



Dietary Requirements and Nutritional Value of Horticultural Crops

Upasana^{1*} and Vikash Surliya²

¹MBA Scholar, Department of Food Business Management & Entrepreneurship Development, National Institute of Food Technology Entrepreneurship and Management, India

²Assistant Professor, Department of Food Business Management & Entrepreneurship Development, National Institute of Food Technology Entrepreneurship and Management, India

***Corresponding author:** Upasana, MBA Scholar, Department of Food Business Management & Entrepreneurship Development, National Institute of Food Technology Entrepreneurship and Management (An Institute of National Importance), Kundli, Sonipat, Haryana, (131028) India, Email: upasanasingh135@gmail.com

Received Date: December 15, 2024; **Published Date:** December 18, 2024

Abstract

Globally and in India, the horticulture sector has seen remarkable growth. India ranks second in vegetable and fruit production, leading in dry onion production. This article highlights the dietary requirements and nutritional value of horticultural crops for human beings. Horticultural produce, including fruits, vegetables, nuts, seeds, and herbs, is vital for human nutrition, providing essential vitamins, minerals, fiber, and bioactive compounds. Fruits such as citrus and berries are rich in Vitamin C, which promotes immunity and skin health. At the same time, vegetables like spinach and broccoli offer nutrients supporting bone, blood, and cancer prevention. Nuts and seeds deliver healthy fats, proteins, and minerals, enhancing heart and brain health, and herbs such as turmeric and ginger provide antioxidants and anti-inflammatory benefits. Dietary recommendations emphasize including diverse horticultural crops daily, with fruits (1.5–2 cups), vegetables (2–3 cups), and nuts/seeds (1–2 ounces) for optimal health.

Keywords: Fruits; Vegetables; Nutrition; Diet

Introduction

Trends in Horticultural Crops in India and Worldwide

The horticulture sector has wide growth, and India is leading in agriculture and horticulture production. Globally, the production of vegetables and melons stands at 1138.74 million tonnes, while fruits (excluding melons) account for 899.56 million tonnes. Potato production worldwide is

371.14 million tonnes, with India contributing 13.08% of the total. Additionally, the global production of dry onions is 104.56 million tonnes, highlighting the significant scale of horticultural crop production around the world [1].

According to the second advance estimates for 2022-23, the total horticultural output is projected at 351.92 million tonnes, exceeding the total food grain yield, which stands at 329.69 million tonnes for the same period [2].

India's varied climatic conditions enable the cultivation of a wide range of fresh fruits and vegetables year-round. Globally, India ranks as the second-largest producer of fruits and vegetables, following China. Based on the National Horticulture Board's second advance estimates for 2023-24, the country achieved a production of 112.62 million metric tonnes of fruits and 204.96 million metric tonnes of vegetables. The land area devoted to fruit farming covered 7.04 million hectares, while vegetables were grown on 11.11 million hectares [3].

The exports of vegetables, roots, and tubers in 2023-24 is 1940.67 US\$ million. The exports of fruits, melons, and citrus fruits in 2023-24 is 1637.10 US\$ million. The imports of vegetables, roots, and tubers in 2023-24 is 3832.14 US\$ million. The imports of fruits and citrus fruits in 2023-24 is 4191.62 US\$ million [4].

Nutritional Value of Horticultural Crops

Horticultural crops, encompassing fruits, vegetables, nuts, and herbs, are indispensable for human nutrition due to their rich array of vitamins, minerals, fiber, and bioactive

compounds. Fruits, such as citrus and berries, are excellent sources of Vitamin C, aiding immunity and skin health, while potassium-rich options like bananas help regulate blood pressure. Vegetables provide diverse nutrients; leafy greens like spinach offer iron and calcium for blood and bone health, while cruciferous vegetables such as broccoli contain compounds with anti-cancer properties. Root vegetables like carrots are rich in beta-carotene, essential for vision and immunity. Nuts and seeds, such as almonds and flaxseeds, deliver healthy fats, plant-based proteins, and minerals like magnesium and zinc, supporting heart health and metabolism. Herbs and spices, though consumed in small quantities, are packed with antioxidants and anti-inflammatory agents, exemplified by turmeric and ginger. These crops not only prevent chronic diseases like diabetes, cardiovascular ailments, and cancer but also aid in hydration and weight management due to their high water and fiber content. Their nutrient density and health benefits make them foundational to a balanced diet, promoting overall well-being and longevity. A diet rich in horticultural crops is a cornerstone of health and sustainable living [5].

Micronutrients	Leafy Vegetables	Other Vegetables	Roots & Tubers	Fruits
Iron (mg)	8.5	2.12	0.6	0.56
Zinc (mg)	0.2	0.3	0.3	0.11
Vitamin A (µg)	397.97	18.4	39.85	35.48
Dietary Folate(µg)	16.7	24.4	31.3	17.61
Calcium(mg)	279.3	38.1	28.5	28.2
Magnesium(mg)	35.7	21.3	19.4	10.3
Vitamin B1(µg)	60	41.3	31.58	34.78
Vitamin B2(µg)	127.7	43.5	10.5	21.7
Vitamin B3(µg)	624.46	365.2	405.3	369.6
Vitamin B6(µg)	97.49	97.48	97.47	65.04
Vitamin B9(µg)	31.6	28.53	21.48	11.41
Vitamin C(µg)	45.6	23.6	12.1	36.7
Vitamin D2(µg)	3.4	2.38	.055	3.62

Source: ICMR-NIN [6].

Table 1: Key Micronutrients in Different Fruits and Vegetables.

Table 1 shows the micronutrient composition across leafy vegetables, other vegetables, roots & tubers, and fruits. Leafy vegetables are particularly rich in iron (8.5 mg), calcium (279.3 mg), vitamin A (397.97 µg), vitamin B2 (127.7 µg), and vitamin B3 (624.46 µg), making them a dense source of essential nutrients. Fruits are comparatively lower in most micronutrients but are a good source of vitamin C (36.7 µg)

and vitamin D2 (3.62 µg). Roots & tubers and other vegetables generally provide moderate amounts of zinc, magnesium, and certain vitamins like B3 and B6. Notably, dietary folate is highest in roots & tubers (31.3 µg), while magnesium is more concentrated in leafy vegetables (35.7 mg). Overall, leafy vegetables stand out as nutrient powerhouses, while fruits and roots provide specific complementary nutrients.

Macronutrients	Green Leafy Vegetables	Other Vegetables	Roots & Tubers	Fruits
Protein(g)	3.8	1.8	1.5	1
Fat(g)	0.7	0.4	0.2	0.6
Carbohydrates(g)	5	5	12	11
Energy(kcal)	45	35	59	59
Total Dietary Fiber(g)	2	2	2	2

Source: ICMR-NIN [7].

Table 2: Average Value of Macronutrients and Dietary Fibre in Fruits & Vegetables.

Table 2 outlines the average macronutrient and dietary fiber content in green leafy vegetables, other vegetables, roots & tubers, and fruits. Green leafy vegetables are the richest in protein (3.8 g) and fat (0.7 g) compared to other categories, while roots & tubers and fruits are highest in carbohydrates (12 g and 11 g, respectively), contributing to their energy content of 59 kcal each. Other vegetables provide moderate amounts of protein (1.8 g), fat (0.4 g), and carbohydrates (5 g), resulting in lower energy (35 kcal). Notably, all categories provide a uniform amount of dietary fiber (2 g), emphasizing their role in digestive health. Overall, the table highlights the complementary nutritional contributions of these food groups, with green leafy vegetables offering higher protein and fat and roots & tubers and fruits being significant carbohydrate sources.

Horticultural Crops and Human Nutrition

As we know fruits and vegetables play a vital role in every human being's life. They are essential for better growth and maintenance of the body. They keep our body fit, active, healthy, and boost our immunity also.

The dietary requirements of horticultural produce involve incorporating a diverse range of fruits, vegetables, nuts, seeds, and herbs into daily meals to meet essential nutrient needs. These crops provide a broad spectrum of vitamins, minerals, fiber, and phytochemicals crucial for maintaining overall health.

Horticulture Crops	Recommendations	Key Nutrients	Benefits
Fruits	1.5–2 cups daily (varies with age, gender, and activity level)	Vitamins (C, A, K), potassium, fiber, and antioxidants	Boost immunity, improve skin health, and provide natural energy
Vegetables	2–3 cups daily, including a mix of leafy greens, cruciferous, and root vegetables	Vitamins (A, C, K), folate, iron, calcium, and dietary fiber	Support digestion, heart health, and cancer prevention
Nuts and Seeds	1–2 ounces daily (unsalted and unprocessed)	Healthy fats, protein, magnesium, and omega-3 fatty acids	Promote heart and brain health and provide sustained energy
Herbs and Spices	Use in moderation for seasoning and health benefits	Antioxidants, vitamins (K, C), and anti-inflammatory compounds	Enhance flavor and support immunity and digestion

Source: Author's compilation from different sources.

Table 3: Dietary Significance and Recommended Consumption of Horticultural Crops

Table 3 highlights the dietary significance and recommended consumption of various horticultural crops, emphasizing their key nutrients and health benefits. Fruits are recommended at 1.5–2 cups daily, offering vitamins (C, A, K), potassium, fiber, and antioxidants to boost immunity, improve skin health, and provide natural energy. Vegetables, with a suggested intake of 2–3 cups daily, are rich in vitamins (A, C, K), folate, iron, calcium, and fiber, supporting digestion, heart health, and cancer prevention. Nuts and seeds, advised

at 1–2 ounces daily, provide healthy fats, protein, magnesium, and omega-3s for heart and brain health and sustained energy [8]. Herbs and spices, used in moderation, contribute antioxidants, vitamins (K, C), and anti-inflammatory compounds, enhancing flavor while supporting immunity and digestion. This table underscores the importance of a varied diet incorporating these nutrient-rich horticultural crops for overall health and well-being.

Conclusion

From the above discussion, horticulture is an important sector for the economic growth of the country. India ranks 2nd in horticulture. Horticulture basically a process of cultivation of fruits, vegetables, flowers and spices crops. From the current trends of the world and India of horticulture, vegetable production is 1138.74 and 135.29 million tonnes, and fruit production excluding melon in the world and India is 899.56 and 106.97 million tonnes. These horticultural crops play an important role in the human body as they are rich in vitamins A, B1, C, iron, and phosphorus which help in the maintenance of bones, vision, reproduction, and immunity. Climatic conditions are very important for growth, the temperature should be 5-40 degrees Celsius, and water, light are also other important factors necessary for growth. Horticulture is the leading and growing sector of the country.

References

1. Chaudhan S, Chand S, Answer ME, Chauhan MS, Kumar A (2024) Instability and Growth Scenario of Potato in India: An Empirical Study. In *Futuristic Trends in Social Sciences* 3 (14): 77-86.
2. PIB (2023) Horticulture Production. Ministry of Agriculture & Farmers Welfare, Government of India.
3. APEDA (2023) Fresh Fruits and Vegetables. Ministry of Commerce and Industry, Government of India.
4. MoFPI (2023) Annual Report 2023-24. Ministry of Food Processing Industries, Government of India.
5. Das M, Singz AK (2021) Horticulture and nutrition: Two sides of the coin. *Indian Horticulture* 66(5): 37-40.
6. ICMR-NIN (2020) Nutrient Requirement and Recommended Dietary Allowances for Indians. A Report of the Expert Group 2020.
7. ICMR-NIN (2024) Dietary Guidelines for Indians. ICMR-National Institute of Nutrition, Ministry of Health and Family Welfare, Government of India.
8. MOFPI (2023-24) Annual report 2023-24. Ministry of Food Processing Industries, Government of India: New Delhi.