



ISSN: 2456-0057

IJPNPE 2026; 11(1): 01-03

Impact Factor (RJIF): 5.91

© 2026 IJPNPE

www.journalofspport.com

Received: 02-10-2025

Accepted: 05-11-2025

Arijit Garai

Research scholar, Department of
Home Science, University of
Calcutta, Kolkata, West Bengal,
India

Dr. Rama Das

Assistant Professor, department
of Food and Nutrition,
Barrackpore Rastraguru
Surendranath College,
Barrackpore, Kolkata, West
Bengal, India

Santa Datta De

Former Professor, Department of
Home Science, University of
Calcutta, Kolkata, West Bengal,
India

Effect of Organic and Conventional Vegetables on Human and Ecological Health: A Systematic Review

Arijit Garai, Rama Das and Santa Datta De

DOI: <https://www.doi.org/10.22271/journalofspport.2026.v11.i1a.3125>

Abstract

In recent times when people are so health conscious, the method of cultivation is an important issue. The debate surrounding the consumption of organic versus conventional vegetables and their respective impacts on human and ecological health has garnered significant attention in modern times. This review paper helps to find out the direct effect of farming methods on crop yielding, antioxidants contents and pesticide exposure. The effect on ecological health like better soil stability, enhanced water percolation, holding capacities and lesser water uses have been found in organic farming. The effects of conventional vegetables and organic vegetables on human health have also been discussed in this review paper. However, the review also acknowledges certain limitations and challenges associated with organic agriculture, including higher production costs and lower yields compared to conventional methods.

Keywords: Organic farming, conventional farming, environmental impacts, human health impact

Introduction

Food is a fundamental essential aspect of human life, satisfying both physical nourishment and often emotional enjoyment. But, now a day's, people are concerned about the origin of food sources. The food we consume daily plays an important role in maintaining optimal health and vegetables, rich in essential nutrients, form a crucial component of a balanced diet. Vegetables are key sources of micronutrients needed for good health and add diversity, flavour, and nutritional quality to diets (Sedani *et al.*, 2018) [15]. There are mainly two kinds of farming type for vegetable grown i.e, organic farming and conventional farming with different varieties of seeds are used, like Hybrid seeds, Open Pollinated (Non-hybrid) and Genetically Modified (GMO) seeds.

Organic farming can be defined as the cultivation of crops without the use of synthetic chemicals like agrochemicals and the use of compost manure, neem-based products, green compost and practice crop rotation to grow the crops and focuses on the sustainability of the environment for the preservation of ecological balance (Patel and Champaneri, 2020) [11]. On the other hand Conventional farming is an open system, where the main purpose is the production of vegetable with heavy reliance upon high input of synthetic fertilizers and other agricultural chemicals, intensive tillage, and mono/limited rotation cropping systems. High production input costs that include machinery, labor, chemicals, fuel and tillage equipment, which are often not considered by producers and the focus is on yield only (Sumberg and Giller, 2022 and Sushma and Dinesh, 2020) [17, 18]. In the case of productivity of vegetables the use of different organic manures with enhanced dosages helps to increase the vegetable production significantly (Pradeepkumar *et. al.*, 2017).

Organic farming is an ecological production management system for this it restores, preserves and increases ecological balance. Organic farming is not using synthetic pesticides, growth hormones, genetic modification techniques and synthetic chemicals (Sushma and Dinesh, 2020) [18]. But Conventional farming has an effect on the environment by degrading soil health, where a significant amount of soil organic carbon (SOC) has been depleted with strong adverse impacts on soil functionality. The dwindling of soil biodiversity and a decline in soil health affect the soil ecosystem that decline in SOC and eventually degrades the soil's capacity

Corresponding Author:

Dr. Rama Das

Assistant Professor, department
of Food and Nutrition,
Barrackpore Rastraguru
Surendranath College,
Barrackpore, Kolkata, West
Bengal, India

to overcome climate disturbances, such as drought and severe and frequent wet events that impact crop productivity (Sumberg and Giller, 2022) [17].

In the 21st century, where the annual average growth rate has increased 20-25 percent the demand for food have increased day by day. In view of the food pyramid, fruits and vegetables are now the highest requirement among the other foodstuffs(reference). But the production of food in organic farming is lower than the conventional way due to high production cost, poor yield, more land require than conventional method. On the other hand, conventional methods reduce such problems and fulfil the current demands of food requirements (Sharma, 2022) [16].

Methodology

- Searching Internet databases like PubMed, Google Scholar and backward searches
- Collect publications from 2001 through to the present 2023.
- The search terms remained broad like “Organic farming and Conventional farming”, “Health and ecological impact on organic and conventional farming” etc.

Aims and Objectives

- To find out the impact of daily consumption of organic and conventional vegetables on human health.
- To observe the effect of pesticide exposure on human by daily intake of conventional vegetables,
- To find the ecological balance by using of organic and chemical fertilizers in organic and conventional farming.

Discussion

Organic vegetables and their effect on human and ecological health

Currently, consumer awareness regarding organic farming has increased day by day. It is due to the fact that organic vegetables contain better nutrients, less adverse effect on environment and also on human health (Brantsaeter et. al, 2017) [1]. Many dietary intervention studies have found that organic food consumption substantially reduces pesticide exposure in humans (Rempelos et. al, 2021) [14]. From different study it is observed that organic farming is a kind of agricultural farming that provides the consumers with fresh, tasty and reliable foods. Fruits and vegetables are well known for their high nutritional content particularly vitamins and minerals. In this regard, organically grown food is dramatically superior in mineral content to that grown by modern conventional methods. Different studies have found that organic vegetables contain lower amount of nitrate and pesticide but, usually higher levels of vitamin C and phenolic compounds (Xavier, et al., 2020) [20]. So, daily intake of organic vegetables causes higher anti-oxidative and anti-mutagenic activity as well as better inhibition of cancer cell proliferation than conventionally grown vegetables.

There is also a positive relationship between organic food intake and body, proper growth, fertility indices, allergy and immune system (Huber, et al, 2011 and Crinnion, 2010) [4, 3]. Organic vegetables help to prevent some degenerative diseases like atherosclerosis, cancer, diabetes, arthritis and also ageing due to their higher antioxidant properties (Kaur and Kapoor, 2001) [7].

In addition to improving people's overall health, organic farming also helps maintain ecological balance. Organic soil amendment is one solution to the problem of increasing the food supply for a growing population, which has become

critical considering global warming. To alter the soil profile, various organic amendments such as biofertilizer, vermicompost, green manure and biostimulant like seaweed must be introduced. The use of these organic fertilizers improves both crop production and growth which have positive effects on human health, soil quality and biodiversity (Rani et al., 2023) [13]. Organic farming practices tend to improves physico-biological properties of soil consisting of more organic matter, biomass, higher enzyme, better soil stability, enhanced water percolation, holding capacities, lesser water and wind erosion compared to conventionally farming soil (Das et al., 2020) [5].

Conventional vegetables and their effect on human and ecological health

Vegetables are rich sources of fibre, which helps to prevent constipation. Conventionally grown vegetables are abundant sources of vitamins, minerals and dietary fiber, contributing to a healthy and balanced diet. On the other hand, the extensive use of agrochemicals in conventional farming has increased crop yields and enhanced food security around the world. Conventional farming systems are also associated with declines in soil quality, declines in soil microbial diversity, decreases in water infiltration, increases in nitrogen leaching and ground water contamination, and the depletion of soil nutrients (Mukherjee et al., 2020) [10]. But, high concentration of chemical fertilizer has used in conventional farming causes a decrease in the desirable minerals, antioxidants and metabolites in food (Chausali and Saxena, 2021) [2]. Many of the pesticides used in conventional agriculture, with more than 600 active ingredients, are linked to potential toxicological effects on humans, including mutagenic and carcinogenic risks and those affecting reproductive health also. Excessive use of nitrate as a fertilizer has been reduced the ability of the haemoglobin in blood to carry oxygen, where excess nitrite converted from nitrate may pose a serious risk of methemoglobinemia (cyanosis), especially for very young babies.

Heavy metals present in chemical fertilizer such as Mercury, Lead, Cadmium and Uranium which can cause disturbances in the kidneys, lungs and liver and cause cancer (Thorat, 2022) [19].

Conclusion

Organic vegetables tend to have lower pesticide residues and higher levels of certain nutrients that protect against different diseases compared to conventional vegetables. The ingestion of pesticide residues from conventional vegetables has been associated with adverse effects such as increased risk of certain cancers, neurological disorders, and reproductive health issues. Bio-active compound present in organic foods have major advantages to prevent several metabolic diseases such as cardio-vascular diseases, diabetes mellitus type 2 and overweight or obesity than conventionally grown foods. Organic farming has major advantages on environmental sustainability by promoting soil health, water management, and land use and biodiversity conservation. Consumer preferences, accessibility and affordability on organic farming also play a significant role in shaping dietary choices and ultimately influencing both human and ecological health outcomes. The ecological implications of conventional vegetable production cannot be overlooked. The heavy use of pesticides and synthetic fertilizers contributes to soil degradation, water pollution and loss of biodiversity, ultimately undermining the resilience of ecosystems. Thus,

organic farming has both human and ecological advantages over conventional farming.

Reference

- Brantsæter AL, Ydersbond TA, Hoppin JA, Haugen M, Meltzer HM. Organic food in the diet: exposure and health implications. *Annual Review of Public Health*. 2017;38:295–313.
- Chausali N, Saxena J. Conventional versus organic farming: nutrient status. In: *Advances in Organic Farming*. 2021. p. 241–254.
- Crinnion WJ. Organic foods contain higher levels of certain nutrients, lower levels of pesticides, and may provide health benefits for the consumer. *Alternative Medicine Review*. 2010;15(1):4–12.
- Huber M, Rembiałkowska E, Średnicka D, Bügel S, Van De Vijver LPL. Organic food and impact on human health: assessing the status quo and prospects of research. *NJAS: Wageningen Journal of Life Sciences*. 2011;58(3–4):103–109.
- Das S, Chatterjee A, Pal TK. Organic farming in India: a vision towards a healthy nation. *Food Quality and Safety*. 2020;4(2):69–76.
- Desai R, Malik G. A study on impact of organic foods on human health. *CT International Hospitality and Tourism E-Conference (CTIHTEC)*. 2021;21:1–5.
- Kaur C, Kapoor HC. Antioxidants in fruits and vegetables—the millennium's health. *International Journal of Food Science and Technology*. 2001;36(7):703–725.
- Köpke U. Influence of organic and conventional farming systems on nutritional quality of food. *Impacts of Agriculture on Human Health and Nutrition*. 2009;2:210–238.
- Meena RMR, Meena HP, Meena RS. Organic farming: concept and components. *Popular Kheti*. 2014;1(4):1–5.
- Mukherjee A, Omondi EC, Hepperly PR, Seidel R, Heller WP. Impacts of organic and conventional management on the nutritional level of vegetables. *Sustainability*. 2020;12(21):8965.
- Patel PP, Champaneri DD. Organic farming: a path to healthy food and environment. *International Journal of Current Microbiology and Applied Sciences*. 2020;9(3):637–644.
- Pradeepkumar T, Bonny BP, Midhila R, John J, Divya MR, Roch CV. Effect of organic and inorganic nutrient sources on the yield of selected tropical vegetables. *Scientia Horticulturae*. 2017;224:84–92.
- Rani M, Kaushik P, Bhayana S, Kapoor S. Impact of organic farming on soil health and nutritional quality of crops. *Journal of the Saudi Society of Agricultural Sciences*. 2023;22:560–569.
- Rempelos L, Baranski M, Wang J, Adams TN, Adebisuyi K, Beckman JJ, *et al*. Integrated soil and crop management in organic agriculture: a logical framework to ensure food quality and human health. *Agronomy*. 2021;11(12):2494.
- Sedani SR, Pardeshi IL, Bhad RG, Nimkarde PG. Vegetables: a boon to human healthy life. *Journal of Ready to Eat Food*. 2018;5(3):22–30.
- Sharma M, Verma P, Kaushal S. Human health implication and economical impact of organic food production system on adoption of organic agriculture. *International Journal of Plant Pathology and Microbiology*. 2022;2(1):22–26.
- Sumberg J, Giller KE. What is 'conventional' agriculture? *Global Food Security*. 2022;32:100617.
- Sushma R, Dines GM. Organic farming and conventional farming: a comparative study. *Journal of Emerging Technologies and Innovative Research*. 2020;7(11):1–6.
- Thorat JC, More AL. The effect of chemical fertilizers on environment and human health. *International Journal of Scientific Development and Research*. 2022;7(2):99–105.
- Xavier JR, Mythri V, Nagaraj R, Ramakrishna VCP, Patki PE, Semwal AD. Organic versus conventional—a comparative study on quality and nutritive value of selected vegetable crops of southern India. *SAARC Journal of Agriculture*. 2020;18(1):99–116.