/1541-4337.13287

Widodo. 2003. Bioteknologi Pengolahan Susu. Lacticia Press. Yogyakarta

Widodo, W., T. T. Taufiq, E. Aryati, A. Kurniawati and W. Asmara. 2012. Human origin lactobacillus casei isolated from indonesian infants demonstrating potential characteristics as probiotics in vitro. Indones. J. Biotechnol. 17 (1): 79-89.

Widodo, Septiana Anindita, Nosa, Tiyas Tono Taufi, and Tutik Dwi Wahyuningsih. 2012. *Identification of Pediococcus Strains Isolated from Feces of Indonesian Infants With in Vitro Capability to Consume Prebiotic Inulin and to Adhere on Mucus*. Vol. 17.

Widodo, A. V. Rachmawati, R. Chulaila, I. G. S. Budisatria. 2012. Produksi dan evaluasi kualitas susu bubuk asal kambing peranakan Ettawa (PE). Jurnal Teknologi dan Industri Pangan. 3(2): 132-139.

Widodo, Widodo, Pradiptya Ayu Harsita, Ari Surya Sukarno, and Arief Nurrochmad. 2019. "Antidiabetic Effect of Milk Fermented Using Intestinal Probiotics." *Nutrition and Food Science* 49(6):1063–74. doi: 10.1108/NFS-11-2018-0326.

Widodo. 2021. Bioteknologi Industri Susu. Edisi ke-2. UGM Press. Sleman.

UNIVERSITAS
GADJAH MADA
Pengaruh Krioprotektan dan Suhu Penyimpanan terhadap Viabilitas Probiotik dalam Serbuk Susu Fermentasi Hasil Freeze Drying
OKTARINA NURWIDYANINGSIH, Prof. Sang Kompiang Wirawan, S.T., M.T., Ph.D. ; Prof. Dr. Ir. Aswati Mindaryani,
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Widodo, Widodo, Hanna Respati Putri Kusumaningrum, Hevi Wihadmadyatami, and Anggi Lukman Wicaksana. 2023. "Milk Fermented with Pediococcus Acidilactici Strain BE Improves High Blood Glucose Levels and Pancreatic Beta-Cell Function in Diabetic Rats." *Food Science of Animal Resources* 43(1):170–83. doi: 10.5851/kosfa.2022.e69.

Widodo. 2017. Bakteri Asam Laktat Strain Lokal: Isolasi sampai Aplikasi sebagai Probiotik dan Starter Fermentasi Susu. UGM Press. Yogyakarta.

Widodo, Widodo, Anggeria Oktavisa Denta, Sunarti Sunarti, and Dietmar Haltrich. 2021. "Milk Fermented with Lactobacillus Casei Strain AP Improves Lipid Profiles in Obese Indonesian Adults." doi: 10.20944/preprints202108.0385.v1.

Widodo. 2021. Bioteknologi Industri Susu. Edisi ke-2. UGM Press. Sleman.

Williams, P. A., and Phillips, G. O. (2021). Gum Arabic. In G. O. Phillips and P. A. Williams (Eds.), *Handbook of Hydrocolloids* (3rd ed., pp. 987–1010). Woodhead Publishing.