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NUTRITIONAL AND MEDICINAL PROPERTIES OF UNDERUTILIZED FRUIT: CITRON (*CITRUS MEDICA* LINN.)

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ABSTRACT

Citron (Citrus medica Linn.) is an underutilized medicinally important fruit belonging to the family Rutacae. It is native to India and occurs naturally in the north-eastern states, Himachal Pradesh, Uttarakhand and in the Western Ghats.Its fruits are characterized by thick rind impeded with very thick white albedo inner layer adherent to segments that cannot be separated easily. It is rich in macro and micronutrients, polyphenols, flavonoids, terpenes, coumarins, polysaccharidesand has antimicrobial, anti-inflammatory,analgesic and cytotoxic activity. Pharmaceutical, nutraceutical, food and cosmetic industries may find uses for the essential components found in different parts of the plant. Citron populations are declining in their natural habitats due to forest degradation and change in land use patterns. There is urgent need to expand the area under citron cultivation for diversification and nutritional security.

INTRODUCTION

Citron is one of the most ancestral species of the genus Citrus along with pummelo and mandarin. It has many vernacular names viz; Bara Nimbu, Baranimbu, Begpura, Bijaura, Jhamirdi,Kutla, Maphal, Turanj.It is a shrub or small tree, 2-4.5 m high with short, stout axillary spines, about 4 cm long on the branches. Branches, leaf buds, and flower buds are purplish when young. Leaves are simple or rarely 1-foliolate and borne on the short, wingless petiole, green, lemon-scented. Leaf lamina is elliptic to ovate-elliptic, 6-12 × 3-6 cm or larger, with serrate margin, rounded obtuse, or rarely mucronate apex. Flowers fragrant, pale purplish or pinkish, pentamerous, pedicellate, bisexual or sometimes male by complete abortion of pistil, solitary or borne in short 12- flowered in florescences. The calyx is synsepalous, 5-partite, cupular, the lobes are ovate and deciduous. Corolla is apopetalous, petals 5, broadly lanceolate, white, tinged pink without, fragrant. Stamens are polyadelphous 30-50 inserted round an annular disc and exserted. Ovary one, 5-8 lobed, cylindric, style long and thick, stigma clavate. Fruit is hesperidium, obovoid, oblong or ellipsoid, obscurely lobed, apex broadly mammillate, bases collared, rind leathery and

nearly pellucid, greenish-purple, green turning yellow when ripe, the pulp juicy, acid; seeds numerous, small, smooth, ovoid, endospermic. Flowering time is April-May and harvesting in October-November.

Figure 1: Citron fruit

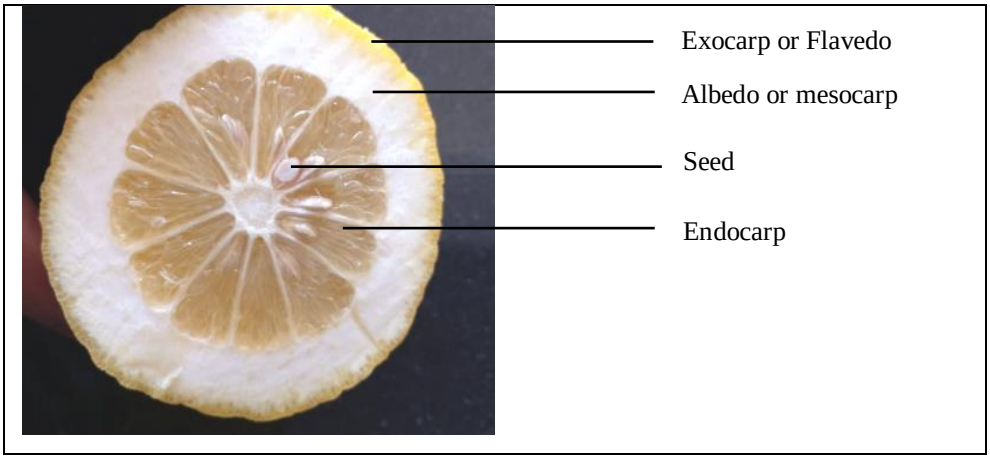

Figure 2: Horizontal cross section of Citron

USES

In north India, fruit is eaten raw with salt and spices. It is also used to make pickles soaking quartered pieces in its juice along with salt. In South India, the outer rind is also used to make a tangy sauce (*gojju* in Kannada) with tamarind extract, jaggery and mustard seeds. The juice is highly recommended for high blood pressure. Taken first thing in the morning with warm water, the juice can help lower high blood pressure. It can also be used in making carbonated drinks, alcoholic beverages, syrup, candied peels, jams, marmalade, cordials and many other value-added products which make it an appropriate raw material to develop healthy processed food (Chhikara et al 2018). The candied peel is widely employed in the food industry, especially as an ingredient in fruit cake, plum pudding, buns, sweet rolls and candy.Essential oils from flowers or petitgrain oils from young twigs and leaves are used in the

perfume industry (Menichini et al. 2011). The wood is heavy and hard and employed for agricultural implements while the branches are used as walking sticks.

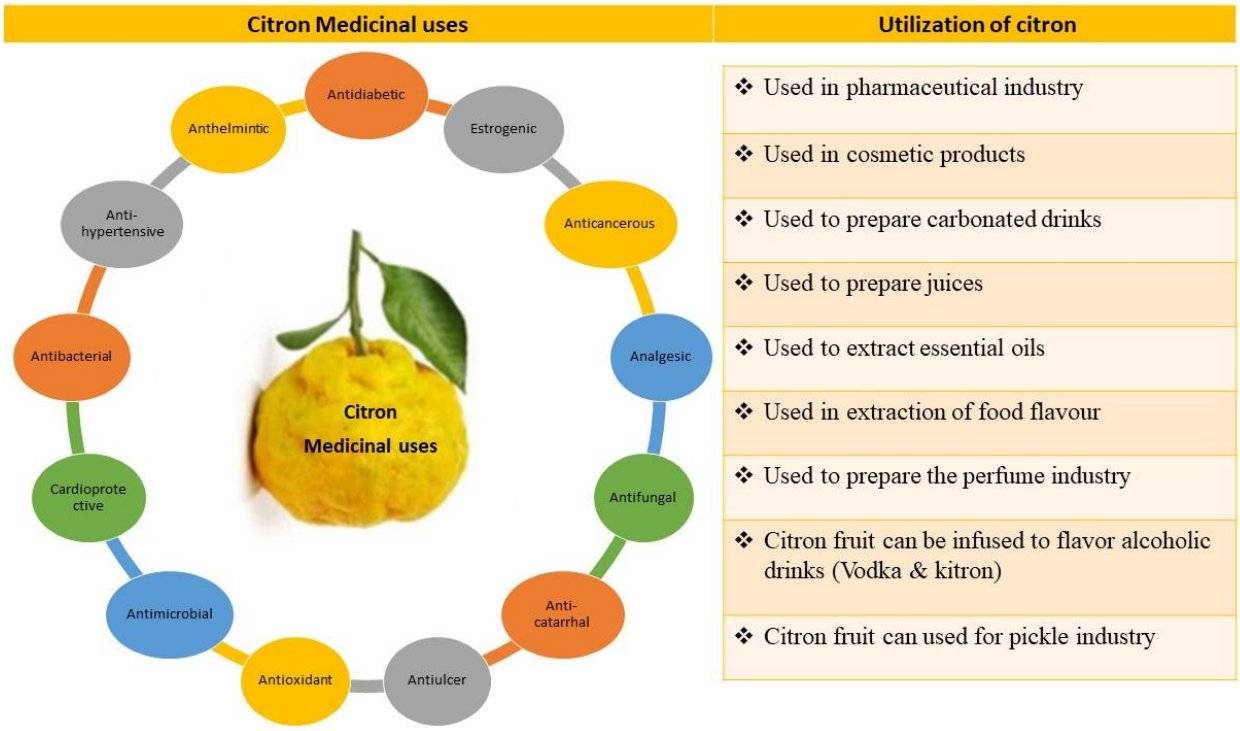

Figure 3: Medicinal properties and utilization of citron in different sectors

NUTRITIONAL VALUE

The nutritional composition of *C. medica* on dry basis comprises moisture (85g/100g), fat (6g/100 gm), fiber (11.33 g/100g), calcium (4.66 mg/100g), phosphorus (0.67 mg/100), iron (1.73 mg/100gm), zinc (0.046 mg/100 g, ascorbic acid (2.33mg/100g),thiamine (0.13 mg/100 g), riboflavin (0.067 mg/100g), niacin (0.067 mg/100 g) and it provides 380 kcal/100 g of fruit.In addition to dietary fiber, it also has polysaccharides including pectin and heteropolysaccharides.Fruits are rich in alkaloids, flavonoids, steroids, phenols, and carbohydrates; peels are rich in alkaloids, flavonoids, steroids, phenols, and carbohydrates; and leaves are rich in alkaloids, flavonoids, steroids, phenols, and carbohydrates.

MEDICINAL PROPERTIES

Citron is an underutilized fruit plant having various bioactive components in all parts of the plant. Major bioactive compounds present are iso-limonene, citral, limonene, phenolics, flavonones, vitamin C, pectin, linalool, decanal and nonanal, accounting for several health benefits. The fruit pulp has numerous nutraceutical properties, it is an anti-catarrhal, capillary protector, anti-hypertensive, diuretic, antibacterial, antifungal, anti-helminthic, antimicrobial, analgesic, a strong antioxidant, anti-cancerous,

anti-diabetic, estrogenic, antiulcer, cardioprotective, antihyperglycemic etc. (Panara *et al* 2012). The peel extract has a high content of phenolic compounds and a good antioxidant activity, therefore can be used to treat several diseases. The peel possesses citro-flavonoids which are stomachic, stimulant, exporant, diuretic and they are anti-inflammatory and antihistamine in nature, thus used as a tonic (Onyeyirichi et al 2014). It is also beneficial to prevent and heal spleen tumours. The leaf oil contains limonene, linalool, citronellol, citronellal, citronellyl acetate and isopulegol. (Gurdip et al 1999). The essential oils of the peel and leaf have several phytochemicals which are known for having free radical scavenging and anti-fungal activity.

CONCLUSION

Citron is an underutilized fruit rich in bioactive compounds and has numerous nutraceutical properties. The area under citron cultivation is declining due to habitat destruction. Systematic research work should be done on this fruit crop to develop improved varieties and promote commercial cultivation.

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