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Nature's Gift to Mankind: Balsam Apple

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Summary
In the traditional medicine markets, medicinal plants play a key role in meeting the demands of herbal drugs and natural health products for local people. Balsam apple (*M. balsamina* Linn), also referred as African pumpkin or Southern Balsam Pear is an important medicinal plant having anti-microbial and antiviral properties. The leaves, fruits, seeds, and bark of these plants are reported to have various medicinal and nutritional properties.

Botanical classification	
Kingdom	Plantae
Division	Tracheophyta
Subdivision	Spermatophytina
Class	Magnoliopsida
Order	Cucurbitales
Family	Cucurbitaceae
Genus	Momordica
Species	balsamina L.

Introduction
Medicinal plants play a key role in meeting the demands of the traditional medicine markets. With the increasing demand for herbal drugs, natural health products and secondary metabolites of medicinal plants, the use of medicinal plants is growing rapidly throughout the world. India is one of the leading countries in Asia in terms of the wealth of traditional knowledge related to use of plant species. Balsam apple (*M. balsamina* Linn), also referred as Southern Balsam Pear or simply Balsam Pear and also known as African pumpkin, is an important medicinal plant of family Cucurbitaceae.

Morphology
It is a monoecious annual to perennial tendril-bearing herb indigenous to tropical Africa, Asia, Arabia, India, Caribbean and Australia. In India, it occurs naturally in forests during the rainy season. This species is closely related to *M. charantia* (Bitter melon) which shows various medicinal properties. It usually grows 6 meters or longer. Leaves are simple, non-stipulated, alternate and 4-12 cm across with separated lobes (3-7). Leaves are heart-shaped at the base with middle lobe being rhombic-ovate. Flowers are unisexual, and actinomorphic with yellow petals. Fruits are warty and ovoid in appearance and orange-red in color. When it ripened, it got burst apart to reveal numerous seeds.

Medicinal properties and phyto-constituents
The leaves, fruits, seeds, and bark of these plants are reported to have various medicinal and nutritional properties. The fruit pulp extract of *M. balsamina* shows anti-HIV property. The phytochemicals secreted from the fruit of *M. balsamina* are resins, alkaloid, flavonoid, anthroquinine, glycosides, steroids, terpenes, cardiac glycoside, saponins and carbohydrate (Bot *et al.*, 2007). The leaves and fruit extracts of this plant show anti-plasmodial activity and are being used against malaria in African traditional medicine. The extract of various parts of this plant showed antiviral, anti-inflammatory, shigellocidal, anti- diarrheal, antiseptic, hepato-protective, anti-trypanosomal, analgesic, anti-diabetic, anti-oxidative and antimicrobial properties. The leaves of the plants are good source of nutrients as rich in amino acids like isoleucine, leucine, lysine, methionine, cysteine, phenylalanine, tyrosine,

threonine, valine, histidine, alanine, arginine, aspatic acid, glutamic acid, glycine, proline and serine with adequate mineral compositions like potassium, magnesium, phosphorus, calcium, sodium, zinc, manganese and iron (Thakur *et al.*, 2009).

Fig. *Momordica balsamina* Linn. (Balsam apple) plant with different parts: leaves, fruit, seeds and flower

The bioactive agents like Balsamin and Momordins present in this plant, possess remarkable pharmacological importance as cited in various research studies, the major among them is Anti-HIV property. Both are ribosome inactivating proteins which inhibit HIV virus replication. It has been confirmed by several researchers both at *in-vitro* and *in-vivo* levels. But more studies are required to elucidate the complete pathways.

Conclusion

This plant has great neutraceutical as well as medicinal importance and has been part of traditional medicine worldwide. More research is needed to explore its phyto-constituents, their pharmacokinetics, application and toxicological behavior.

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