

Abiu – An emerging potential fruit for diversification in fruit orchard

***Pouteria caimito* (Ruiz & Pavon.) Radlk. is commonly known as abiu, yellow star apple, yellow sapote and caimo etc., is an excellent and rare fruit of Sapotaceae family. This exotic fruit is delicious and nutritious that has drawn much attention not only because of its attractive bright golden yellow colour but also due to ease of cultivation. Abiu fruits are mostly preferred as table fruit and also being used in processing industry. This article discusses about the importance, nutritive value and strategies to diversify abiu in fruit orchard.**

INDIA is bestowed with wide agro-climatic variations from sub-tropical to tropical conditions which provide scope for growing a large number of new generation fruit crops like rambutan, mangosteen, durian, avocado, dragon fruit, abiu, pulasan, longan, passion fruit, chempedak, rose apple and malayan apple etc., having national importance in view of their potential markets. Some recent efforts have also indicated the possibility of growing a few new generation crops at some specific agro-ecologies. Further, challenges in malnutrition, profitability to farmers and the threat of climate change still continues and new generation fruits appear to be the crops for the future. Many of them are rich in antioxidants and nutraceuticals. It is able to sustain the livelihood of people and also facilitates sustainable horticulture for growing a wide range of fruit crops in different regions. Commercial production and processing for value-addition of these crops would also enhance the income of small and marginal farmers. Recently, cultivation of new generation fruits gained substantial momentum due to steadily increasing market demand and niche market. Currently, all the exotic fruits grown are for intrastate and interstate trade. Many of these new generation fruits got introduced into India especially from the South East Asian countries. It is primarily introduced and raised in quite a few homesteads of Kerala state. The avocado, mangosteen, rambutan and dragon fruit are now familiar and being grown commercially in India. Though it is early days for the abiu, longan and other exotic high value fruit crops, some are already in fruit market and consumer bowl. One such new crop under the lime light is 'abiu'.

Origin and distribution

Abiu [*Pouteria caimito* (Ruiz & Pavon.) Radlk.] is an excellent and rare fruit of Sapotaceae family widely known as 'Golden Star Apple'. It is tropical evergreen fruit tree originated in the Amazonian region of South America and was cultivated by Indian tribes about 10,000

years ago and vernacularly called abi or caimo. The abiu grows best in areas that have a year-round moist and warm climate. Abiu is spread to Venezuela, Peru, Ecuador, Trinidad, Brazil and South Asian countries. In India, abiu is distributed in southern part covering Kerala, Karnataka and Tamil Nadu as a backyard crop and also found in coffee plantation.

Botanical description

The tree is from medium to large size with a pyramidal or oval canopy. The flowers are borne singly or in clusters of 2–5 flowers in leaf axils on long, thin shoots. Flowers are small, hermaphrodite, 4 to 5 lobed, cylindrical and white to greenish. Fruit is botanically a berry with a smooth, leathery skin, containing irritant latex in immature fruits. The mature fruits are yellow in



Field view of Abiu tree



Closeup view of round fruits



Closeup view of oval fruits

colour and its shape varies from ellipsoidal to spherical and may have a pointed end.

Nutritional composition

In India, there are two genotypic variants, viz., oval and round. Fruit is more attractive with bright yellow in colour with a sweet, caramel flavoured and creamy-white pulp. The oval shaped fruits has more number of seeds than round ones. In Kerala, it has been cultivated mainly in backyards and plantations; in Karnataka only few places are spotted with abiu plants. Around 50 ripen fruits collected randomly from different locality (Gadag and Tumakuru district of Karnataka) were analyzed for the traits, viz., biochemical and mineral content at laboratory, ICAR-IIHR, Bengaluru.

This exotic fruit is delicious and nutritious that has drawn much attention not only because of its attractive bright golden yellow colour but also for its nutritional value and health benefits. The fruit contains many nutrients and antioxidants that are beneficial for the human body, such as an inhibitor of acetylcholinesterase activity, anti-microbial and anti-cancerous.

The biochemical composition of Abiu fruits is given in Table 1. The pulp of abiu fruit has TSS ranging from 13.03 to 13.89°B, titratable acidity - 0.032 to 0.034%, total sugar - 0.77 to 0.80 g glucose/100g of pulp. Apart from this, it is also rich in phytochemicals such as total antioxidant - 1126.40 to 1132.80 μ mol trolox/100g in FRAP assay and flavonoids -1.24 to 1.37 mg catechin equivalents/100g which indicated potential of its health promoting and functional food components

Table 1. Biochemical composition of abiu fruit

Parameter	Range
TSS (°Brix)	13.03 - 13.89
Titratable acidity (%)	0.032 - 0.034
Ascorbic acid (mg/100 g)	2.95 - 3.07
Reducing sugars (g glucose/100 g pulp)	0.25 - 0.27
Non-reducing sugars (g glucose/100 g pulp)	0.51 - 0.53
Total sugars (g glucose/100 g)	0.77 - 0.80
Phenols (mg GAE/ 100 g)	163.51 - 163.68
Total antioxidant (μ mol trolox/100 g) (FRAP assay)	1126.40 - 1132.80
Flavonoids (mg catechin equivalents /100 g)	1.24 - 1.37

Abiu fruit offers several potential health benefits as it is rich in essential nutrients with predominance in potassium (1.25 to 1.28%), followed by nitrogen (0.90 to 1.01%), magnesium (0.17 to 0.18%), calcium (0.34 to 0.37%); and trace amount of phosphorous (0.10%). However, micronutrients such as iron (26.75 to 29.85 ppm) followed by zinc (2.12-2.18 ppm) and copper (1.37 to 1.46 ppm) were also found in abiu. The fibre content in the fruit helps in digestive disorder. It is rich in Vitamin A which is essential for eye health. The fruit is used to provide relief from fever and diarrhea and it is also used as folk medicine. The sticky latex that appears on the skin

of the unripe abiu fruit is used to treat against intestinal worms in human body.

Strategies for abiu diversification

The area under abiu fruit is yet to expand as many of the fruit growers are unaware of its cultivation practices. Abiu can be a game changer in near future for its attractive yellow fruit with juicy translucent pulp and nutritional value. Fruits are available during winter months where many of the tropical fruits are not available in southern states and therefore huge scope for consumption is present and demand can be created accordingly. The physio-chemical analysis reveals that it can be a better alternative to few tropical fruits in terms of nutrient supplementation. Apart from this, it may be considered as a profitable future crop for the farmers in India especially for niche markets. Apart from farmers point of view, there are a few other drawbacks, viz. abiu plants are fragile (softwood) in nature, having poor shelf-life with browning of pulp during post transit stage and only few southern states grow this fruit as a backyard crop which is lesser known to fruit lovers of metropolitan cities.

Empirical appraisal of agro-climatic requirements of the crop, profiling of potential tropical humid areas in parts of southern India through application of GIS tools for area expansion needs consideration. Such efforts need to be appropriately backed up by introduction of elite genetic resources of this crop already available especially from the South East Asian countries. Undertaking awareness programme among the growers, consumers and entrepreneurs regarding the potential of these fruits in the local and export markets, development of trait-specific superior types (sturdy tree, better shelf-life post transit), crop production practices including pests and diseases management, post-harvest management and value-addition protocols are the critical needs for promoting this crop for fruit crop diversification and sustainable livelihoods of the growers.

CONCLUSION

A paradigm shifts in consumption pattern of fruits amid heightened health consciousness following post COVID era made the underutilized nutritious fruits a path breaker in the market. The present market appeal, exotic taste, health benefits and consumers preference indicate that new generation fruits have good potential for commercial exploitation in the future; hence needs due attention. It is almost unknown to other parts of India. Hence, the market can easily absorb through production of 'Abiu'. The increase in area and production of new generation fruit crops like abiu will not only provide nutritional security but also expected to boost the region's economy.

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