



Lesser Known Orange Species in Meghalaya: A Market Driven Review

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Abstract

The agro-climatic conditions in some of the States in North Eastern Region like Sikkim, Tripura, Meghalaya etc. offers a congenial environment for growth and proliferation of oranges. Considering the commercial value and market demand of mandarins in general across the country, there is considerable opportunities for market driven cultivation practices and livelihood development of the farmers in this region. Meghalaya in particular enjoys a niche in the mandarin segment, with the State being blessed with unique and diverse varieties of this popular fruit. The health benefits of various citrus fruits including mandarins have gained particular importance after the devastating global COVID 19 pandemic. Meghalaya is positioned uniquely in this space both in terms of opportunities to be tapped on one hand and the threat of some of the rare and unique species of mandarins found in the wild of Meghalaya facing threat of extinction. There is an urgent need to develop implementable strategies to tap the opportunities and mitigate the challenges in this context.

Key words: Meghalaya, Mandarin, Folk Medicine, Immunity, Income Security, Gross State Domestic Product (GSDP)

Introduction

Traditional medicinal practice among the indigenous population across the North Eastern Region (NER) is a rich mix of several valuable medicinal plants, herbs, vegetables and fruits. Citrus fruits found in NER constitute an important aspect of health and wellbeing through the traditional medicine system followed for ages by various communities in the region. Several species of oranges found in the State of Meghalaya possess some unique properties. At the same time, some of these rare species are facing the threat of extinction. Need is to conserve and cultivate these species and at the same time, tap the economic potential of these rare species for the larger benefit of health and well being of the people. Many experts feel that a market driven sustainable and holistic approach of propagation, cultivation and processing of Meghalaya mandarins can have a long term positive impact on the livelihood development of the rural people of the State as well as enabling the larger population of the Country and even abroad to benefit from the unique health benefits that some of these species provides. People in larger cities across age groups are more inclined towards natural ways of immunity and healthcare after going through the horrific phase of COVID 19 pandemic in recent times.

Material and Method

This article is an outcome of a qualitative and quantitative analysis of the opportunities, issues and challenges of the oranges grown either on a commercial basis by the farmers or grow in the wild. The method is essentially based on a techno-commercial and market driven approach consisting of an extensive secondary research and primary insights gained from past field level exposure of the North eastern region, discussions with stakeholders like farmers, horticulturists, government officials, trade associates and industry players. Knowledge and insights gained from several field level production and market studies done by the author in the past in areas of the medicinal plants in

NER has contributed to assessment of the current challenges as well as the opportunities which can be tapped.

Discussion and Result

All citrus plants in the world are grouped into four distinct categories, namely sweet oranges, mandarin, grapefruit and pummel, and the common acid members like lime, lemon and citron (Mohamed et al., 2022). While citrus is known to have been in existence and use by human being for over 4000 years now, there has been a differential growth in the use of various species when it particularly comes to mandarins. Apart from development of some of the popular hybrid types, mostly those varieties have emerged as mostly used and popular which essentially are sweeter in taste, easy to peel, more juicy and easy for processing and preparation of value added products. As a result, while the orange and citrus industry has grown by leaps and bounds in modern times (Mahato et al., 2019), many other useful species have been left out of use. At the same time, there is also a paradox that some of the species which are mostly known and used by the indigenous communities as a part of their traditional folk medicine are facing threats of either becoming extinct or endangered and finding entries into IUCN Red list. This has mainly happened due to lack of sustainable propagation, cultivation and conservation efforts for these species which mostly grow in the wild and are continuously subjected to vagaries of nature, climate change, deforestation, diseases and pests. This article reviews few such species found in some parts of India from the lens of how they have been a part of our rich and traditional system of folk medicine, how their population has dwindled over a period of time and to what extent they have the potential to be integrated in the herbal healthcare industry, particularly in a situation where the world is re-learning various natural ways of increasing immunity after the devastating COVID 19 pandemic (www.bevindustry.com)

Meghalaya Mandarins

Being in the middle of the Indo-Burma biodiversity hotspot and one of the 25 biodiversity hotspots of the world, North Eastern region has been an exclusive producer of citrus fruits in the country, of which oranges are an important constituent. The regions of Mizoram and Meghalaya are significant that these are also the original home or primary gene centre of the world's Citrus species of crops (www.zizira.com). The label of "best, sweet and juicy oranges" in India has been credited to the famed Khasi Mandarin (*Citrus reticulata* Blanco, of the Rutaceae family). Khasi Mandarin is grown on the southern slopes of Wakhken Mawphu and Nongsteng villages, among others, in the sub-division of Sohra, previously known as Cherrapunji, in the East Khasi Hills district (Upadhyaya et al., 2017).

As a matter of fact, various studies have proven that NE India is one of the origin centres for citrus. For example, the wild and endangered species *Citrus indica* Tanaka is a progenitor species or the mother of all oranges of the world is a native of the NER, found in the Nokrek Biosphere Reserve in the Garo hills of Meghalaya. Of the 27 citrus species that exist in the Indian subcontinent, 23 of these are found in Northeast India and particularly in Meghalaya.

The study revealed that the unregulated cultivation and clearing of forest cover at an alarming rate are posing extinction threat to the two rare species of oranges found in Khasi hills, namely *Citrus indica* Tanaka and *Citrus macroptera*

(Upadhyaya *et al.*, 2017). Surveys were undertaken in this region for ascertaining distribution, studying variability and for collection of germplasm of these two species (Hazarika *et al.*, 2017). These rare species apart from facing the danger of extinction is also depriving the region to tap the immense commercial potential that these varieties have and their invaluable medicinal values. These are threatened by anthropogenic use of its native habitat (Upadhaya, 2017). Habitats of these species are currently fragmented and in decline due to number of anthropogenic activities. This also includes other agricultural activities and urban expansion. Even if seeds in natural habitat fall to the ground and germinate, they have to pass through human induced fire and natural dry conditions resulting in desiccation and death of seedlings. This could be possibly one of the reasons for population decline of these species (Hussain, 2022).

Many of these species are considered by the local indigenous population as Mother Nature's 'Over-the-Counter (OTC)' Medicine for High Fever. Modern science is steadily rediscovering just how potent some of the natural remedies are, practiced for centuries by various indigenous tribes. Indigenous communities such as the Khasis and Garos of



Figure 1: Local Mandarin of Meghalaya

Meghalaya use this local mandarin to treat ailments.

Indian wild orange (*Citrus macroptera* Montrouz), another endangered species that is called Soh Kwit by the Khasis, is an age old proven traditional remedy for headaches, body aches, colds and fevers within a very quick time. The Khasi mothers find it great for bringing down high fever in babies and children.

Integrated Approach- Conservation, Propagation, Large Scale Cultivation and Market Linkage

In the existing scenario, the approach has to be an integrated one which needs to start from the essential step of conservation efforts and end in effective market linkage efforts. The continuously depleting population of the khasi mandarins need to be first conserved through mass propagation initiatives. It should include both in-situ and ex-situ conservation, with active participation of both government and private nurseries. Special incentives can be provided to private nurseries to undertake conservation and propagation activities. Particular emphasis on ex-situ conservation and propagation should be provided by supporting programs in rural areas, and lands like forest land, public non-public and institutional lands. Techniques of germplasm conservation, developing gene bank, tissue culture etc. should be adopted in a coordinated manner. The entire efforts will also need concerted efforts of various related line departments in a convergence mode.

Once the population of this dwindling mandarin species is increased to a large extent and the plants starts bearing, processing and marketing activities should be supported in a mission mode so that it can be linked to the consumer market which can include agri-startups, beverage manufacturing companies, herbal based health care products manufacturers and allied sectors.

Key Driver for Market Linkage- The FMCG Sector

A business model can be envisaged where a major emphasis will be on value addition and processing of both the rare mandarin varieties into health drinks / juice. According to industry classification, this will come under non-alcoholic beverage or soft beverage market segment, with an emphasis on branding as a health drink. The main 3 segments constituting the non-alcoholic beverage market in India are Carbonated Beverage, Fruit Based Drinks and Bottled Water. A meager section of beverage is constituted by other drinks like ready-to-drink tea, concentrates, sports and energy drinks.

Estimated global non-alcoholic beverages market: US\$ 833.1 billion.

Share of packaged water, carbonated beverage and fruit based drinks: US\$ 816 billion.

USA is the largest market with share of about US\$ 320 billion.

Market share of India is about US\$ 13 billion.

Share of fruit based drinks: US\$ 900 million

**Est. market of citrus drinks in India:
US\$ 300 million**

**Est. Indian market potential
of Khasi Mandarin based
drinks in initial 3 years: US\$ 5
million**

Source: Market Estimation by Author from Various Published Market Reports (www.statistica.com, www.zizira.com, fortunebusinessinsights.com)

Conclusion

Through an integrated program comprising knowledge transfer, innovation, advisory services, improved competitiveness, and improved environmental performance, the restoration of the rare mandarin species of the Country can be done and the extraordinary health benefits can be made available to the public. The collaboration of industry and farmers both in the downstream and upstream components will be mutually rewarding and will play a significant role in the entire process.

The broader framework is to have a vibrant ecosystem of timely availability initiatives to protect, preserve, propagate and process the unique benefits of the endangered mandarin species of the country, with focus on States like Meghalaya in particular. This can be achieved by developing a vibrant an ecosystem of various institutions like technical support, agribusiness development, process compilation, extension and skill development to bring them in direct connection with all the stakeholders in order to create a pro-farmers' ecosystem for sustainable and climate adapted cultivation of rare mandarin species.

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