

Nutraceutical Importance of an Underutilized Wood Apple Fruit

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SUMMARY

Wood apple an underutilized and climate resilient fruit crop which can tolerate extreme dry conditions. It has contains good nutraceutical and medicinal value. This article deals with several information on wood apple botany, origin, distribution, nutraceutical value, medicinal uses, traditional value and other several processed products which can be made from it. Seeing this multipurpose uses and climate resilience it can be promoted for cultivation in the dryer and unutilized or barren lands.

INTRODUCTION

Underutilized fruits are important source of minerals, vitamins, proteins, antioxidants and many other essential nutrients required for better health. India is rich source of underutilized fruit with good nutraceutical value and many of the fruits whose distribution, traditional ITK (Indigenous Traditional Knowledge), medicinal and nutraceutical potential has not been explored yet. Wood apple is underutilized fruit which has several in different languages such as Elephant apple (English), Hindi (Barnahi billan, Barnasi, Beli), Aranamullu, Aruna mullu (Kannada) Cerukattunarakam, Cherrukatnarragam (Malayalam), Kauth, Kavat, Kaveet, Kovit, Sit-ranlimbi (Marathi), Kapithah, Akshasasya, Atha, (Sanskrit), Narivila, Nilavila, Vilaa, Vilanga (Tamil), Kapithhamu, Parupuvelaga, Pulivelaga (Telugu) and Kaitha (Urdu). Beside this, it also have other names i.e. elephant apple, monkey fruit, curd fruit, and kath bel. The scientific name of wood apple is *Feronia limonia* Swingle and has different synonyms, which are as *Limonia acidissima* L.; *F. elephantum* Correa; and *Schinus limonia* L. In the rutaceae family it is only species which is highly drought and salt tolerant and prefers to grow well under dry climate for optimum flowering and fruiting. Hence it can be grown in drought prone and semi-arid regions. It can also be grown in fallow and barren waste land.

Uses

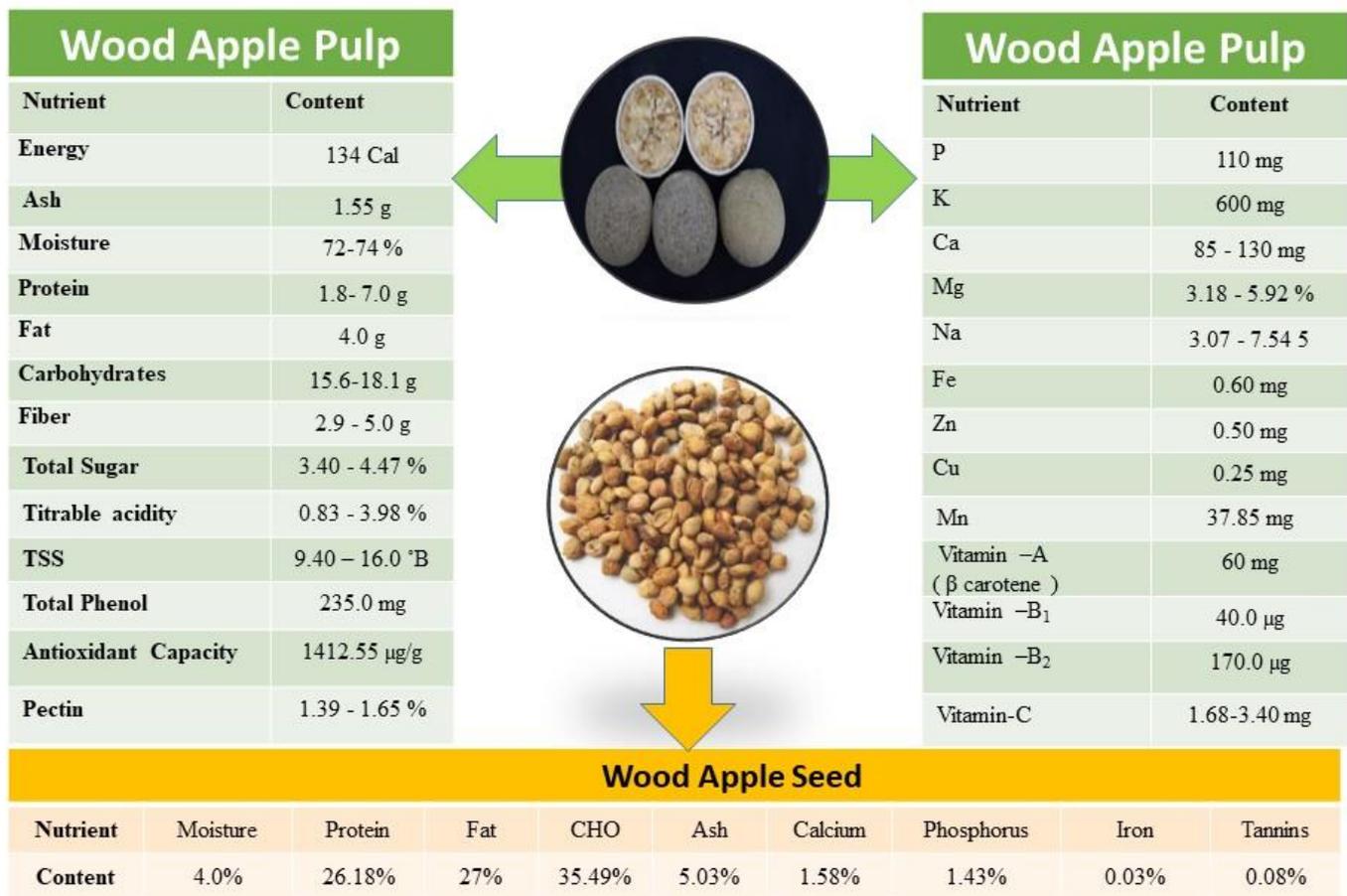
Wood apple an underutilized fruit has diverse range of uses such as nutraceutical, medicinal and traditional uses. The fruit pulp is good source of phytochemicals i.e. amino acids, coumarins, minerals, polyphenols, phytosterols, saponins, vitamins, tri-terpenoids, tannins, tyramine derivatives, etc. (Dar et. al., 2013). It has diverse uses in Indian traditional system of medicine, to cure different diseases like asthma, cardiac debility, dysentery, diarrhea, tumors, wounds, hepatitis and (Ilango and Chitra, 2009). The medicinal and traditional uses of different plant parts are mentioned in Table 1.

Table 1. Medicinal and traditional uses of wood apple plant parts

Plant Part	Category	Uses
Tree	Medicinal uses	The heartwood contains ursolic acid which can used as an alternative medicine for the treatment and prevention of cancer, obesity/diabetes, cardiovascular disease, brain disease, liver disease, and muscle wasting (sarcopenia) (Seo et al., 2018). The wood also contains flavanone glycoside which has significant antioxidant activity, anticancer and antitumor activity, hepatoprotective activity, anti-inflammatory activity, anti-diabetes activity, antiviral activity, antibacterial and antifungal activity, and other biological effects (Xiao et al., 2016).

	Traditional uses	Wood of the tree used in agricultural implements, construction, carving, fuel, patternmaking, rollers for mills, rulers and other products.
Bark	Medicinal uses	The pulverized or decoction form bark of the tree is used to cure biliousness. The bark extract is used to prevent sun burn. In Ayurveda bark is used to cure snake bites
Leaves	Medicinal uses	<ul style="list-style-type: none"> • The woodapple leaves reduces inflammation, and help in treating ulcers. • The leaves juice also used as massaged on the skin rashes caused by biliousness. • The leaves used to prevent and treat cold and other respiratory disorders. • Leaf infusion is an effective remedy for peptic ulcers • In Ayurveda leaves is used to cure snake bites
	Traditional uses	<ul style="list-style-type: none"> • People use wood apple leaves on festival • The young leaves juice + milk + sugar candy is given as a remedy for biliousness and intestinal troubles of children
Fruit	Medicinal uses	<ul style="list-style-type: none"> • Used to treat certain cardiac problems, relieving sore throats, chronic coughs, blood purify, stone problem, diabetes and used as liver tonic. • It also cures skin cancer, Jaundice and gastropathy • The mature fruit pulp can also be used to cure stomach problems in children. • The half-ripe fruit is most effective remedy for treatment of dysentery. • The mashed pulp is used to treat diarrhea or piles. • It contains carotene, which is helpful for the Cataract patient. • Wood apple juice maintain body temperature and protect from too hot air during summer season.
	Traditional uses	<ul style="list-style-type: none"> • The fruit's shell is fashioned into snuffboxes and other small containers • The fruit rind yields oil that is popular as a fragrance for hair; it also produces a dye used to colour silks and calico • The wood apple's pulp has a soap-like action, which resulted in it being used as a household cleaner for hundreds of years. • Coconut oil when boil in outer shell of fruit is used to cure to dandruff
Root	Medicinal uses	<ul style="list-style-type: none"> • The root is used to cure several ear problems • In Ayurveda root is used to cure snake bites. • The decoction of root is used to cure cholesterol and blood pressure.
Seed	Traditional uses	The sticky substance around the unripe seeds is a household glue and also use in jewellery making.
Gum	Medicinal uses	<ul style="list-style-type: none"> • The gum of wood apple is known as Feronia gum and this is used to remove intestine bacteria, diarrhea and dysentery • Gum is also used to cure diabetes
	Traditional uses	<ul style="list-style-type: none"> • The gum of the trunk and branches is used as glue. • The gum of the wood apple is mixed with lime and used to treat waterproof wells and walls. • Gum is also used to protect oil paintings when added as a coat onto the canvas.

Wood apple contains significant amount of anti-oxidants, proteins, vitamins (Vitamin A, Vitamin B₁ and Vitamin B₂), minerals which are described in figure 1 whereas different plant parts of the *F. limonia* tree have excellent therapeutic and functional properties.



Source: Hiwale (2006), Poongodi et al., (2013), Shukla and Singh (2008), Singh et al., (2018). <http://foodmagazines1.blogspot.com>, <https://biowellbeing.com>, Anitha et al., (2016).

Figure 1. Nutrient content of wood apple pulp and seed

CONCLUSION

The wood apple is excellent crop with multipurpose uses. Till now only few studies have been conducted. Hence the crops need full attention on its systematic research and development of varieties with

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