Scopus

Documents

Richmond, R.V.[a] , Mageswary, U.[b] , Ali, A.[a] , Taib, F.[c] , Koo, T.H.[c] , Yusof, A.[d] , Hamid, I.J.A.[e] , Zhao, F.[f] , Rahman, N.N.N.A.[g] , Hasan, T.H.[h] , Zhang, H.[f] , Liong, M.-T.[b]

Therapeutic Potential of Bifidobacterium longum subsp. infantis B8762 on Gut and Respiratory Health in Infant
(2025) *International Journal of Molecular Sciences*, 26 (3), art. no. 1323, .

DOI: 10.3390/ijms26031323

[a] Department of Pediactric, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur, 56000, Malaysia
[b] School of Industrial Technology, Universiti Sains Malaysia, Gelugor, 11800, Malaysia
[c] Pediatric & Palliative Care, Hospital Universiti Sains Malaysia, Kota Bharu 16150, Malaysia
[d] Kepala Batas Health Clinic, Ministry of Health Malaysia, Putrajaya, 13200, Malaysia
[e] Advanced Medical & Dental Institute, Universiti Sains Malaysia, Gelugor 13200, Malaysia
[f] Key Laboratory of Dairy Biotechnology and Engineering, Ministry of Education, Inner Mongolia Agricultural University, Hohhot, 010018, China
[g] Wakaf Che Yeh Health Clinic, Ministry of Health Malaysia, Kota Bharu 15100, Malaysia
[h] IIUM Medical Centre, International Islamic University Malaysia, Kuantan, 25200, Malaysia

Abstract
Respiratory tract and gastrointestinal infections in pediatric populations are major public health concerns. Addressing these challenges necessitates effective preventative and therapeutic strategies. This study assessed the efficacy of the probiotic Bifidobacterium longum subsp. infantis B8762 (0.5 × 1010 CFU) in reducing the duration and frequency of these infections in young children. In a randomized trial, 115 eligible children were assigned to either the probiotic (n = 57; 3.51 ± 0.48 months old) or placebo (n = 58; 2.78 ± 0.51 months old) group, with daily consumption for 4 weeks. The probiotic group demonstrated a lower duration of infections than the placebo group (p < 0.05). The probiotic group also showed fewer clinical visits due to respiratory and gastrointestinal problems as compared to the placebo group (p = 0.009 & p = 0.004, respectively). Oral swab samples revealed that the placebo group had higher levels of pro-inflammatory cytokine TNF-α after 4 weeks (p = 0.033), while the probiotic group demonstrated a balanced cytokine response, indicating modulation of the immune system. Genomic analysis showed that B8762 harbors various genes for the synthesis of proteins and vitamins crucial for the gut health of children. Both the clinical and genomic findings suggested that B8762 offered a therapeutic effect on gut and respiratory health in children, highlighting its potential in managing common pediatric infections. © 2025 by the authors.

Author Keywords
Bifidobacterium longum subsp. infantis B8762; gut health; immunomodulation; pediatrics; probiotic; respiratory illness

References

- **A National Framework to Reduce the Under-5 Mortality and Support Child Growth & Development**
(2011) *Child Health 2021–2030*,
Ministry of Health Malaysia, Putrajaya, Malaysia

- Chan, C.M., Wahab, A.A., Ali, A.
Assessing the impact of COVID-19 on epidemiological changes of severe pediatric respiratory syncytial virus infections in Malaysia
(2024) *Front. Public Health*, 12.
38356949

- Khoo, M.S., Azman, A.H.A., Ismail, N.A.S., Wahab, A.A., Ali, A.
Associations between meteorological variation and hospital-isations for rotavirus infections in Kuala Lumpur, Malaysia
(2024) *Heliyon*, 10.
38596105

- Gomaa, E.Z.
Human gut microbiota/microbiome in health and diseases: A review

(2020) *Antonie Leeuwenhoek*, 113, pp. 2019-2040.
33136284

- Gambadauro, A., Galletta, F., Pomi, A.L., Manti, S., Piedimonte, G.
Immune Response to Respiratory Viral Infections
(2024) *Int. J. Mol. Sci*, 25.

- **Health and nutritional properties of probiotics in food including powder milk with live lactic acid bacteria**
(2021) *Prevention*, 5, pp. 1-10.

- Thoda, C., Touraki, M.
Immunomodulatory Properties of Probiotics and Their Derived Bioactive Compounds
(2023) *Appl. Sci*, 13.

- Mageswary, M.U., Ang, X.Y., Lee, B.K., Chung, Y.L.F., Azhar, S.N.A., Hamid, I.J.A., Bakar, H.A., Kang, X.
Probiotic Bifidobacterium lactis Probio-M8 treated and prevented acute RTI, reduced antibiotic use and hospital stay in hospitalized young children: A randomized, double-blind, placebo-controlled study
(2022) *Eur J Nutr*, 61, pp. 1679-1691.

- Grandy, G., Medina, M., Soria, R., Terán, C.G., Araya, M.
Probiotics in the treatment of acute rotavirus diarrhoea. A randomized, double-blind, controlled trial using two different probiotic preparations in Bolivian children
(2010) *BMC Infect. Dis*, 10.

- Abouelela, M.E., Helmy, Y.A.
Next-Generation Probiotics as Novel Therapeutics for Improving Human Health: Current Trends and Future Perspectives
(2024) *Microorganisms*, 12.

- Chichlowski, M., Shah, N., Wampler, J.L., Wu, S.S., Vanderhoof, J.A.
Bifidobacterium longum subspecies infantis (B. infantis) in pediatric nutrition: Current state of knowledge
(2020) *Nutrients*, 12.

- Li, Z., Peng, C., Sun, Y., Zhang, T., Feng, C., Zhang, W., Huang, T., He, Q.
Both viable Bifidobacterium longum subsp. infantis B8762 and heat-killed cells alleviate the intestinal inflammation of DSS-induced IBD rats
(2024) *Microbiol. Spectr*, 12.
38647334

- Lovie-Toon, Y.G., Chang, A.B., Newcombe, P.A., Vagenas, D., Anderson-James, S., Drescher, B.J., Otim, M.E., O'grady, K.-A.F.
Longitudinal study of quality of life among children with acute respiratory infection and cough
(2018) *Qual. Life Res*, 27, pp. 891-903.
29357027

- Wischmeyer, P.E., Tang, H., Ren, Y., Bohannon, L., Jiang, D., Bergens, M., Ramirez, Z.E., Sung, J.A.
Efficacy of probiotic treatment as post-exposure prophylaxis for COVID-19: A double-blind, Placebo-Controlled Randomized trial
(2023) *Clin. Nutr*, 43, pp. 259-267.
38103462

- Fayol-Messaoudi, D., Berger, C.N., Coconnier-Polter, M.H., Lievin-Le Moal, V., Servin, A.L.
pH-, Lactic acid-, and non-lactic ac-id-dependent activities of probiotic Lactobacilli against Salmonella enterica Serovar Typhimurium

(2005) *Appl. Environ. Microbiol*, 71, pp. 6008-6013.
16204515

- Bu, Y., Liu, Y., Liu, Y., Wang, S., Liu, Q., Hao, H., Yi, H.
Screening and Probiotic Potential Evaluation of Bacteriocin-Producing Lactiplantibacillus plantarum In Vitro
(2022) *Foods*, 11.

- Van Zyl, W.F., Deane, S.M., Dicks, L.M.
Molecular insights into probiotic mechanisms of action employed against intestinal path-ogenic bacteria
(2020) *Gut Microbes*, 12.

- Choi, C.-Y., Lee, C.-H., Yang, J., Kang, S.-J., Park, I.-B., Park, S.-W., Lee, N.-Y., Chun, T.
Efficacies of Potential Probiotic Candidates Isolated from Traditional Fermented Korean Foods in Stimulating Immunoglobulin A Secretion
(2023) *Korean J. Food Sci. Anim. Resour*, 43, pp. 346-358.

- Geng, T., He, F., Su, S., Sun, K., Zhao, L., Zhao, Y., Bao, N., Sun, H.
Probiotics Lactobacillus rhamnosus GG ATCC53103 and Lactobacillus plantarum JL01 induce cytokine alterations by the production of TCDA, DHA, and succinic and palmitic acids, and enhance immunity of weaned piglets
(2021) *Res. Vet. Sci*, 137, pp. 56-67.

- Li, B., Liu, K., Kwok, L.-Y., Guo, S., Bai, L., Yang, X., Chen, Y.
Development of a non-target metabolomics-based screening method for elucidating metabolic and probiotic potential of bifidobacteria
(2022) *Innov. Food Sci. Emerg. Technol*, 77.

- Milajerdi, A., Mousavi, S.M., Sadeghi, A., Salari-Moghaddam, A., Parohan, M., Larijani, B., Esmaillzadeh, A.
The effect of probiotics on inflammatory biomarkers: A meta-analysis of randomized clinical trials
(2019) *Eur. J. Nutr*, 59, pp. 633-649.

- Kak, G., Raza, M., Tiwari, B.K.
Interferon-gamma (IFN-γ): Exploring its implications in infectious diseases
(2018) *Biomol. Concepts*, 9, pp. 64-79.
29856726

- Rojas, J.M., Avia, M., Martín, V., Sevilla, N.
IL-10: A Multifunctional Cytokine in Viral Infections
(2017) *J. Immunol. Res*, 2017, pp. 1-14.
28316998

- Bermúdez-Humarán, L.G., Chassaing, B., Langella, P.
Exploring the interaction and impact of probiotic and commensal bacteria on vitamins, minerals and short chain fatty acids metabolism
(2024) *Microb. Cell Factories*, 23.
38867272

- Wang, Y.-H., Limaye, A., Liu, J.-R., Wu, T.-N.
Potential probiotics for regulation of the gut-lung axis to prevent or alleviate influenza in vulnerable populations
(2022) *J. Tradit. Complement. Med*, 13, pp. 161-169.
36970463

- Kunisawa, J., Sugiura, Y., Wake, T., Nagatake, T., Suzuki, H., Nagasawa, R., Shikata, S., Suzuki, Y.
Mode of Bioenergetic Metabolism during B Cell Differentiation in the Intestine

Determines the Distinct Requirement for Vitamin B1
(2015) *Cell Rep*, 13, pp. 122-131.

- Kim, J.Y., Choi, E.J., Lee, J.H., Yoo, M.S., Heo, K., Shim, J.J., Lee, J.L.
Probiotic potential of a novel vitamin B2-overproducing Lactobacillus plantarum strain, HY7715, isolated from Kimchi
(2021) *Appl. Sci*, 11.

- Solopova, A., Bottacini, F., degli Esposti, E.V., Amaretti, A., Raimondi, S., Rossi, M., van Sinderen, D.
Riboflavin Biosynthesis and Overproduction by a Derivative of the Human Gut Commensal Bifidobacterium longum subsp. infantis ATCC 15697
(2020) *Front. Microbiol*, 11.

- Hernández-Alcántara, A.M., Pardo, S., Mohedano, M.L., Vignolo, G.M., LeBlanc, A., LeBlanc, J.G., Aznar, R., López, P.
The Ability of Riboflavin-Overproducing Lactiplantibacillus plantarum Strains to Survive Under Gastrointestinal Conditions
(2020) *Front. Microbiol*, 11.

- Parra, M., Stahl, S., Hellmann, H.
Vitamin B₆ and Its Role in Cell Metabolism and Physiology
(2018) *Cells*, 7.

- Espinoza, A.C., Wright, M.A., Candee, M.S., Trandafir, C., Nelson, G.R.
Child Neurology: Late-Onset Vitamin B6–Dependent Epilepsy Identified by Rapid Genome Sequencing
(2021) *Neurology*, 96, pp. 911-914.

- Said, Z.M., Subramanian, V.S., Vaziri, N.D., Said, H.M.
Pyridoxine uptake by colonocytes: A specific and regulated carri-er-mediated process
(2009) *Am J Physiol Cell Physiol*, 294, pp. C1192-C1197.
18353902

- Said, H.M., Nexo, E.
Gastrointestinal handling of water-soluble vitamins
(2018) *Compr Physiol*, 8, pp. 1291-1311.
30215865

- Magnúsdóttir, S., Ravcheev, D., de Crécy-Lagard, V., Thiele, I.
Systematic genome assessment of B-vitamin biosynthesis suggests co-operation among gut microbes
(2015) *Front. Genet*, 6.
25941533

- Sugahara, H., Odamaki, T., Fukuda, S., Kato, T., Xiao, J.-Z., Abe, F., Kikuchi, J., Ohno, H.
Probiotic Bifidobacterium longum alters gut luminal metabolism through modification of the gut microbial community
(2015) *Sci. Rep*, 5.
26315217

- Pompei, A., Cordisco, L., Amaretti, A., Zanoni, S., Raimondi, S., Matteuzzi, D., Rossi, M.
Administration of Folate-Producing Bifidobacteria Enhances Folate Status in Wistar Rats
(2007) *J. Nutr*, 137, pp. 2742-2746.

- Zaneveld, J.R., Lozupone, C., Gordon, J.I., Knight, R.
Ribosomal RNA diversity predicts genome diversity in gut bacteria and their relatives
(2013) *Nucleic Acids Res*, 8, pp. 3869-3879.

- Wang, Y., Xu, B., Chen, H., Yang, F., Huang, J., Jiao, X.A., Zhang, Y.
Environmental factors and gut microbiota: Toward better con-servation of deer species
(2023) *Front Microbiol*, 14.

- (2015) *Quality management systems—Requirements*,
International Organization for Standardization, Geneva, Switzerland, Available online

- (2018) *Food safety management systems—Requirements for any organization in the food chain*,
International Organization for Standardization, Geneva, Switzerland, Available online

- Weizman, Z., Asli, G., Alsheikh, A.
Effect of a Probiotic Infant Formula on Infections in Child Care Centers: Comparison of Two Probiotic Agents
(2005) *Pediatrics*, 115, pp. 5-9.

- Lau, A.S., Yusoff, M.S., Lee, Y.Y., Choi, S.B., Rashid, F., Wahid, N., Xiao, J.Z., Liong, M.T.
Development, translation and validation of questionnaires for diarrhea and respiratory-related illnesses during probiotic administration in children
(2017) *Educ. Med. J*, 9.

Correspondence Address
Ali A.; Department of Pediactric, Malaysia; email: adli.ali@ppukm.ukm.edu.my
Liong M.-T.; School of Industrial Technology, Malaysia; email: mintze.liong@usm.my

Publisher: Multidisciplinary Digital Publishing Institute (MDPI)

ISSN: 16616596
Language of Original Document: English
Abbreviated Source Title: Int. J. Mol. Sci.
2-s2.0-85218232980
Document Type: Article
Publication Stage: Final
Source: Scopus