



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(5): 2640-2643
© 2023 TPI

www.thepharmajournal.com

Received: 04-03-2023

Accepted: 10-04-2023

Vishal Kumar

Department of Food Technology and Nutrition, School of Agriculture, Lovely Professional University, Phagwara, Punjab, India

Nidhi Selwal

Department of Botany, School of Bioengineering and Biosciences, Lovely Professional University, Phagwara, Punjab, India

A comprehensive examination of underutilized fruits and their potential health benefits

Vishal Kumar and Nidhi Selwal

Abstract

Not only do underutilized fruits provide critical food and nourishment, but they also provide much-needed family income, especially in rural and agricultural communities. However, some of the underutilized fruits have received less attention than commercial fruits. It's possible that this is because they have an unrealistic view of their own worth. Because of this, knowledge of the health benefits provided by underutilized fruit species is crucial for boosting their value and ensuring their continued preservation and sustainable use in fostering improved food, nutrition, health, and livelihood security. The goal of this article is to provide a comprehensive analysis of the phytochemical makeup and biological functions of underappreciated fruits.

Keywords: Biological activity, health benefits, underutilized fruits

Introduction

Plants have long been used for their medicinal and nutritional properties in the treatment of a wide range of conditions. With the rising prevalence of degenerative diseases, these plant-based compounds provide a cost-effective means of disease management. There are fewer negative side effects with these alternatives to existing treatment methods. Safe, inexpensive therapeutic food products may be made from plant components with medicinal qualities thanks to advances in our knowledge of health, nutrition, and safety [Yadav *et al.* 2018] ^[1]. The nutritional and health advantages of fruits make them a crucial food group. Several fruits have comparable qualities but are seldom used to their full potential. Underutilized fruit crops are ones with economic potential but are not cultivated economically, developed on a large scale, or even widely accessible to consumers [Mirfat *et al.* 2018] ^[2]. Several underappreciated fruits native to India will be featured in this research for their nutritional value and potential medical applications in the treatment of a wide range of illnesses.

Loquat (*Eriobotrya japonica*)

Gupta *et al.* (2020) ^[8] found that the loquat, a little fruit with a rounded crown and a short trunk that belongs to the family Rosaceae, helps maintain a healthy immune system by boosting resistance to inflammation, cancer, diabetes, and other disorders. As for nutrients, you may expect to find between 85-92% water, 9.6% carbs, 1% fiber, 0.6% protein, 0.5% minerals, and 0.2% fat. It also contains trace amounts of minerals including iron (0.28-1.40 mg), manganese (0.05-1 mg), copper (0.040 mg), and potassium (266-1216 mg). The phenols, flavonoids, and triterpenes present all have properties that make them useful for treating and preventing cancer, diabetes, inflammation, and skin diseases. Because of these qualities, this fruit is useful in the prevention and treatment of several chronic illnesses [Dhiman *et al.* 2022; Gupta *et al.* 2020] ^[3, 8].

Jamun (*Syzygium cumini*)

The jamun, jambul, jambilao, Java plum, Indian blackberry, and black plum are all popular names for a member of the family Myrtaceae called *Syzygium cumini* (L.). It has 70 mg of protein per 100g fw, 11 mg of sodium per 100g fw, 172 mg of potassium per 100g fw, 172 mg of calcium per 100g fw, 0.46 mg of zinc per 100g fw, 4.66 mg of iron per 100g fw, 27.1 mg of magnesium per 100g fw, 1.8 mg of copper per 100g fw, 0.2 mg of manganese per 100g fw, 0.29 mg [Madani *et al.* 2021; Qamar *et al.* 2022] ^[6, 7]

Corresponding Author:

Vishal Kumar

Department of Food Technology and Nutrition, School of Agriculture, Lovely Professional University, Phagwara, Punjab, India

Black Plum (*Vitex doniana*)

The Verbenaceae family is where you'll find *Vitex doniana*. It dominates the savannah as the most numerous and spreading member of its genus. It is a tree of the deciduous woods found along the coast, in river valleys, and in lowland and highland forests and grasslands. Black plums contain 487 g/kg of water, 289 g/kg of carbs, 67 g/kg of fiber, 72 g/kg of proteins, 52 g/kg of ash, and 30 g/kg of fat, according to a nutritional study. Minerals such as potassium (8800 mg/kg), phosphorus (2000 mg/kg), calcium (3200 mg/kg), magnesium (720 mg/kg), sodium (1000 mg/kg), and nitrogen (22720 mg/kg) are also present. Additionally present are the phytochemicals alkaloids, flavonoids, saponins, tannins, steroids, terpenoids, and cardiac glycosides [Agbede and Ibitoye 2006; Imoisi *et al.* 2021]^[4, 5].

Velvet Apple (*Diospyros blancoi*)

The velvet apple tree, or mabolo tree, *Diospyros blancoi*, is endemic to the Philippines and is found across the tropics and milder parts of the temperate globe. (Setu *et al.* 2017)^[11]. Mabolo fruit nutrition facts (Hung *et al.*, 2016)^[12]. Hung *et al.* 2016^[12] the wetness was present, as shown by: Ash: 0.8 grams, calories: 62 kilocalories/100 grams, Protein: 84.4 grams/100 grams Carbohydrate content (13.8 g per 100 g); Glucomannan (g/100g) Calories (kcal/100 g), Protein (g/100 g), and Fat (g/100 g) all add up to 3.2.5.4%; crude fat 0.6%; glucose 1.4% Fructose (g per 100g) 1.9 Choline chloride (mg/100 g):62.52; Malic acid (mg/100 g):227.1; Fumaric acid (mg/100 g):4.5; Zinc (mg/100 g):3.6; Tannin acid (mg/100 g) (Akter *et al.*, 2015)^[13].

Cluster Fig (*Ficus racemosa*)

In the family Moraceae, you'll find the rather big Cluster Fig Tree, Indian Fig Tree, Goolar (Gular) Fig, or *Ficus racemosa* (Linn). The original locations of this plant are in Australia, Malaysia, South-East Asia, and the Indian Subcontinent. Many of India's woods and hilly areas are home to the *Ficus racemosa* tree. It's a common sight everywhere there's water, and it's also cultivated. This plant is common along riverbanks and in inland woodlands anywhere in India, Sri Lanka, Pakistan, Queensland, South China, or New Guinea between plains and 1500 m. This plant may reproduce both vegetatively and sexually (through seeds). *Ficus racemosa* Linn. phytoconstituents. Sterols, tannins, flavonoids, triterpenoids (Lanosterol), and alkaloids may all be found in the leaf. Tannin, wax, saponin, gluanol acetate, -sitosterol, leucocyanidin-3-O--D-glucopyranoside, leucopelargonidin-3-O--D-glucopyranoside, leucopelargonidin-3-O--L-rhamnopyranoside, lupeol, ceryl behenate, lupeo Fructose, tiglic acid, esters of taraxasterol, lupeolacetate, friedelin, higherhydrocarbons, and other phytosterols may all be found in fruit, as can gluanol, gluanol acetate, hentriacontane, -

sitosterol, gluanolacetate, and glucose. The bark contains euphorbol and its hexacosanate, ingenol and its triacetate, and taraxerone [Mall 2017; Bhalerao *et al.* 2014; Ahmed and Urooj 2011; Ahmed *et al.* 2010]^[17, 18, 19, 20], whereas the root contains Cycloartenol, euphorbol, and its hexacosanoate, taraxerone, and tinyatoxin.

Bael (*Aegle marmelos*)

The Indian medicinal plant bael (*Aegle marmelos* (L.) Corr.), which has remarkable traditional benefits against a wide variety of illnesses, has yielded a large number of bioactive compounds, many of which have been isolated. The Bale fruit tree, also known as the Bael (*Aegle Marmelos* (Linn), family Rutaceae, is a small to medium-sized tree that is native to the deciduous woods of India, the western Himalayas (at altitudes of up to 1200 metres), and Andaman Island. Skimmianine, Aegeline, Lupeol, Cineol, Citral, Citronella, Cuminaldehyde, Eugenol, and Marmesinine were all extracted from different portions of *Aegle marmelos*. Skimmianine, Fagarine, and Marmin may be found in the bark, whereas Marmelosin, Luvangetin, Auraptin, Psoralen, Marmelide, and Tannin can be found in the fruit [Hazra *et al.* 2020; Sarkar *et al.* 2020]^[14, 15].

Kafal (*Myrica esculenta*)

Kafal trees are grown in the 1000–2000 m (3,000–6,600 ft) altitude range of Nepal and northern India. Referred to in the scientific literature under the names *Myrica nagi* and *Myrica integrifolia*. The Kafal tree, also known as Kaiphala or Kaphala, has medicinal properties, as attested by the ancient Sanskrit language. Kafal matures into an ellipsoid shape with a deep red color. The outside of the fruit is bright red, exactly like a raspberry, but within is a single huge, spherical seed. Ripe fruits have an acidic flavor, whereas sour ones taste unripe. There is a temporal restriction on their availability. The fruit is a spherical drupe that is juicy on the outside and firm in the inside. The wide canopies of Chir pine woods are ideal for growing Kafal trees. Asthma sufferers may find relief by eating the fruit. The fruit may be used to make squash, syrup, and jam. Helps with a variety of digestive issues, such as bloating, flatulence, heartburn, and ulcers. Fruit blossom oil is used to treat both diarrhea and paralysis. Riboflavin, thiamine, carotene, Vitamin C, Vitamin E, iron, and OPCs (Oligomeric Proanthocyanidins) are just some of the vitamins, minerals, and antioxidants that may be found in abundance in kafal. It cures stomach and brain aches in addition to addressing anemia and lung problems. Cancer and diabetes-causing free radicals are successfully neutralized [Gusain and Khanduri 2016; Kataria *et al.*; Sood and Shri 2018]^[22, 23, 24].

The following table describes the potential health benefits of all the underutilized fruits described in this review.

Table 1: Potential health benefits of underutilized fruits

Common name	Scientific name	Health benefits	References
Loquat	<i>Eriobotrya japonica</i>	Human EJ bladder cancer cells proliferation, migration, and invasion are significantly inhibited by an ethanolic extract of loquat fruit skin, which also increases ERK 1/2 phosphorylation and inhibits MMP-9 by downregulating NF-kB, AP-1, and Sp1 transcription factor bindings.	Shin <i>et al.</i> 2017 [9]
Jamun	<i>Syzygium cumini</i>	<i>S. cumini</i> crude and methanol extracts were tested for their cytotoxic effects on SiHa (uterine carcinoma) and HeLa (cervical cancer) human cancer cells in culture. Both cancer cell lines experienced dose-dependent cell death. HeLa cells were more susceptible to the extracts than SiHa cells. More apoptosis was induced in HeLa cells by the 50% aqueous methanol fraction than in SiHa cells.	Barh and Vishwanathan 2008 [10]
Black plum	<i>Vitex doniana</i>	<i>Salmonella typhi</i> , <i>Shigella dysenteriae</i> , and <i>Escherichia coli</i> were all killed by a methanolic extract of <i>V. doniana</i> stem bark and hence have anti-bacterial properties.	Kilani 2006 [21]
Bael	<i>Aegle marmelos</i>	In a 96-hour plaque inhibition study, marmelide extracted from bael inhibited the growth of coxsackieviruses B1-B6. Antiviral activity was observed in the extract without apparent harm to the host cells.	Badam <i>et al.</i> 2002 [16]
Cluster fig	<i>Ficus racemosa</i>	The anti-diabetic efficacy of several <i>F. racemosa</i> parts was tested in alloxan/streptozotocin-induced diabetic rats/rabbits. An aqueous extract equal to 15 g of <i>F. racemosa</i> bark powder reduced blood glucose in both normal and diabetic rabbits by 13.3% and 18.8% after 18 and 48 hours of fasting, respectively.	Ahmed and Urooj 2011 [19]
Velvet Apple	<i>Diospyros blancoi</i>	Diarrhea, dysentery, aphthous stomatitis, snakebites, heart problems, hypertension, spider bites, stomach aches, diabetes, and eczema are only few of the conditions traditionally treated with this herb.	Akter <i>et al.</i> 2015 [13]
Kafal	<i>Myrica esculenta</i>	Natural antioxidants, like those found in <i>M. esculenta</i> fruit extract, may fight against free radical damage, and keep diseases at bay.	Rawat <i>et al.</i> 2011 [25]

Conclusion

It is feasible to increase interest in underutilized fruits that have a good nutritional profile and bioactive components but are not economically grown. Research into the possible therapeutic properties of these underutilized fruits is possible. The treatment of diseases and conditions connected to poor nutrition may benefit from a more thorough understanding of the potential of underutilized fruits.

References

- Yadav M, Srilekha K, Maheswari KU. Potential health benefit of underutilized fruits: A review. *Journal of Pharmacognosy and Phytochemistry*. 2018;7(5):1417-20.
- Mirfat AH, Amin I, Kartinee KN, Muhajir H, Shukri MA. Underutilised fruits: A review of phytochemistry and biological properties. *Journal of Food Bioactives*. 2018 Mar 31;1:2-30.
- Dhiman A, Suhag R, Thakur D, Gupta V, Prabhakar PK. Current status of Loquat (*Eriobotrya japonica* Lindl.): Bioactive functions, preservation approaches, and processed products. *Food Reviews International*. 2022 Nov 1;38(sup1):286-316.
- Agbede J, Ibitoye A. Chemical composition of black plum (*Vitex doniana*): An under-utilized fruit. *J Food Agric Environ*. 2006, 5.
- Imoisi C, Iyasele JU, Imhontu EE, Orji UR, Okhale SA. Phytochemical and antioxidant capability of *Vitex doniana* (Black plum) fruit. *Journal of Chemical Society of Nigeria*. 2021 Feb 6;46(1).
- Madani B, Mirshekari A, Yahia EM, Golding JB, Hajivand S, Dastjerdy AM. Jamun (*Syzygium cumini* L. Skeels): A promising fruit for the future. *Horticultural Reviews*. 2021 Apr 2;48:275-306.
- Qamar M, Akhtar S, Ismail T, Wahid M, Abbas MW, Mubarak MS, *et al.* Phytochemical Profile, Biological Properties, and Food Applications of the Medicinal Plant *Syzygium cumini*. *Foods*. 2022 Jan 28;11(3):378.
- Gupta P, Priyanka K, Sivanand C. Loquat. *Antioxidants in Fruits: Properties and Health Benefits*, 2020, p. 577-592). Springer, Singapore.
- Shin SS, Hwang B, Lee SB, Kim WJ, Moon SK. Ethanol extract of loquat fruit skin inhibits the proliferation and metastatic potential of EJ human bladder carcinoma cells. *Animal Cells and Systems*. 2017;21(5):323-331.
- Barh D, Viswanathan G. *Syzygium cumini* inhibits growth and induces apoptosis in cervical cancer cell lines: A primary study. *Ecancermedical science*. 2008;2:83.
- Setu JK, Akhter A, Rahman R, Moriam Islam M, Koly MN, Amran MS, *et al.* Study on Antioxidant and Cytotoxic Activities of Methanolic and Ethyl Acetate Extracts of Peel and Seed of *Diospyros blancoi*. *Annual Research & Review in Biology*. 2017;21(5):1-9.
- Hung SF, Roan SF, Chang TL, King HB, Chen IZ. Analysis of aroma compounds and nutrient contents of mabolo (*Diospyros blancoi* A. DC.), an ethnobotanical fruit of Austronesian Taiwan. *Journal of Food and Drug Analysis*. 2016;24:83-89
- Akter S, Majumder T, Karim R, Ferdous Z, Sikder M. Analgesic activities of *Geodorum densiflorum*, *Diospyros blancoi*, *Baccaurea ramiflora* and *Trichosanthes dioica*. *Journal of Pharmacognosy and Phytochemistry*. 2015;4(3):209-214
- Hazra SK, Sarkar T, Salauddin M, Sheikh HI, Pati S, Chakraborty R. Characterization of phytochemicals, minerals and in vitro medicinal activities of bael (*Aegle marmelos* L.) pulp and differently dried edible leathers. *Heliyon*. 2020 Oct 1;6(10):e05382.
- Sarkar T, Salauddin M, Chakraborty R. In-depth pharmacological and nutritional properties of bael (*Aegle marmelos*): A critical review. *Journal of agriculture and food research*. 2020 Dec 1;2:100081.
- Badam L, Bedekar S, Sonavane KB, Joshi SP. In vitro antiviral activity of bael (*Aegle marmelos* Corr) upon. *J commun. Dis*. 2002;34(2):88.
- Mall TP. Diversity of under-utilized plants for nutrition and health from Bahrach (UP), India. *International Journal of Tropical Agriculture*. 2017;35(1):69-88.
- Bhalerao SA, Verma DR, Teli NC, Didwana VS, Thakur

- SS. *Ficus racemosa* Linn.: A comprehensive review. Journal of Applicable Chemistry. 2014 Jun;3(4):1423-31.
19. Ahmed F, Urooj A. Pharmacognostical studies on *Ficus racemosa* stem bark. Pharmacognosy Journal. 2011 Jan 1;3(19):19-24
20. Ahmed F, Asha MR, Urooj A, Bhat KK. *Ficus racemosa* bark: nutrient composition, physicochemical properties and its utilization as Nutra tea. International Journal of Nutrition and Metabolism. 2010;2(2):33-9.
21. Kilani AM. Antibacterial assessment of whole stem bark of *Vitex doniana* against some enterobacteriaceae. African journal of biotechnology. 2006, 5(10).
22. Gusain YS, Khanduri VP. *Myrica esculenta* wild edible fruit of Indian Himalaya: need a sustainable approach for indigenous utilization. Eco Env Cons. 2016 Apr;22:S267-70.
23. Kataria P, Bhardwaj A, Rathore T, Thakur R, Singh R. Potential of Underutilized and Neglected Local Fruits of Uttarakhand: A Review.
24. Sood P, Shri R. A review on ethno medicinal, phytochemical and pharmacological aspects of *Myrica esculenta*. Indian Journal of Pharmaceutical Sciences. 2018 Feb 28;80(1):2-13.
25. Rawat S, Jugran A, Giri L, Bhatt ID, Rawal RS. Assessment of antioxidant properties in fruits of *Myrica esculenta*: A popular wild edible species in Indian Himalayan region. Evidence-Based complementary and alternative medicine; c2011.