Ficus virens Aiton: an unexplored leafy vegetable

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Abstract: Wild plants and their products have made significant contributions to the human diet since ancient times. Among them, wild leafy vegetables play a major role in meeting the nutritional requirements of the tribal and local populations. Leafy vegetables not only provide food quantity but also make a significant contribution to the population's nutrition throughout the year. *Ficus virens* is one such species that is used as traditional food and medicine by tribal communities as a wild leafy vegetable. There is less documentation available on it. Therefore, keeping this in mind, an attempt has been made to gather information about *F. virens* in various aspects from field and literature surveys. A survey revealed that the tender leaves or new foliage of *F. virens* are used in food, medicinal, and economic aspects. It needs proper documentation in a scientific way for value addition.

Keywords: *Ficus*, leafy vegetables, nutraceuticals, traditional knowledge

Introduction: Throughout the world, accelerated growth of the population has resulted in scarcity of food accessibility and availability. Taking this problem in consideration, exploration, identification, and utilization of lesser-known leafy vegetables is important as it could play a prominent role

in satiating the hunger of the world's expanding population (Sheela et al. 2004; Noor and Satapathy 2023). Wild plants and their products make significant contributions to the human and animal food web. They are often a means of survival for millions of poor rural households. Wild leafy vegetables are an important constituent of the traditional diets of tribal communities (Raghuvanshi et al. 2001). These leaves are high in nutrients and medicinal values. It plays a crucial role in ensuring food security during times of famine and poor harvest (Jana 2007; Mallick et al. 2020). The tribal people collect various species of edible leaves from their agricultural fields, non-agricultural fields, and forest areas (Parida and Mahalik 2020). These edible wild plants are an important source of food and medicine in their routine lives and ensures food security for them. Often, they also earn their livelihood by selling those leafy vegetables in the local market, boosting their socio-economic standard (Horo and Topno 2015). There are still many unexplored leafy vegetables in their natural habitat with hidden nutritional and medicinal values exist that need identification and commercialization to solve the menace of food problems (Noor and Satapathy 2023). For the reasons, genus *Ficus* plays an important role in the ecosystem and providing food & medicines for humans since long. *Ficus* L. (commonly known as Fig) is the largest genus in Moraceae, with about 870 species of trees, shrubs, climbers, and creepers occurring in the tropical and subtropical ecosystems of the world as keystone species. Its fruits are eaten by insects, birds, and animals throughout the year (Dubey et al. 2019; Kumar et al. 2022). *Ficus virens* from this family is one such species that not only provides fodder for animals, but also used as a vegetable by many tribal communities, which is an unexplored food plant. The authors have presented here its food, medicinal, and pharmacological values, along with future aspects.

Morphology: *F. virens* or White fig belongs to the family Moraceae. Commonly it is known as Pilkhan, Pakad, or Pakhad tree, and in Odisha it is known as Putkal saag (Plate 1). It is a medium-sized tree that grows to the height of 24-27 meters. It has a very large and spread canopy. The leaves are 8-9 cm long and 3-6 cm wide. New leaves appear in the month of March with purple, red, and bronze hues which give mesmerizing look to the whole trees. The leaves of this deciduous species are spiral-arranged, hairless, and have entire laminas that can be egg-shaped oblong, or elliptical (Saxena and Brahmam 1995; Patel et al. 2023). Sometimes, it grows as a hemi-epiphyte that can germinate on the host plant and later establishes its root in soil.



Plate 1: Vegetative parts of Putkal Sag (*F. virens*)

F. virens is found in coastal, monsoon, or savannah forests, on cliffs, and in secondary rainforests (Berg and Corner 2005). It is normally found in India, Southeast Asia, Malaysia, and Northern Australia.

Food Values: The new foliage of *F. virens* is collected by the tribal communities during the winter season since the mature leaves are not appropriate for human consumption. They prepare side dishes like curry or chutney from the leaves and eat it with rice. In Thai culture, it is consumed as a cuisine called Phak Lueat. It also eaten by boiling as vegetable (https://en.wikipedia.org/wiki/Thai_cuisine). The fruits of *Ficus virens* are edible and can be consumed in ripened or dried form. The ripened fruits are also eaten in the form of jam (Mahapatra and Panda 2012; Patel et al. 2023).



Plate 2: A tribal woman selling Putkal Sag in Odisha state, India

Economic Values: Nowadays economic aspects of all single essential things link with sustainability. Therefore, the study of wild edible plant and nutraceuticals gets focused and are in high demand in global market. In rural communities, these wild edible plants are not only the food source but also boosts the financial stability of the family. Nonetheless, this wild leafy vegetable is still unexplored and is limited to the tribal market only. The new foliage is sold in the local market for a value of 20 rupees per leaf bowl and 80 to 100 rupees per Kg (Present study; Plate 2).

Ethnomedicinal Value: *F. virens* is used in treating various diseases and provides many health benefits. For instance, ripened fruit is helpful for indigestion (Mon et al. 2020). Soup made with the fruits of *F. virens* gives relief in urinary disease, and reduces excess sweating. Grounded tender leaves and fruits and the juice is taken against diabetes (Devi et al. 2022). It is also used as poultice, and has estrogenic, hepaprotective, intrinsic, anti-haemorrhage, anti-erysipelas, and wound healing properties. The white latex of the tree when applied on sore sites reduces inflammation. The ripened fruits can be eaten in the form of jam mixed with jaggery or sugar to cure heart-related diseases. The dried fruits are called figs which have many medicinal properties. The ripe fig or the cluster fig can be roasted over fire and taken with salt to treat fever. The bark has astringent properties. An infusion of bark is used as mouth wash in spongy gum condition (Murugan et al. 2013; Ramadevi et al. 2014). Decoction of bark is used in blood diseases, menstrual disorders, leucorrhoea, and diabetes. Paste from the bark is used in burning sensation, rheumatism and in bone fracture. Bark is also useful in treating diarrhoea, menorrhea, nervous disorder, vaginal diseases, hyperlipidaemia, hallucination, dysentery, vertigo etc. (Khan et al. 2011; Kumar et al. 2012).

Pharmacological Values: Very limited research has been done on the pharmacological activities of *F. virens*. It has been found that in *F. virens* exhibits a wide range of biological actions including antioxidant, anti-inflammatory, antibacterial, anti-diabetic, and anticancer characteristics. Its leaf shows antioxidant, anti-inflammatory, antidiabetic, and hepatoprotective properties (Orabi and Orabi 2016; Ramadevi et al. 2014). It has also been found that the extract of *F. virens* improves insulin sensitivity (Nugraha et al. 2018). The bark extract showed antifungal, antibacterial, anti-inflammatory, and anticancer properties (Figure 1).

Phytochemicals present: Phytochemicals found in *F. virens* include phenolics, flavonoids, tannins, terpenoids, alkaloids, and glycosides. These chemicals have been demonstrated to exhibit a wide range of biological actions, including antioxidant, anti-inflammatory, antibacterial, anti-diarrhoeal, anti-diabetic, and anticancer characteristics. Quercetin, kaempferol, luteolin, myricetin, catechin, epicatechin, rutin, gallic acid, ellagic acid, betulinic acid, sitosterol, stigmasterol, and lupeol are some of the phytochemical elements found in *F. virens* (Chandira et al. 2010; Shi et al. 2011). These compounds have been researched for their potential therapeutic uses and are known to exhibit a wide spectrum of biological functions (Patel et al. 2023).



Figure 1: Pharmacological values of Putkal Sag

Future Aspect: As per the reports indicate, *F. virens* has several ethnomedicinal, ayurvedic, pharmacological as well as food values. However, the reports need to be validated and detailed investigations on the

composition and pharmacological significance of this wild leafy vegetable must be conducted. This leafy vegetable is in dire need of commercialization so that the urban people can also get benefited from this wild edible plant species. Based on the dietary bioactivities, this evaluation additionally highlights the capacity utilization of this leafy vegetable. Multidisciplinary research interventions have facilitated the conversion of underutilized leafy vegetable into healthy ingredients in the food sector. Different parts of the plant are also rich in several phytochemicals such as quercetin, kaempferol, luteolin, myricetin, catechin, epicatechin, rutin, and gallic acid. Further exploration these phytochemicals can lead to discovery of new drugs in coming future. Advanced analytical techniques must be used to authenticate the secondary metabolites found in this plant species to validate its quality and biological potential. Additional scientific studies on *F. virens* or other unexplored plants can contribute effectively to G20 goal of sustainable development.

Conclusion: Modern civilization and industrialization have become biggest threat to the biodiversity. Uncontrolled increase in the population is further aggravating the world's food accessibility and availability issues. Young and tender leaves of *F. virens* has significant good amino acid profile, a significant amount of minerals and vitamins, and has richness in phytoconstituents. It could be a better option for our dietary system and for economic purposes as well. To encourage this crop there is a need to enlighten the local inhabitants on its food, clinical and commercial importance, and uses. This *Ficus* species also provides food and habitat to many birds or other organisms. It also has ecological aspects that contribute for healthy and fresh environment. Proper knowledge and conservation practices are required to conserve this native species.

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