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The Role of Exotic Fruits in Modern Diets: Health Benefits and Nutritional Value

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Review Article

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ABSTRACT

Exotic fruits, once restricted to certain regions of the world, have gained global popularity due to their unique flavor, bright color, and exceptional nutritional profile. These fruits, including acai berry, dragon fruit, kiwifruit, and mangosteen, are increasingly being incorporated into modern diets due to their potential health benefits. Rich in essential vitamins, minerals, and antioxidants, exotic fruits are associated with improved immunity, heart health, and digestive health. Additionally, many exotic fruits are valued for their high fiber content, anti-inflammatory properties, and role in combating oxidative stress, which is important for disease prevention. This research explores the growing role of exotic fruits in dietary trends, emphasizing their contribution to nutrition and health. Through examining their nutritional value, bioactive compounds, and the specific benefits they provide, it becomes evident that these fruits can play an important role in increasing dietary diversity and promoting a balanced, health-conscious lifestyle. As consumer demand for exotic fruits grows, incorporating them into the everyday diet serves as both a culinary trend and a nutritional strategy to address modern health challenges.

Keywords: Bioactive compounds; commercial cultivation; exotic fruits; health benefits; nutritional benefits.

1. INTRODUCTION

The term "exotic fruits" describes those mouthwatering fruits that are native to a distant nation, particularly one with a tropical climate. Thus, in certain places, exotic fruits are also referred to as tropical fruits. To put it briefly, these are unique to particular parts of the world and may not be grown everywhere; instead, they are imported from those areas so that other people can also sample them. More nations are now engaged in growing these fruits domestically in an effort to lessen the drawbacks of importing fruit products. People are getting more health conscious and inclined to choose healthier foods these days. Exotic fruits are rich in bioactive components with anti-inflammatory and anti-cancer capabilities, as well as a variety of vitamins and minerals, according to numerous studies. The exotic fruits are also highly praised for their delicious flavor, elegant appearance, and possible health advantages. There are many different kinds of exotic fruits, such as creamy durian, crisp kiwis, and spicier cactus pears. Dragon fruit, lychee, kiwi, durian, rambutan, mangosteen, star fruit, feijoa, longan, kiwano, Buddha's hand, cactus pear, pomelo, ackee, and breadfruit are a few of the exotic fruits.

2. RAMBUTAN

The tropical fruit rambutan, scientifically known as *Nephelium lappaceum* L., is a member of the Sapindaceae family. The fruits are round, oval, or circular, has soft, hairy projections that resemble spines and an exterior skin texture like leather [1]. It grows naturally in many tropical regions of South-Eastern Asia, including Malaysia and Indonesia. Commercial cultivation and exportation have spread to nations like India, Singapore, Thailand, Australia, Congo, Madagascar, Syria, and the Philippines, with Malaysia, Thailand, and Singapore being the largest producers and exporters [2,3]. According to a study, rambutan fruits are rich in antioxidants, which can help heal bacterial infections, diabetes, and reduce cellular damage, all of which can lower the risk of cancer [4]. An edible rambutan fruit weighing 100 grams contains 13.9 grams to 20.87 grams of carbs, 0.65 grams to 1.05 grams of protein, 0.21 grams of fat, 38.6 mg to 70 mg of vitamin C, 11 mg of sodium, 7 mg of manganese, 140 mg of potassium, 0.1 mg to 25 mg of iron, 9 mg to 30 mg of phosphorus, 22 mg of calcium, and 0.3 grams to 2.8 grams of fiber [5]. Eating rambutan fruits improves the health of the heart, bones, digestive system, skin, scalp, and hair. Moreover, it helps to avoid high blood pressure. Moreover, it possesses aphrodisiac, anti-cancer, anti-obesity, and anti-hypercholesterolemia qualities [6].

Kiwi Fruit: The oval-shaped fruit known as Actinidia deliciosa, or kiwi, is also known as Chinese gooseberry. Its mesocarp, which is

green in color with purple-black seeds and a pleasant, tangy flavor, is covered with hairy, thin, greenish brown skin. In temperate regions with latitudes between 25°C and 45°C, it grows profusely. Originating in China's Yangtze Valley, it was extensively grown in New Zealand during the 1900s [7,8]. Research indicates that one hundred grams of fresh kiwi fruit has 17.5 grams of carbohydrates, 0.79 grams of protein, 0.07 grams of fat, 0.027, 0.025, 0.341, 0.183, and 0.063 milligrams of Vitamin B1, B2, B3, B4, B5, and B6 in that order. vitamin C (92.7 mg), vitamin A (87 IU), vitamin E (1.47 mg), vitamin K (40.3 µg), calcium (34 mg), magnesium (17 mg), iron (0.31 mg), phosphorous (34 mg), copper (0.13 mg), and zinc (0.14 mg) Rhythm Kalsi et al., [9]. Actinidin, a proteolytic enzyme that facilitates protein digestion, is abundant in kiwifruits. Because anti-platelets factor is present, it provides cardioprotective properties that help prevent cardiovascular illnesses. The fiber in question aids in lowering blood cholesterol levels in the fruit. The inclusion of potassium, vitamin C, vitamin E, and beneficial polyphenols also lowers blood triglyceride levels. A combination of vitamin K and amino acids, including glutamate and arginine, can help avoid blood clotting by dilatation of the blood arteries and improved blood flow. Additionally, it demonstrates some laxative qualities, resulting in softer, looser feces with a larger volume. Copper stops premature graying, vitamin C stops hair loss, and Omega 3 fatty acids keep hydration in the hair. It also possesses antimicrobial, anti-inflammatory, and anti-diabetic qualities [10,11].

Dragon Fruit: Dragon fruit are native to Central America and southern Mexico and are now grown all over the world. They are members of the Hylocereus genus and family of Cactaceae. Its exterior layer is scaly and reddish-green or yellow-green, while its juicy inner layer is reddish-purple or white and contains tasty black seeds. Other names for it include red pitaya, belle of the night, night blooming cereus, strawberry pear (*Selenicereus* spp. and *Hylocereus* spp.), pitaya, red pitaya, conderella plant, and kamalam [12]. The crop is becoming more and more well-liked since it needs minimal water and can withstand higher temperatures [13]. The pulp of *Hylocereus undatus* is found to contain a variety of substances in different solvents, including sugars, glucosides, cardiac glycosides, anthocyanins, phenols, steroids, terpenoids, alkaloids, triterpenoids, saponins, tannins, flavonoids, quinones, and coumarins [14]. Along with being high in vitamins, fiber, magnesium, calcium, phosphorus, and antioxidants including betalains and ascorbic acid, the fruit is also high in phytochemicals. Red dragon fruit has anti-diabetic qualities, helps with digestion, reduces blood pressure, which avoids hypertension, and aids in the body's removal of toxins, particularly heavy metal pollutants, thanks to its abundance of vitamins and minerals. Rich in antioxidants, the phytoalbumin found in dragon fruits helps prevent some malignancies, including colon cancer, and also relieves cough and asthma. [15,16] Because the fruit possesses anti-obesity and hypolipidemic qualities, it also aids in preventing atherosclerosis [17].

Durian: The tropical fruit *Durio zibethinus*, is a member of the Bombacaceae family, is indigenous to Southeast Asia and has been grown there for generations. This fruit is not available in most Western countries because of its overpowering sulfurous smell, which makes people feel repulsed nonetheless, it is regarded as "the king of fruits" in Southeast Asian countries, primarily China. Approximately 200 different types of durian are widely grown in Malaysia, as well as in Indonesia, India, the Philippines, Thailand, Madagascar, Sri Lanka, Florida, and Hawaii. The creamy, sweet texture of the durian fruit makes its pulp quite popular. It is eaten either fresh or freeze-dried, and it can also be found in drinks and sweets like cake, jam, and candies [18,19]. It has three to five seeds approximately, encircled with edible, custard-like flesh that most people eat [20]. Overripe durians have higher concentrations of flavonoids, tannins, polyphenols, flavanols, and ascorbic acid than immature durians [21]. Anthocyanin, apigenin, gallic acids, lutein, ascorbic acids, tannins, polyphenols, quercetin, flavonols, and flavonoids are the components of durian fruit [22]. Thai durian types contain higher levels of total carotenoid content than Malaysian ones. Additionally, it preserves cardiac health and possesses a number of medicinal qualities, including anti-inflammatory and anti-diabetic effects [23]. It has been discovered that durian, particularly the Monthong and Chani types, is high in carotene, including alpha- and beta-carotene, as well as linoleic, oleic, palmitoleic, myristic, and stearic acids. s [24].

Passion Fruit: The botanical name for passion fruit is *Passiflora edulis*, and it is extensively grown in tropical and subtropical climates [25]. Scientifically known as Passiflora edulis f. flavicarpa, the yellow passion fruit species is primarily grown in Brazil, Ecuador, and Peru; P.

edulis f. edulis, the violet passion fruit species, is primarily grown in Colombia; and P. alata, the sweet passion fruit, is primarily grown in Brazil. The sweet passion fruit weighs between 192 and 243 grams and has dimensions of 9.6 and 7.1 cm in length, whereas the violet passion fruit is round in shape, about 5 cm in diameter, 42–68 grams in weight, and has a thinner peel than the yellow kind [26]. According to Biswas et al. [27], roughly 100 g of edible passion fruit contains compound such as 23.38 g of carbohydrates, 2.20 g of protein, 0.70 g of total fat, 10.40 g of dietary fiber, 1274 IU of vitamin A, 14 µg of folate, 1.500 mg of niacin, 30 mg of vitamin C, 12 mg of calcium, 348 mg of potassium, 1.60 mg of iron, 68 mg of phosphorus, 29 mg of magnesium, 743 µg of beta-carotene, and 41 µg of beta-crytoxanthine. The antifungal and antibacterial properties of passion fruit protect plants and humans from hazardous pathogenic organisms [28]. Passion fruit has been used as herbal medicine and to cure a variety of illnesses since ancient times. It is believed to have anxiolytic and antidepressant qualities [29,30]. Passion fruit possesses a variety of bioactive qualities, including sedative, hepato and lung protecting, anti-diabetic, anti-hypertensive, antibacterial, and antidepressant effects, according to several pharmacological investigations conducted both *in vitro* and *in vivo* [31].

Avocado: The nutrient-dense avocado (*Persea americana*) is a member of the Lauraceae family of fruits. As the name of the species implies, it originated in America. There are three possible shapes of the fruit egg, spherical, and pear. Its outer covering is thick and uneven, and when ripe, it may turn purple black. Inside, the fruit is smooth, creamy, and tasty, with a big, single seed positioned in the middle [32]. The fruit's abundance of nutrients supports the body's regular operations and guards against a number of harmful illnesses. Avocados contain folate, a naturally occurring form of vitamin B9 that helps reduce the risk of several malignancies, including prostate and colon cancer. Folate reduces depression by halting the rise in homocysteine levels. The presence of vitamin K lowers the risk of osteoporosis by promoting better bone health, which in turn helps to slow down the loss of bone mineral density. Because of the fruit's high potassium content, it has anti-inflammatory qualities, helps with normal digestion, protects the eyes from UV radiation, and delays the onset of muscular atrophy. It also contains lutein and zeaxanthin.

Goji: Goji yields an ellipsoid, orange-red berry that is about 2 cm deep and has a flavor that is both sweet and acidic. The Goji berry belongs to the Solanaceae family, which also includes potato, tomato, and eggplant. It is the fruit of L. *barbarum* and L. *chinense* [33]. It is most frequently utilized in Traditional Chinese Medicine to lessen a variety of medical conditions, such as diabetes and obesity. Goji fruit seems to have potential medicinal uses. for obesity, diabetes, and the issues that follow. In alloxan-induced diabetic rabbits, the crude polysaccharide and purified polysaccharide fractions extracted from goji fruit significantly decreased blood glucose levels, serum total cholesterol, and triglyceride content, and boosted HDL levels. In diabetic rats, it has been discovered that the injection of goji fruit reduced body weight, plasma insulin levels, and the insulin-sensitive index [34]. Strong cardioprotective and antioxidant properties are also present in goji fruit. Moreover, therapy with 10 mg/kg of goji polysaccharide lowers blood glucose, malondialdehyde (MDA), and NO levels. Reis et al. [35].

Accordingly, the research indicates that goji can control glucose metabolism and homeostasis and shield against complications caused by oxidative stress that arise from diabetes Guowen et al. [36].

Mangosteen: *Garcinia mangostana* Linn is a fruit that belongs to the Guttiferae family and is tropical in nature. Mangosteen fruits range in color from dark purple to red purple. The edible fruit of aril is white [37].

It is juicy and supple, with a sweet and somewhat tangy flavor. In addition, it smells good. It is also known as the "queen of fruit". It is a tropical fruit that is prized for its many health advantages as well as its sweet and sour taste. Though it is produced all over the world now, the fruit's popularity is highest in Africa, Australia, and the America. It originated in Southeast Asia. Mangosteen trees require a warm, humid atmosphere to flourish and can reach heights of up to 80 feet [38]. Mangosteen has shown proven for a range of applications and has become an unexplored source of bioactive Natural substances found in abundance in the fruit, including antioxidants and xanthones, have been shown to have a host of health advantages. These bioactive substances have antibacterial, anti-inflammatory, and anti-cancer effects.

Additionally, studies on preclinical and clinical mangosteen extracts and supplements have put forward encouraging results, indicating their potential as therapeutic agents [39]. The bioactive chemicals found in mangosteen have novel prospects for the pharmaceutical, nutraceutical, and cosmetic industries [40]. These breakthroughs lay the groundwork for further advancements and applications of this exceptional fruit. Furthermore, mangosteen has demonstrated promise in bolstering immune system performance, preventing neurological illnesses, and improving cardiovascular health. Mangosteen has a potential bioactive profile, although it is still mostly untapped and unstudied [41]. With only 63 calories per 100 g, mangosteen is low in calories, cholesterol, and saturated fats. It also contains a lot of dietary fiber (100 g provides 13% of RDA). Additionally a strong source of vitamin C, This fruit also has a small quantity of B complex vitamins, which help the body metabolize fats, proteins, and carbohydrates. These vitamins include thiamin, niacin, and folates. It also has a very high concentration of minerals, such as magnesium, manganese, and copper. Potassium is an essential component of bodily fluids and cells because it helps control blood pressure and heart rhythm [42].

3. CONCLUSION

It is concluded that through examining the nutritional value, bioactive compounds, and the specific benefits they provide, it becomes evident that these fruits can play an important role in increasing dietary diversity and promoting a balanced, health-conscious lifestyle. As consumer demand for exotic fruits grows, incorporating them into the everyday diet serves as both a culinary trend and a nutritional strategy to address modern health challenges.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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