eISSN 2583-6986
IDEALISTIC JOURNAL OF ADVANCED RESEARCH IN PROGRESSIVE SPECTRUMS (IJARPS)
A MONTHLY, OPEN ACCESS, PEER REVIEWED (REFEREED) INTERNATIONAL JOURNAL
Volume 03, Issue 09, September 2024

Health Effects Of Orange Juice: An Overview

Anuradha Tiwari[1], Neetu Singh[2], Neelam Pal[3]
[1]Department of Chemistry, V.S.S.D College, Kanpur, U.P
[2]Department of Chemistry, V.S.S.D College, Kanpur, U.P
[3]Department of Chemistry, V.S.S.D College, Kanpur, U.P

Received: 15 Sep 2024 Accepted & Reviewed: 25 Sep 2024, Published : 30 Sep 2024

Abstract

Orange juice is a popular worldwide beverage for its refreshing taste and nutritional benefits. It is derived from the fruit of the orange tree and is packed with essential nutrients that contribute to overall health juices are important beverages that are consumed all over the world. Due to its high flavor and rich nutritional value orange juice is used globally. Orange juice is a valuable source of essential vitamins and nutrients. The main source of orange juice is vitamin C, its consumption has positive and negative health effects depending on factors like quantity, processing, and added sugars. This study discusses the nutritional value, health benefits, and Potential Downsides of orange juice. Due to their increasing demand and high value, fruit juices are one of the most frequent targets of adulteration. This practice involves intentionally adding substances to increase volume, enhance color or taste, or reduce production costs, often compromising quality and safety.
Keywords: Orange juice, Vitamin C, Antioxidant, Inflammation health effects

Introduction

The beverage market has had many modifications and innovations over the last several years as consumers seek new benefits from their beverages. One of the most remarkable benefits for consumers is health and wellness. The new functional beverages market with added ingredients and related health benefits has grown fast with strategies linked to energy, digestion, cognitive ability, hydration, and weight management. Orange juice is one of the most fantastic beverages in the whole world. According to studies, Brazil [1] is the worldwide orange producer of approximately 1106 metric tons, Mexico has 155 metric tons, the United States has 105 metric tons, and the European Union has 47 metric tons produced worldwide. In India, 3.6 metric tons are produced by seven states [2] Maharashtra, Rajasthan, Madhya Pradesh, Tamilnadu, Panjab, Assam, and Meghalaya [3].

Orange Juice is a process that extracts the juices from fresh Orange [4]. It usually strips away most of the solid matter from whole fruits, including the seeds and pulp. The resulting liquid contains the most nutritional substances like vitamins, minerals, etc present in the entire fruit. Orange Juice is rich in its nutritional profile [5,6]. Vitamin C, folate, Potassium, and Vitamin B1 or thiamin is an important nutrient in orange juice [7]. Fresh fruits, especially citrus fruits, are good sources of vitamin C.

1.1 Nutritional value of orange juice

1.1.1-Orange juice is an outstanding source of vitamin C (ascorbic acid), which supports immune function in the human body, and collagen production, also acts as an antioxidant, to protect the body from free radical damage [8,16,17].

1.1.2- Orange juice [8,9] is a source of Folate or vitamin B9, which is the generic term for the vitamin that occurs naturally in certain foods. Folate is essential for cell division, and DNA synthesis, and is particularly important during pregnancy to prevent neural tube defects. Folic acid is a lab-made vitamin that is used in dietary supplements and added to foods. Oranges and other citrus fruits, such as lemons, are most well-known

eISSN 2583-6986
IDEALISTIC JOURNAL OF ADVANCED RESEARCH IN PROGRESSIVE SPECTRUMS (IJARPS)
A MONTHLY, OPEN ACCESS, PEER REVIEWED (REFEREED) INTERNATIONAL JOURNAL
Volume 03, Issue 09, September 2024

for their good amount of folate, with one small fresh orange providing 29 mcg. Folate and folic acid are major sources of cell growth and metabolism[11,14]. The daily recommended intake of folate for teens and adults is 400 mcg. Pregnant women need at least 600 mcg daily, and breastfeeding women need 500 mcg.

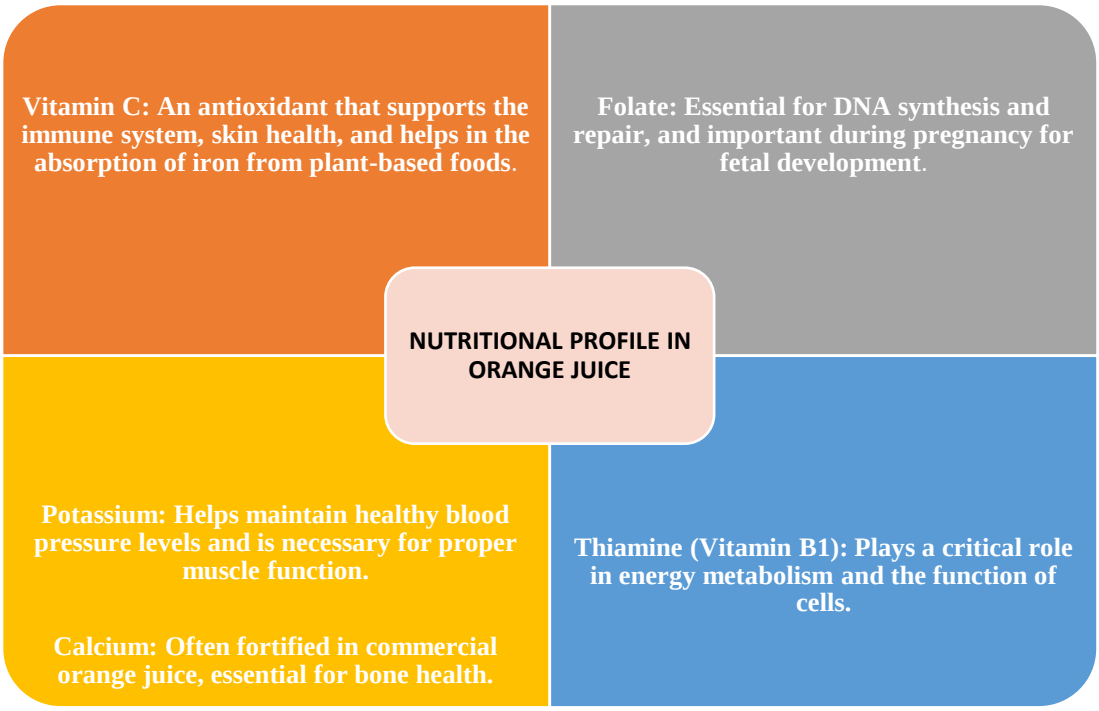

Fig no 1: Nutritional profile in Orange Juice

1.1.3-Presence of Potassium in Orange juice [10] is vital for heart health, regulating blood pressure, and supporting nerve function. Orange juice contains remarkable amounts of this mineral. Potassium is essential for the normal functioning of all cells. It regulates the heartbeat, ensures proper function of the muscles and nerves, and is essential for synthesizing protein and metabolizing [13] carbohydrates. It helps to maintain a normal level of fluid inside the cell.

1.1.4- Vitamin B1 or thiamin is present in Orange Juice [12,14] and is essential for glucose metabolism and heart function nerve, and muscle. People may need supplements if their diet does not provide enough vitamin B1, during hemodialysis, and for other reasons. Water-soluble vitamins travel through the bloodstream. If the body does not use the vitamins, it excretes them in urine.

1.2- Health Benefits

1.2.1-Boosts Immune System: Orange Juice with its high vitamin C content helps strengthen the immune system, reducing the duration and severity of colds. Regular consumption of vitamin C from orange juice [7, 15,16] can help boost the immune system, reducing the severity of colds and infections.

1.2.2- Antioxidant Properties: Orange Juice contains antioxidants like flavonoids, which help combat oxidative stress and reduce the risk of chronic diseases. Antioxidants [17] in Orange Juice contain flavonoids like hesperidin, which have anti-inflammatory and antioxidant properties, potentially protecting against chronic diseases. Vitamin C in Orange Juice helps reduce oxidative stress by neutralizing free radicals, which

eISSN 2583-6986
IDEALISTIC JOURNAL OF ADVANCED RESEARCH IN PROGRESSIVE SPECTRUMS (IJARPS)
A MONTHLY, OPEN ACCESS, PEER REVIEWED (REFEREED) INTERNATIONAL JOURNAL
Volume 03, Issue 09, September 2024

can damage blood vessels and lead to heart disease.

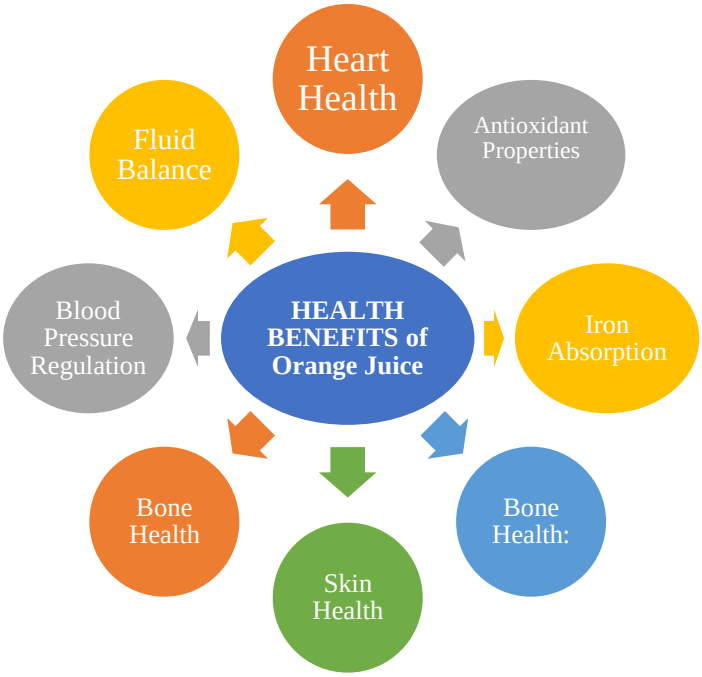

Fig no 2: Health Benefits of Orange Juice

1.2.3- Heart Health: Potassium in orange juice can help manage blood pressure levels [10, 15], reducing the risk of hypertension and cardiovascular diseases. Orange juice, especially without added sugars, can contribute to cardiovascular health. Potassium helps regulate blood pressure.

1.2.4-Skin Health: The high levels of vitamin C in Orange Juice [11,17,22] contribute to collagen production, helping maintain healthy skin and reducing signs of aging. Vitamin C is crucial for the production of collagen, which helps maintain skin elasticity and reduce signs of aging.

1.2.5- Iron Absorption: Orange Juice helps to enhance the absorption of non-heme iron (found in plant-based foods), helping prevent anemia.

1.2.6- Digestive Health: Orange Juice [13, 16] contains the natural acidity and fiber content (in some varieties) to aid digestion and promote gut health.

1.2.7- Bone Health: Orange Juices are fortified with calcium and vitamin D, which support bone density and reduce the risk of osteoporosis [18].

1.2.8- Blood Pressure Regulation: The presence of Potassium in Orange Juice helps counteract the effects of sodium in the body, aiding in the relaxation of blood vessel walls and reducing blood pressure [10]. High blood pressure is a major risk factor for heart disease.

1.2.9- Fluid Balance: Orange Juice helps to maintain a healthy fluid balance, which is crucial for proper cardiovascular function.

1.2.10-Cholesterol Management: Some studies suggest that vitamin C in Orange Juice can help lower LDL cholesterol [9,19] (the "bad" cholesterol) and increase HDL cholesterol (the "good" cholesterol), contributing to better heart health.

eISSN 2583-6986
IDEALISTIC JOURNAL OF ADVANCED RESEARCH IN PROGRESSIVE SPECTRUMS (IJARPS)
A MONTHLY, OPEN ACCESS, PEER REVIEWED (REFEREED) INTERNATIONAL JOURNAL
Volume 03, Issue 09, September 2024

1.2.11- Anti-inflammatory Properties: Flavonoids, such as hesperidin found in orange juice, have anti-inflammatory [18,20] effects that can reduce inflammation in blood vessels, lowering the risk of atherosclerosis (hardening of the arteries).

Due to their continually increasing demand and high value, Orange Juices are one of the most frequent targets of adulteration. Since adulterated foods are proven to have harmful effects on health, several approaches have been utilized for the detection of Orange Juice adulteration. Adulteration in orange juice [21,22] involves various deceptive practices aimed at altering its quality and purity. Common methods include substituting genuine ingredients with cheaper alternatives, diluting the juice with water, adding artificial flavorings and colorings, addition of sugar or sweeteners, use of concentrates and synthetic Juices, and addition of pulp wash. These mixing not only mislead consumers but also diminish the nutritional value of the product and can introduce health risks such as allergies and deficiencies in essential nutrients

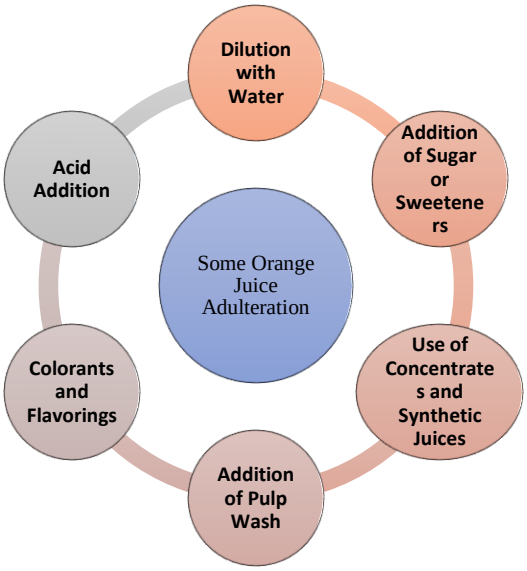

Fig no 3- Type of Orange Juice Adulteration

1.3. Potential Downsides

1.3.1- Orange Juice contains a significant amount of sugar, which can contribute to weight gain and increase the risk of metabolic diseases, especially if consumed in large quantities or if the juice is sweetened. The glycemic load of orange juice is relatively high, meaning it can cause rapid spikes in blood sugar levels [11,23]. This can be particularly concerning for people with diabetes or insulin resistance. Many commercial orange juices [24] contain added sugars, which can contribute to weight gain, dental problems, and an increased risk of type 2 diabetes

1.3.2- Tooth Erosion: The natural acids in orange juice (especially citric acid) can erode tooth enamel over time, particularly if consumed using Orange Juice frequently and in large amounts.

2-Conclusion:

Research has shown that regular consumption of orange juice can lead to modest reductions in blood pressure levels. Orange juice, when consumed in moderation, can positively impact heart health due to its rich content

of potassium, vitamin C, and flavonoids. These nutrients help regulate blood pressure, reduce oxidative stress, improve cholesterol levels, and enhance overall vascular function. However, it is essential to choose 100% pure orange juice and integrate it into a balanced diet for optimal heart health benefits. Orange juice, when consumed in moderation, can be a healthy addition to the diet, providing essential vitamins and minerals. However, it is important to be mindful of its sugar content and potential impact on dental and metabolic health. Opting for pure, unsweetened orange juice and maintaining a balanced diet can help maximize its benefits while minimizing any adverse effects.

References:-

1. Leda Coltro, Anna Lúcia Mourad, Rojane M. Kletecke, Taíssa A. Mendonça & Sílvia P. M. Germer, (2009) Assessing the environmental profile of orange production in Brazil, The International Journal of Life Cycle Assessment, Volume 14, pages 656–664, doi.org/10.1007/s11367-009-0097-1

2. YuQiu Liu, Emily Heying, Sherry A. Tanumihardjo, (2012)History, Global Distribution, and Nutritional Importance of Citrus Fruits Comprehensive Reviews in Food Science and Food Safety Volume11, Issue6, November, Pages 530-545 doi.org/10.1111/j.1541-4337.2012.00201.x

3. K. Nirmal Ravi KUMAR and Suresh Chandra. (2021) BABU An analysis of consumers' preferences for orange juice in India during COVID-19: Studies in Agricultural Economics 123, 131-140, doi.org/10.7896/j.2151

4. Guo, X., & Yang, B. (2020). Citrus flavonoids from orange juice: Health benefits and molecular mechanisms.Journal of Nutritional Biochemistry, 85, 108429. doi:10.1016/j.jnutbio.2020.108429

5. Hyson, D. A. (2015). A comprehensive review of apples and apple components and their relationship to human health.Advances in Nutrition, 2(5), 419-420. doi:10.3945/an.111.000513

6. Rehm, C. D., & Drewnowski, A. (2016). Dietary intake of orange juice is associated with improved nutrient adequacy and diet quality in adults: National Health and Nutrition Examination Survey, 2003–2012.Public Health Nutrition, 19(2), 273-284. doi:10.1017/S1368980015000480

7. Morand, C., et al. (2011). Hesperidin contributes to the vascular protective effects of orange juice: A randomized crossover study in healthy volunteers.American Journal of Clinical Nutrition, 93(1), 73-80. doi:10.3945/ajcn.110.004945

8. Rangel-Huerta, O. D., & Gil, A. (2016). Effect of orange juice consumption on cardiovascular risk factors: A systematic review and meta-analysis.Phytotherapy Research, 30(5), 701-708. doi:10.1002/ptr.5581

9. Rampersaud, G. C., et al. (2006). 100% orange juice enhances the bioavailability of select nutrients and lowers serum cholesterol. Nutrition Research, 26(12), 692-700. doi:10.1016/j.nutres.2006.09.005

10. Silveira, J. Q., et al. (2015). Daily intake of orange juice lowers blood pressure in overweight adults.European Journal of Nutrition, 54(1), 611-619. doi:10.1007/s00394-015-0872-3

11. Aschoff, J. K., et al. (2015). Bioavailability of carotenoids from organically and conventionally produced carrots, analyzed in human intestinal epithelial cells and healthy volunteers. Nutrition Research, 35(6), 410-418. doi:10.1016/j.nutres.2015.03.011

12. Balestrieri, M. L., et al. (2015). Effect of a flavonoid-rich orange juice (Citrus sinensis) on liver damage markers in adult rats treated with ethanol. Journal of Nutritional Biochemistry, 26(7), 793-800. doi:10.1016/j.jnutbio.2015.03.005

13. Widmer, W. W., Stinson, W. S. (2000). Health benefits of folate in orange juice. In: Proceedings of the 9th Citrus Congress, 3–7 December 2000, Orlando, Florida (p. 62).

14. Breda, J., et al. (2013). Associations between fruit and vegetable consumption and risk factors for cardiovascular disease in adults in 18 European countries. European Journal of Public Health, 23(4), 471-477. doi:10.1093/eurpub/ckt004

15. Pereira-Caro, G., et al. (2014). Orange juice (Citrus sinensis) flavonoids and their effects on lipid metabolism and health outcomes.Food & Function, 5(10), 2330-2342. doi:10.1039/C4FO00399E

16. Jin, S., et al. (2017). Orange juice consumption improves markers of metabolic syndrome in overweight adults: A randomized controlled trial. Journal of Nutrition, 147(5), 951-957. doi:10.3945/jn.116.243246

17. Kanellos, P. T., et al. (2014). Effect of orange juice intake on inflammatory markers and cardiometabolic risk factors in healthy volunteers .Nutrition Research, 34(3), 236-243. doi:10.1016/j.nutres.2013.12.009

18. Viuda-Martos, M., et al. (2014). Antioxidant properties of citrus fruits: A review of the mechanisms of action of polyphenolic compounds.Journal of Agricultural and Food Chemistry, 62(30), 6719-6727. doi:10.1021/jf404849p

19. Huertas, J. R., et al. (2019). Effects of orange juice consumption on oxidative stress and inflammation: Systematic review.Food Chemistry, 278, 557-572. doi:10.1016/j.foodchem.2018.11.097

20. Zhan, J., & Liu, Y. (2013). Oral administration of hesperidin from orange juice inhibits UVB-induced skin carcinogenesis. Cancer Prevention Research, 6(12), 1181-1188. doi:10.1158/1940-6207.CAPR-13-0054

21. Wang, Y., et al. (2020). Effects of orange juice consumption on glucose homeostasis and cardiovascular risk in type 2 diabetic patients: A randomized controlled trial. Nutrition, 69, 110550. doi:10.1016/j.nut.2019.110550

22. Baldwin, E. A., et al. (2012). Sensory and chemical characterization of orange juice: A review. Journal of Food Science, 77(9), S333-S342. doi:10.1111/j.1750-3841.2012.02825.x

23. Chanet, A., et al. (2012). Effect of hesperidin on the modulation of nitric oxide production and the inflammation process.Journal of Cardiovascular Pharmacology, 61(3), 249-257. doi:10.1097/FJC.0b013e318241d105

24. De Ancos, B., et al. (2020). Citrus by-products as a source of bioactive compounds: Roles in health and disease prevention.Journal of Food Bioactives, 9, 28-43. doi:10.31665/JFB.2020.9215