

## Letter to Editor

# Postbiotics as novel health-promoting ingredients in functional foods

Aziz Homayouni Rad<sup>1</sup>, Leili Aghebati Maleki<sup>2</sup>, Hossein Samadi Kafil<sup>3</sup>, Hamideh Fathi Zavoshti<sup>1</sup>, Amin Abbasi<sup>1,4\*</sup><sup>1</sup>Department of Food Science and Technology, Nutrition Research Center, Tabriz University of Medical Sciences, Tabriz, Iran<sup>2</sup>Department of Immunology, Immunology Research Center, Tabriz University of Medical Sciences, Tabriz, Iran<sup>3</sup>Department of Microbiology, Drug Applied Research Center, Tabriz University of Medical Sciences, Tabriz, Iran<sup>4</sup>Student's Research Committee, Tabriz University of Medical Sciences, Tabriz, Iran

Received: 25 Nov. 2019; Accepted: 3 Dec. 2019; ePublished: 28 Jan. 2020

**Dear Editor,**

Clinical investigations have demonstrated that lifestyle factors, especially diet, are significantly associated with a variety of diseases and the host's health status. In this regard, functional foods containing health-promoting ingredients such as protein, carbohydrate, lipids, vitamins, minerals, phenolic and bioactive components (probiotics, prebiotics, synbiotics and postbiotics) have been attaining more significance by researchers, producers and consumers.<sup>1,2</sup> These functional foods can be categorized as natural, transformed, fortified, enhanced or enriched foods. A functional food with an ingredient of bioactive components such as probiotics, prebiotics, and postbiotics is considering as an enriched food.<sup>3</sup> Probiotics are the most investigated and applied components in functional food supplements. Probiotics are characterized as non-pathogenic microorganisms that exert beneficial effects on the host when consumed in sufficient quantities.<sup>4</sup> Some of the recognized health effects for probiotic supplements includes immunomodulation, anticarcinogenic, effectiveness against diarrhea, antidiabetic, hypolipidemic, and improvement of lactose intolerance.<sup>5-7</sup> Prebiotics are characterized as non-digestible constituents of functional foods (inulin, oligofructose, stachyose, oligosaccharides, and raffinose) that not affected by human digestive enzymes nonetheless it is fermented via colonized probiotics in the large colon and promoting the colonization of beneficial microbiota and subsequently improving the health of the host.<sup>8</sup> The main health-promoting effect of prebiotic supplements on the host are decreased cancer risk, balanced cholesterol levels, increased mineral absorption, promote hormonal balance, lipid regulation, lower risk for cardiovascular disease, decreased acute gastroenteritis and lower autoimmune reactions.<sup>9</sup> Along with increasing consumer awareness, to optimize the

positive health effects of probiotics, functional foods containing postbiotic compounds were introduced. The term postbiotics (Nonbiotics) refers to all products obtained from non-viable probiotic microorganisms including non-viable microbial cells, cell walls, lysates, fractions, secretions, components and metabolites that when received in adequate quantities (postbiotic supplements),<sup>10</sup> endowment healthiness to the host like live probiotic cells.<sup>11</sup> The advantages of postbiotics in terms of safety, biological and pharmaceutical properties in comparison with live probiotics, includes no risk of translocation from gut lumen to blood, suitable absorption, metabolism, distribution, and excretion potencies, signaling to various organs and tissues in the host and making several biological responses, higher stability and easier to standardize and carrying.<sup>12</sup> On the other hand, postbiotics used in a delivery system reinforce the endogenous probiotics of each host instead of adding unfamiliar probiotic strains to the gut microbial ecosystem<sup>13</sup> that can be consider as a safe alternative for live probiotic microbes and applied in functional foods and pharmaceutical industry for creating and developing health benefits, preventing of diseases and therapeutic aims. Additional metabolomics studies are required for the description of novel postbiotic components and survey their safety and constancy during the production processes, marketplace, and host's digestive system conditions.

**Ethical approval**

Not applicable.

**Competing interests**

The authors declare that they have no competing interests.

**Authors' contributions**

All authors had active participation in preparation of manuscript.

\*Corresponding Author: Amin Abbasi, Email: aminabasi.tbz.med.ac@gmail.com

© 2020 The Author(s). This is an open access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**References**

1. Manach C, Milenkovic D, Van de Wiele T, Rodriguez-Mateos A, de Roos B, Garcia-Conesa MT, et al. Addressing the inter-individual variation in response to consumption of plant food bioactives: towards a better understanding of their role in healthy aging and cardiometabolic risk reduction. *Mol Nutr Food Res*. 2017;61(6). doi: 10.1002/mnfr.201600557.
2. Dehghan P, Pourghassem Gargari B, Faghfoori Z, Salekzamani S, Asghari Jafarabadi M. Comparative effect of inulin and oligofructose-enriched inulin on glycemic indices and blood pressure in women with type 2 diabetes: a randomized clinical trial. *Journal of Advances in Medical and Biomedical Research*. 2014;22(91):25-38. [Persian].
3. Birch CS, Bonwick GA. Ensuring the future of functional foods. *Int J Food Sci Technol*. 2019;54(5):1467-85. doi: 10.1111/ijfs.14060.
4. Homayouni-Rad A. Letter to the editor. *Food Chem*. 2009;114(3):1073. doi: 10.1016/j.foodchem.2008.10.012.
5. Sanaie S, Ebrahimi-Mameghani M, Mahmoodpoor A, Shadvar K, Golzari SE. Effect of a probiotic preparation (VSL# 3) on cardiovascular risk parameters in critically-ill patients. *J Cardiovasc Thorac Res*. 2013;5(2):67-70. doi: 10.5681/jcvtr.2013.014.
6. Vaghef-Mehrabany E, Vaghef-Mehrabany L, Asghari-Jafarabadi M, Homayouni-Rad A, Issazadeh K, Alipour B. Effects of probiotic supplementation on lipid profile of women with rheumatoid arthritis: a randomized placebo-controlled clinical trial. *Health Promot Perspect*. 2017;7(2):95-101. doi: 10.15171/hpp.2017.17.
7. Homayouni-Rad A, Torab R, Ghalibaf M, Norouzi S, Mehrabany EV. Might patients with immune-related diseases benefit from probiotics? *Nutrition*. 2013;29(3):583-6. doi: 10.1016/j.nut.2012.10.008.
8. de la Rosa O, Flores-Gallegos AC, Muñiz-Marquez D, Nobre C, Contreras-Esquivel JC, Aguilar CN. Fructooligosaccharides production from agro-wastes as alternative low-cost source. *Trends Food Sci Technol*. 2019;91:139-46. doi: 10.1016/j.tifs.2019.06.013.
9. Tabrizi A, Khalili L, Homayouni-Rad A, Pourjafar H, Dehghan P, Ansari F. Prebiotics, as promising functional food to patients with psychological disorders: a review on mood disorders, sleep, and cognition. *NeuroQuantology*. 2019;17(6):1-9. doi: 10.14704/nq.2019.17.6.2189.
10. Homayouni-Rad A, Vaghef-Mehrabany E, Alipour B, Vaghef-Mehrabany L, Javadi M. Do probiotics act more efficiently in foods than in supplements? *Nutrition*. 2012;28(7-8):733-6. doi: 10.1016/j.nut.2012.01.012.
11. Homayouni-Rad A. Therapeutical effects of functional probiotic, Prebiotic and Synbiotic Foods. Tabriz: Tabriz University of Medical Sciences; 2008. [Persian].
12. Aguilar-Toalá JE, Garcia-Varela R, Garcia HS, Mata-Haro V, González-Córdova AF, Vallejo-Cordoba B, et al. Postbiotics: an evolving term within the functional foods field. *Trends Food Sci Technol*. 2018;75:105-14. doi: 10.1016/j.tifs.2018.03.009.
13. Homayouni-Rad A, Akbarzadeh F, Vaghef-Mehrabany E. Which are more important: prebiotics or probiotics? *Nutrition*. 2012;28(11-12):1196-7. doi: 10.1016/j.nut.2012.03.017.