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POTENSI ANTI BAKTERI MULTI-STRAIN PROBIOTIK *Lactiplantibacillus plantarum* subsp. *plantarum* (STRAIN Dad-13 dan FNCC-0250) dan *Lacticaseibacillus paracasei* GMRMP-001 TERHADAP *Escherichia coli* FNCC-0091
SECARA IN VITRO DAN IN VIVO
Devi Ariska, Yunika Mayangsari, S.Si., M.Biotech., Ph.D ; Prof. Dr. Ir. Endang Sutriswati Rahayu., M.S.
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DAFTAR PUSTAKA

- Apriliana, Ety., M. Ricky, R., E. Warganegara., S. A. Hasibuan., 2018. Perbandingan Daya Hambat Ekstrak Daun Jarak Pagar (*Jatropha curcas Linn*) terhadap Pertumbuhan Bakteri *Staphylococcus aureus* dan *Escherichia coli* secara In Vitro. *Jurnal Agromedicine*. Universitas Lampung.
- Banin, M. M., T. Utami, M. N. Cahyo, J. Widada, and E. S. Rahayu. 2019. *Effects of Consumption of Probiotic Powder Containing Lactobacillus plantarum Dad-13 on Fecal Bacterial Population in School-Age Children in Indonesia*. *International Journal of Probiotics and Prebiotics* 14(2016): 1–8.
- Camilleri, M., Sellin, J.H., Barrett, K.E., 2017. *Pathophysiology, evaluation, and management of chronic watery diarrhea*. *Gastroenterol.* 152, 515–532 e2.
- Campbell, J.M., Fahey, G.C. dan Wolf, B.W. 1997. *Selected Indigestible Oligosaccharides Affect Large Bowel Mass, Cecal and Fecal Short-chain Fatty Acids, pH and Microflora In Rats*. *Journal of Nutrition* 127: 130-136.
- Chen X.F., Chen X., Tang X. 2020. *Short-chain fatty acid, acylation and cardiovascular diseases*. *Clin. Sci.* 2020;134:657–676. doi: 10.1042/CS20200128.
- Chen LA, Sears CL. *Prebiotics, Probiotics, and Synbiotics*. In: Bennett JE, Dolin R, Blaser MJ. Mandell, Douglas, and Bennett's. 2015. *Principles and Practice of Infectious Diseases, Updated Edition*. 8th ed. Philadelphia, PA: Elsevier; 2015:19-25.
- Darves, Nazia., Jai. K. D., Tyler, V., Michelle, F. G., Kumanan, R., Zulfiqar, A. B., 2017. *Water, sanitation and hygiene interventions for acute childhood diarrhea: a systematic review to provide estimates for the Lives Saved Tool*. *BMC Public Health* 2017, 17 (Suppl 4) : 776.
- Davidson, P.M., dan Parish, M.E. 1989. *Methods for Testing the Efficacy of Food Antimicrobials*. *Food Technology*. New York. Halaman 43.
- Dewiyanti, R., Rahayu, E. S., Utami, T., 2022. Probiotik Lokal sebagai Starter pada Pembuatan Keju Krim. Universitas Gadjah Mada. Yogyakarta.
- DG Demissie, Y Yeshaw, W Aleminew, Y. Akalu, 2021. *Diarrhea and associated factors among under five children in sub-Saharan Africa : Evidence from demographic and health surveys of 34 sub-Saharan countries*, *PLoS One* 16 (9) (2021) e0257522.
- Falcinelli, S., Rodiles, A., Hatef, A., Picchietti, S., Cossignani, L., Merrifield, D. L., & Carnevali, O. (2018). *Influence of probiotics administration on gut microbiota core: a review on the effects on appetite control, glucose, and lipid metabolism*. *Journal of Clinical Gastroenterology*, 52, S50-S56.



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SECARA IN VITRO DAN IN VIVO

FAO/WHO. 2002. *Joint Working Group on Drafting Guideline for the Evaluation of Probiotics in Food.*

Ferdouse, J., Paul, S., Chowdhury, T., Ali, F., Islam, S., & Hossain, T. J. 2023. *Probiotic Characteristics of Pediococcus pentosaceus and Apilactobacillus kunkeei Strains: The lactic Acid Bacteria Isolated from Bangladeshi Natural Honey.* Applied Food Biotechnology, 10(1), 33–45. <https://doi.org/10.22037/AFB.V10I1.39617>.

Fitzpatrick, Margaret., 1999. *Haemolytic uraemic syndrome and E coli 0157.* British Medical Journal. Vol 318.

Food and Agriculture Organization. 2011. *Preventing E. coli in Food.* Food and Agricultural Organization (FAO).

Galdeano, C. M., Silvia, I. C., José, M. L. D., Eva, V., Gabriela, P. 2019. *Beneficial Effects of Probiotic Consumption on the Immune System.* PubMed 2019 ; 74 (2) : 115-124.

Gani, A. 2007. Aktivitas Antibakteri Ekstrak Kasar Daun Cocor Bebek (*Kalanchoe gastonis-bonnier*) Skripsi. Bogor : Departemen Biologi Fakultas Matematika dan Ilmu Pengetahuan Alam, Institut Pertanian Bogor.

Gobel, Risco B. 2008. Mikrobiologi Umum Dalam Praktek. Universitas Hasanuddin. Makassar.

Goldstein, E. J. C., Kerin, L. T., Diane, M. C., 2015. *Lactobacillus species: taxonomic complexity and controversial susceptibilities.* Clinical Infectious Diseases. 2015;60(S2):S98–107.

Grzeskowiak, Lukasz., Minna-Maija, G., Christina, B., Seppo, S., Andrea von, Berg., Erika, Isolauri., 2012. *The impact of perinatal probiotic intervention on gut microbiota: Double-blind placebo-controlled trials in Finland and Germany.* Anaerobe 18 (2012) 7-13.

Guarner, Francisco., Aamir, G. Khan., James, G., Rami, E., Alfred, G., Alan, T., Justus, K., Ton, Lemair., Pedro, K., Juan, A. de Paula., Richard, F., Fergus, S., Mary, E. Sanders., Hania, S., Balakrishnan, S. Ramakrishna., Tarkan, K., Nayoung, K., 2012. *World Gastroenterology Organisation Global Guidelines. Probiotics and Prebiotics.* Journal Clinical Gastroenterol Volume 46, Number 6, July 2012.

Harahap, I. A., Mariyatun, M., Hasan, P. N., Pamungkatingtyas, F. H., Widada, J., Utami, T., Cahyanto, M. N., Juffrie, M., Dinoto, A., Nurfiani, S., Zulaichah, E., Sujaya, I. N., Rahayu, E. S., 2021. *Recovery of Indigenous probiotic Lactobacillus plantarum Mut-7 on healthy Indonesian adults after consumption of fermented milk containing these bacteria.* Journal Food Science Technology 58 (9) : 3525 – 3532.

Hill, Colin., Francisco, G., Gregor, R., Glenn, R. G., Daniel, J. M., Bruno, P., Lorenzo, M., Roberto, B. C., Harry, J., Flint., Seppo, S., Philip, C. C., Mary, E. S., 2014. *The International Scientific Association for Probiotics and Prebiotics consensus statement on the scope and appropriate use of the term probiotic.* Gastroenterol Hepatolog. 11, 506–514 (2014).



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Howick, K., Griffin, B. T., Cryan, J. F., & Schellekens, H. 2017. *From belly to brain: targeting the ghrelin receptor in appetite and food intake regulation.* International Journal of Molecular Sciences, 18(2), 273.

Hu, Yafan., Mengna, Z., Zhaoxin, L., Fengxia, Lv ., Haizhen, Z., Xiaomei, B. 2021. *L. johnsonii*, *L. plantarum*, and *L. rhamnosus* alleviated Enterohaemorrhagic *Escherichia coli*-induced diarrhoea in mice by regulating gut microbiota. Microbial Pathogenesis. 154 (2021) 104856.

Ikhsani, Atika Yahdiyani. 2016. Evaluasi Keamanan Strain Probiotik Indigenous *Lactobacillus plantarum* Mut-7 Menggunakan Model Tikus Spague Dawley. Tesis. Fakultas Teknologi Pertanian. Universitas Gadjah Mada.

Kanra, G. Y., Ozen, H., & Kara, A. 2006. *Infection and anorexia.* Turkish Journal of Pediatrics, 48(4), 279-287.

Kaper JB, Nataro JP, Mobley HLT. 2004. *Pathogenic Escherichia coli.* Nat Rev Microbiol. 2: 123-140.

Kemgang, T. S., Kapila, S., Shanmugam, V. P., & Kapila, R. (2014). *Cross-talk between probiotic lactobacilli and host immune system.* Journal of Applied Microbiology, 117(2), 303-319.

Khelifa, M. S., Skov, L. J., & Holst, B. (2021). *Biased ghrelin receptor signaling and the dopaminergic system as potential targets for metabolic and psychological symptoms of anorexia nervosa.* Frontiers in Endocrinology, 12.

Koch, S., & Nusrat, A. (2012). *The life and death of epithelia during inflammation: lessons learned from the gut.* Annual Review of Pathology: Mechanisms of Disease, 7, 35-60.

Leroy, Frederic and De Vuyst, Luc. 2004. *Lactic acid bacteria as functional starter cultures for the food fermentation industry.* Trends in Food Science & Technology 15 (2004) 67–78.

M Putri, Nancy Eka., 2020. Peran Probiotik Terhadap Diare. <https://cfns.ugm.ac.id/2020/06/09/peran-probiotik-terhadap-diare/> (Diakses pada 8 November 2022).

M. Widianingsih dan E. F. Yunita., 2018. Efektivitas Probiotik Single dan Multi Strain Terhadap *Escherichia coli* secara In Vitro. P-ISSN : 2303-3142 E-ISSN : 2548-8570 Vol. 7, No. 2, Oktober 2018.

Mandal, A., dan Sahi, P. K. 2017. *Probiotics for diarrhea in children.* Journal of Medical Research and Innovation. 1 (2): 5-12.

Mantegazza, Cecilia., Paola, M., Enza, D` Auria., Micol, S., Lorenzo, M., 2017, *Probiotics And Antibiotic-associated Diarrhea In Children: A Review And New Evidence On Lactobacillus*



Mohammed, Sarhan and Ahmet, Hilmi Con., 2021. *Isolation and characterization of potential probiotic lactic acid bacteria from traditional cheese.* LWT – Food Science Technology (2021) 112319.

Nabrdalik, K., Drożdż, K., Kwiendacz, H., Skonieczna-Żydecka, K., Loniewski, I., Kaczmarczyk, M., Nalepa, J., Holleman, F., Nieuwdorp, M., Gumprecht, J. 2023. *IDF2022-1183 The effect of multi-strain probiotics on diarrhea in patients with type 2 diabetes and metformin intolerance.* Diabetes Research and Clinical Practice. Volume 197.

Niken Tari, Agustina Intan., Catur, B. Handayani., Sudarmi., 2016. Potensi Probiotik Indigenus *Lactobacillus plantarum* Dad 13 Pada Yogurt Dengan Suplementasi Ekstrak Ubi Jalar Ungu Untuk Penurun Diare dan Radikal Bebas. agriTECH, Vol. 36, No. 1, Februari 2016.

Noor, Zulafa., Muhammad, N. C., Retno, I., S. Sardjono., 2017. Skrining *Lactobacillus plantarum* Penghasil Asam Laktat untuk Fermentasi Mocaf. agriTECH, Vol. 37, No. 4, November 2017, Hal. 437-442.

Oyetayo, V. O., Adetuyi, F. C., & Akinyosoye, F. A. (2003). *Safety and protective effect of Lactobacillus acidophilus and Lactobacillus casei used as probiotic agent in vivo.* African Journal of Biotechnology, 2(11), 448-452.

Pelczar, Michael J.; Chan, E.C.S.; Ratna Siri Hadioetomo, Teja Imas, S. Sutami Tjitrosomo, Sri Lestari. 2008. Dasar-dasar mikrobiologi 1 : *Elements of microbiology*. Penerbit Universitas Indonesia (UI-Press), 2008.

Peng, Kaidi., Mohamed, K., Olivier, Bals., Eugene, V., 2020. *Recent insights in the impact of emerging technologies on lactic acid bacteria: A review.* Food Research International.

Petrella, Carla., Georgios, S., Alessio, T., Silvia, M., Valentina, R., Giorgio, G., Diego, M., Francesca, De Santa., Stefano, F. Vecchioli., 2021. *Proneurogenic and neuroprotective effect of a multi strain probiotic mixture in a mouse model of acute inflammation: Involvement of the gut-brain axis.* Pharmacological Research 172 (2021) 105795.

Pino., M. De Angelis., M. Chieppa., C. Caggia., C. L. Randazzo., 2020. *Gut Microbiota, Probiotics and Colorectal Cancer : a Tight Relation.* World Cancer Research Journal.

Prabhurajeshwar, C. and Kelmani, Chandrakanth. 2019., *Evaluation of antimicrobial properties and their substances against pathogenic bacteria in-vitro by probiotic Lactobacilli strains isolated from commercial yoghurt.* Clinical Nutrition Experimental 23 (2019) 97-115.



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Rahayu, E. S., 2003. *Lactic Acid Bacteria in Fermented Foods of Indonesian Origin.* agriTECH, 23: 75-84.

Rahayu, E. S., Agung, Y., Mariyatun., Linda, W., Tyas, U., Koichi, W., 2015. *Molecular Characteristic of Indigenous Probiotics Strains From Indonesia.* International Journal of Probiotics and Prebiotics Vol. 10, No. 4, 2015.

Rahayu, E. S., Djafaar, T. F., Wibowo, D., Sudarmadji, S., 1996. *Lactic Acid Bacteria from Indigenous Fermented Foods and Their Microbial Activity.* agriTECH. Gadjah Mada University.

Rahayu, E. S., Ilzamha, H. R., Armita, A., Rafli, Z. K., Putrika, C. P., Yustinus, M., Tyas, U., Jaka, W., 2019. *Safety Assessment of Indigenous Probiotic Strain Lactobacillus plantarum Dad-13 Isolated from Dadih Using Sprague Dawley Rats as a Model.* American Journal of Pharmacology and Toxicology.

Rahayu, E. S., Muhammad, N. Cahyanto., Mariyatun., Martinus, A. Sarwoko., Pri, Haryono and Linda Windiarti., 2016. *Effects of consumption of fermented milk containing indigenous probiotic lactobacillus plantarum dad-13 on the fecal microbiota of healthy indonesian volunteers.* International Journal of Probiotics & Prebiotics (Vol. 11, Issue 2).

Rahmi, A. O., Dian, A. Suroto., Endang, S. Rahayu., Tyas, U., 2023. *Selection of Lactic Acid Bacteria From Indonesian Dadih Originated from Alahan Panjang, West Sumatra, as a Probiotic Candidate.* Gadjah Mada University. Indonesia.

Rao, M.C., 2019. *Physiology of electrolyte transport in the gut: implications for disease.* Compr. Physiol. 9, 947–1023.

Ratna, D.K., M.M. Evita, E.S. Rahayu, M.N. Cahyanto, R. Wikandari dan T. Utami. 2021. *Indigenous Lactic Acid Bacteria from Halloumi Cheese as a Probiotics Candidate of Indonesian Origin.* International Journal of Probiotics and Prebiotics. 16 (39-44).

RC Reiner, KE Wiens, A Deshpande, MM Baumann, PA Lindstedt, BF Blacker, 2020. *Mapping geographical inequalities in childhood diarrhoeal morbidity and mortality in low-income and middle-income countries, 2000-17: analysis for the Global Burden of Disease Study 2017,* Lancet 395 (2020) 1779–1801.

Reeves, P.G., F.H. Nielsen dan G.C. Fahey. 1993. *AIN-93. Purified Diets for Laboratory Rodents : Final Report of the American institute of Nutrition Ad Hoc writing Committee on the Reformulation of AIN76 Rodent Diet.* J. Nutr. 123 : 1939-1953.



Selection of probiotic Lactobacillus strains with antimicrobial activity to be used as biocontrol agents in food industry. LWT Food Science Technology 143 (2021) 111142.

Saxelin, M., Tynkkynen, S., Salusjärvi, T., Kajander, K., Mattila-sandholm, T., Korpela, R. and Myllyluoma, E. 2010. *Developing a multispecies probiotic combination.* International Journal of Probiotics and Prebiotics, 5(4), pp. 169–182.

Shafi, Afshan., H. N. Raja., U. Farooq., K, Akram., Z. Hayat., A. Nazi., H. R. Nadeem., 2018. *Antimicrobial and antidiabetic potential of symbiotic fermented milk: A functional dairy product.* Dairy Technology.

Shah, N. P., Jolene F. A., Ramakanth R. R., 2000. *Populations of Lactobacillus acidophilus, Bifidobacterium spp., and Lactobacillus casei in Commercial Fermented Milk Products.* Bioscience Microflora Vol. 19 (1), 35-39.

Soderholm, J. D., & Perdue, M. H. (2006). *Physiology of Gastrointestinal Tract 4th Edition: Effect of Stress on Intestinal Mucosal Function.* Elsevier Academic Press, Burlington, San Diego and London, 763-80.

Sominsky, L., & Spencer, S. J. (2014). *Eating behavior and stress: a pathway to obesity.* Frontiers in Psychology, 5, 434.

Stiles, M. E. and Wilhelm H. H., 1997. *Lactic acid bacteria of foods and their current taxonomy.* International Journal of Food Microbiology 36 (1997) 1-29.

Sumaryati, B. T., Tyas, U., Suparmo., 2009. Pengaruh Infeksi *Escherichia coli* dan Pemberian *Lactobacillus plantarum* Dad 13 Terhadap Mikrobiota Feses Tikus Wistar. agriTECH, Vol. 29, No. 4 November 2009.

Surawicz CM, Brandt LJ. *Probiotics and Fecal Microbiota Transplantation.* In: *Sleisenger and Fordtran's Gastrointestinal and Liver Disease.* 10th ed. Philadelphia, PA: Elsevier; 2016:2339-43.

Takeuchi, A., & Sprinz, H. (1967). *Electron-microscope studies of experimental Salmonella infection in the preconditioned guinea pig.* The American Journal of Pathology, 51(1), 137-161.

Taskforce BR. 1996. *Dry Fermented Sausage and E. coli O157:H7,* Research report No. 11-316. National Cattlemen's Beef Association. Chicago.

Tomasik, Przemyslaw Jan and Piotr Tomasik., 2003, *Probiotics and Prebiotics.* Review. Cereal Chem 2003;80(2):113-117.



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Valerio, F., Lonigro, S.L., Giribaldi, M., Di Biase, M., De Bellis, P., Cavallarin, L., Lavermicocca, P. 2015. *Probiotic Lactobacillus paracasei IMPC 2.1 strain delivered by ready-to-eat swordfish fillets colonizes the human gut after alternate-day supplementation.* Journal of Functional Foods. 17 (2015) 468-475.

Vipperia, K. dan S. O'Keefe. 2012. *The Microbiota and its Metabolites in Colonic Mucosal Health and Cancer Risk.* Nutrition in Clinical Practice. 27 (5) : 624 – 635.

Wangko, William S., 2020. Aspek Fisiologik *Short Chain Fatty Acid* (SCFA). Medical Scope Journal (MSJ). 2020;2(1): 26 -35.

Wattimury, Angelia., E.S. Rahayu., D.A Suroto. 2021. Identifikasi Gen Penanda Resisten Antibiotik pada *Lactiplantibacillus plantarum* Kita-3 melalui Analisa *Whole-Genome Sequencing*. Fakultas Teknologi Pertanian. Universitas Gadjah Mada.

World Health Organization. 2005. *The Treatment of Diarrhoea*, Geneva.

World Health Organization. *Diarrhoeal disease*, 2017. In: Fact Sheets. World Health Organization. <https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease>. (Accessed 11 November 2022).

World Health Organization. *Diarrhoeal disease : World Health Organization*; 2017. [Available from <https://www.who.int/news-room/fact-sheets/detail/diarrhoeal-disease>].

Yang X, Wang H. 2014. *Pathogenic E. coli*. Lacombe Research Centre, Lacombe. Canada.

Yin, X., Gu, X., Yin, T., Hongyu, W., Xiali, G. dan Zheng, X. 2016. *Study of enteropathogenic bacteria in children with acute diarrhoea aged from 7 to 10 years in Xuzhou, China.* Microbial Patogenesis. 91: 41-45.

Zhang, Q., Pan, Y., Wang, M., Sun, L., Xi, Y., Li, M., & Zeng, Q. 2022. *In vitro evaluation of probiotic properties of lactic acid bacteria isolated from the vagina of yak (Bos grunniens).* PeerJ, 10. <https://doi.org/10.7717/PEERJ.13177/SUPP-7>.

Zheng, Jinshui., Stijn, W., Elisa, S., Charles, M. A. P. F., Hugh, M.B. H., Paola, M., Paul, W. O., Bruno, P., Peter, V., Jens, W., Koichi, W., Sander, W., Giovanna, E. F., Michael, G. G., Sarah, L., 2020. *A taxonomic note on the genus Lactobacillus: Description of 23 novel genera, emended description of the genus Lactobacillus Beijerinck 1901, and union of Lactobacillaceae and Leuconostocaceae.* International Journal of Systematic and Evolutionary Microbiology. 2020;70:2782–2858.



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Zhou, J. S., Shu, Q., Rutherford, K. J., Prasad, J., Birtles, M. J., Gopal, P. K., & Gill, H. S. (2000b). *Safety assessment of potential probiotic lactic acid bacterial strains Lactobacillus rhamnosus HN001, Lb. acidophilus HN017, and Bifidobacterium lactis HN019 in BALB/c mice*. International Journal of Food Microbiology, 56(1), 87-96.

Zhu, Wenxing., Yuyu, Z., Xinli, Liu., 2015. *Efficient production of safety-enhanced Escherichia coli ghosts by tandem expression of PhiX 174 mutant gene E and staphylococcal nuclease A gene*. Microbiological Research 176 (2015) 7 – 13.