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A comprehensive review of the nutritional properties of Chekkurmanis

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Abstract

Sauropus androgynus L. Merr is an underexploited medicinal shrub from the Phyllanthaceae family, often referred to both as a leafy vegetable and as a kind of multivitamin-rich green plant. Compounds having anti-inflammatory, anti-diabetic, anti-microbial, wound-healing, and anti-obesity properties can be found in abundance in *S. androgynous* leaf extracts. Furthermore, these extracts may also enhance breast milk production. Micronutrient and vitamin deficiencies are prevalent across the globe, particularly impacting women and children who frequently experience malnutrition due to inadequate vegetable intake. Green leafy vegetables (GLVs) are significantly neglected in diets while being a rich source of minerals and vitamins. Their high-water content causes them to spoil quickly, emphasizing the necessity of processing these greens to enhance their value and encourage their inclusion in everyday meals. Chekurmanis is a highly nutritious green leafy vegetable that remains largely overlooked.

Introduction

Chekkurmanis (*Sauropus androgynus* L.), Katuk or Sweet Leaf Bush, is a smooth, shrubby perennial leafy vegetable. It is a member of the Euphorbiaceae family and is commonly grown in tropical regions with warm, humid climates and plentiful rainfall. Chekkurmanis is commonly known as a "multivitamin" or "green plant" because of its high nutritional value in India. Koundinya et al. (2019) report that Katuk leaves provide 73.6% moisture, 103 kcal of energy, 6.8 g of protein, 3.2 g of lipids, 11.6 g of total carbohydrates, 1.4 g of dietary fiber, 570 mg of calcium, 28 mg of iron, 200 mg of phosphorus, 247 mg of Vitamin C, 0.48 mg of Vitamin B1, 0.32 mg of Vitamin B2, 2.60 mg of Vitamin B3, and 9510 IU of Vitamin A per 100 grams. The antioxidant properties of the leaves make them useful in treating various conditions such as diabetes, cancer, allergies, microbial infections, high cholesterol, and inflammation, as noted by Paul and Beena Anto (2011). Consuming leafy vegetables in the recommended quantities can help prevent mineral deficiencies and associated health conditions. Chekkurmanis and other leafy vegetables have a high concentration of various macro, micro, and phytonutrients, which can aid in reducing malnutrition and significantly contribute

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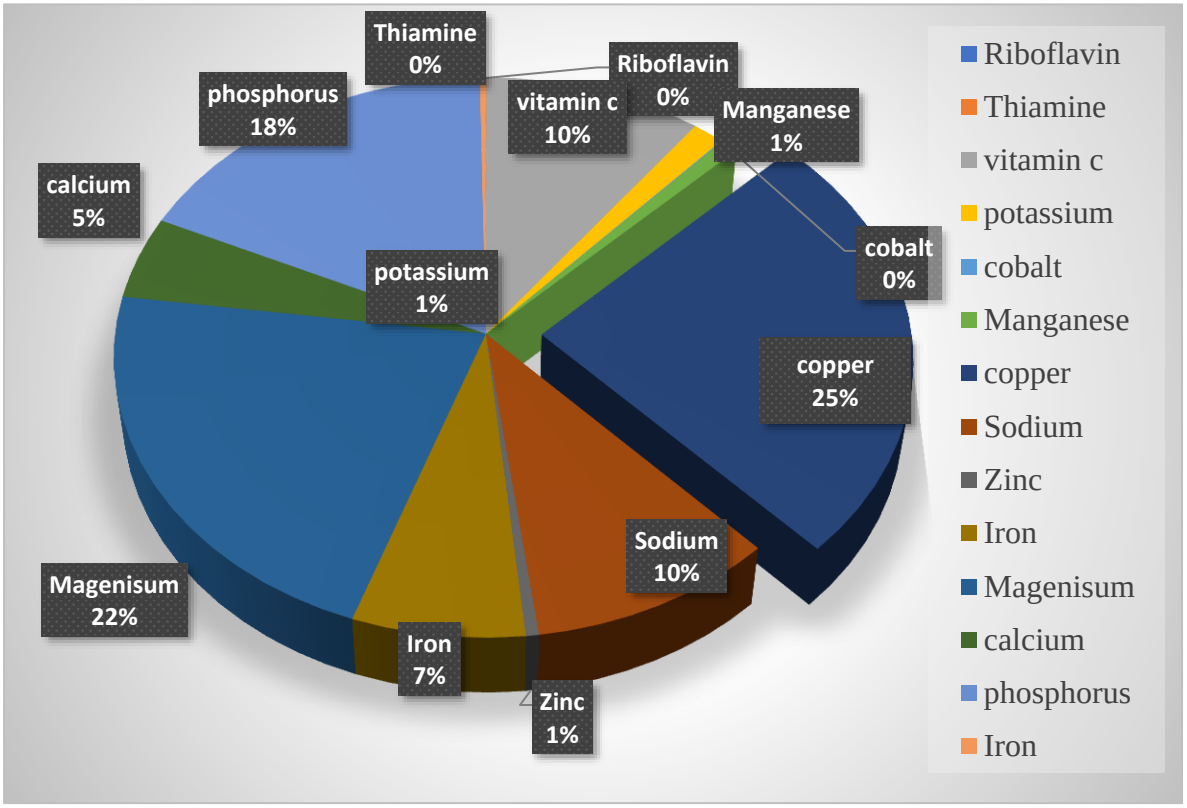
to nutritional food security. These vegetables are a great source of vitamins, minerals, and phytochemicals that are necessary for healthy human metabolism. According to Ong (2003) in ancient India, Katuk leaves were commonly used to improve eyesight, treat skin disorders, relieve urinary and cardiovascular issues, reduce internal fevers, and address a variety of other ailments.

Nutritional and phytochemical components.

Sauropus androgynous is a vitamin-rich green vegetable that is highly nutritious. The leaves have 7.4 g, compared to other green vegetables, such as spinach, mint, and cabbage, which provide 2.0 g, 4.8 g, and approximately 1.8 g in protein per 100 g of fresh leaves. The plant is rich in various minerals and vitamins along with protein shown in Fig 1. In particular, 100 g of fresh leaves have the following nutritional values: 5.25–7.4 g of protein, 0.58–1.1 g of fat, 1.75–1.8 g of fiber, 69.9–85.4 g of moisture, and 5600 µg of carotene. Wang and Lee (1997) discovered nucleosides, flavanol glycosides, and triosides in the leaf extracts of *Sauropus androgynus*. Several phytochemicals, including polyphenols, anthocyanins, carotenoids, vitamins, and tannins, were also discovered by Singh et al. (2011).

Fig 1. Vitamins and minerals content in chekkrumanis



Antioxidant and antimicrobial properties.

It has been traditionally used to enhance the levels of the hormones prolactin and oxytocin to support lactation. Fikri et al. (2020) reported that the high levels of vitamin C, flavonoid content, and antioxidant polyphenol in leaf extracts can help fight against infectious diseases, aging, and degenerative disorders. The ability of flavonoids to inhibit polyphenolic neutrophils' synthesis of lysosomal substances shows significant anti-inflammatory efficacy. In addition, several

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phytoconstituents, including coumarins, triterpenoids, saponins, and tannins, have been connected to the analgesics and antinociceptive properties of non-steroidal anti-inflammatory medicines. Both methanolic and ethanolic extracts demonstrate significant antibacterial activity against *Proteus vulgaris, Bacillus cereus, Klebsiella pneumoniae, Staphylococcus aureus, Bacillus subtilis,* and *Escherichia coli.* Prolactin is a hormone that stimulates the development of secretory glands in the intralobular duct. Increased activity of these secretory glands, along with the presence of lipids and unilocular fat tissue, prepares the mammary glands for the letdown of milk. Dewajee et al. (2007) identified several phytochemicals linked to anthelmintic activity, including alkaloids, phytosterols, tannins, flavonoids, and saponins, among others.

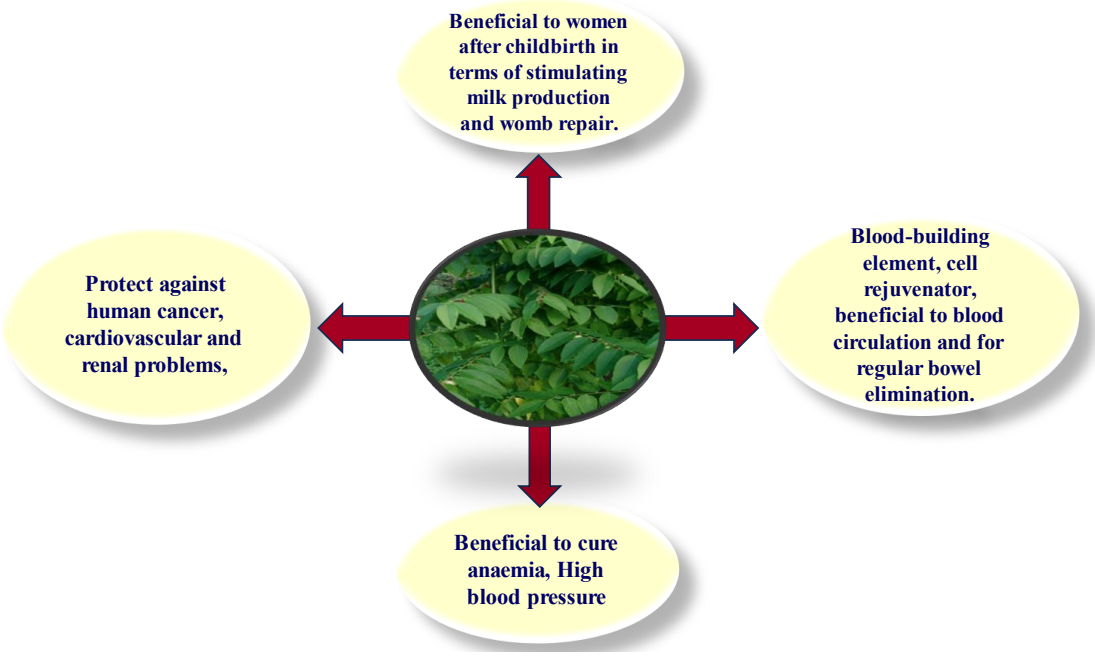

Fig 2. Vitamins and minerals content in chekkrumanis

Pharmaceutical properties

The aqueous leaf extract of *Sauropus androgynus* has been reported to assist in lowering blood glucose levels in humans. According to Selvi and Bhaskar (2012), the ethanolic leaf extract demonstrated significant anti-inflammatory activity. A significant increase in oxytocin and prolactin gene expression was observed in the leaf extract. Furthermore, the extract promotes the early release of oxytocin into the bloodstream. Xin et al. (2009) investigated the cytotoxicity and genotoxicity of varying concentrations of fresh and cooked *Sauropus androgynous* leaf extracts in CHL-1 human cell lines. Yunita et al. 2013 assessed the impact of methanolic leaf extract from *Sauropus androgynous* on human mesenchymal stem cells derived from bone marrow. Bunawan et al. (2015) reported that the *Sauropus androgynus* herb may pose risks of pulmonary dysfunction. Increased consumption leads to respiratory failure. They found that leaf fraction exhibited potential antiviral effects against the dengue virus but not against chikungunya. Additionally, the fraction was tested

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against the *P. falciparum* strain 3D7 in O+ human erythrocytes, showing no positive effects on malaria parasites.

Conclusion

Thus, chekurmanis leaves can be utilized to supply a considerable quantity of micronutrients. Encouraging the consumption of this green leafy vegetable is particularly beneficial for at-risk populations. Supplemental feeding programs and midday meals should feature this vibrant green vegetable. This program may be a useful tool in fighting against micronutrient deficiencies in the United States.

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