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The sweetness of bitter brinjal (*Solanum gilo* Raddi): An underutilized vegetable of North Eastern Himalayas

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Abstract

Solanum gilo, known as bitter brinjal is commonly seen growing due to its wider adaptability across the different locations in the entire North Eastern Himalayas. Wide variations exist within and between the species and are grown by the tribals in homestead as well as *jhum* field as mixed cropping. The crop had been traditionally valued due to its medicinal properties since time immemorial. Keeping in view the potentiality and wide variability of the crop, fifteen landraces were collected from different parts of the region and evaluated for its growth and biochemical components at the College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh during 2015 to 2016. The results showed that the genotypes exhibited marked variation in growth, fruiting characteristics and biochemical attributes confirming its adaptation to climatic conditions of subtropics with higher yield and acceptable fruit quality.

Keywords: bitter brinjal, *Solanum gilo*, growth, biochemical

Introduction

The North-eastern region of India lying between 21.5° N - 29.5° N latitudes and 85.5° E - 97.3° E longitudes spreading over an area of 2,620,230 km² (8% of country's geographical area) comprises of eight states - Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The region with its diverse agro climatic condition, soil physiographic and climatic variability is endowed with rich genetic resources and considered an abode for numerous plant species including many underutilized vegetables. Among the different underutilized vegetable crops grown, *Solanum gilo* Raddi., commonly known as 'bitter brinjal' belonging to the family Solanaceae, is widely seen grown by the tribals in homestead and *jhum* field as mixed cropping with ginger, chilli, brinjal, beans, tuber crop etc. under rainfed conditions and form an integral part of dietary system. Available almost throughout the year when basketfuls of green coloured appealing fruit starts appearing in the market is considered as wonderful bounty to the tribals since yore has been contributing food and nutrition security. Bitter brinjal is used like any other vegetable in preparation of local food. It is relished by the tribal communities as boiled vegetable as a local cuisine. It is also used in preparation of stews, pickles, chutneys, fries etc. A self-pollinating crop by nature although some outcrossing of up to 30% is possible. Wide variations exists within and between the species including variation in characters like diameter of corolla, petiole length, leaf blade width, plant branching, fruit shape and color (Chinedu *et. al*, 2011) [2]. The fruits are round, the top and bottom are flattened out and have grooved portions with a length of 5-6 cm and a width of 6-7 cm containing small seeds with stalk curved or erect (Knapp, 2011) [3].

Medicinal properties

Bitter brinjal had traditionally been valued for its appeal in tribal ethos since time immemorial. Their uses in indigenous medicine include the use of roots and fruits as a carminative and sedative and to treat colic and high blood pressure, leaf juice as a sedative to treat uterine complaints, anti-emetic and to treat tetanus after abortion, weight reduction to treatment of several ailments including asthma, allergic rhinitis, nasal catarrh, skin infections, rheumatic disease and swollen joint pains, gastro-oesophageal reflux disease, constipation, dyspepsia (Bello *et. al*, 2005) [1]. Fruits possess analgesic, anti-inflammatory, anti-asthmatic, anti-glaucoma, hypoglycaemic, hypolipidemic properties (Odetola *et al*, 2004) [4].

These pharmacological properties have been attributed to the presence of fiber, ascorbic acid, phenols, anthocyanin, glycoalkaloids and α -chaconine (Sanchez-Mata *et al.*, 2010) [5] in the plant.

Physico-biochemical properties

Although bitter brinjal is popular and cultivated in all the state of North eastern region of India but there is no improved variety that can be recommended to the farmers for its commercial cultivation in the region. Study conducted on evaluation of physico-chemical characteristics of 15 landraces of bitter brinjal collected from farmers' field and homestead gardens from different parts of north eastern region and planted at Vegetable Research Farm, College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh exhibited a variation in morphological and biochemical characteristics. The fruit colour varies from light green, green, dark green, white, purple, blackish green when unripe all turning into red or orange colour when ripened with cluster and solitary fruiting habit. Study indicated that plant height ranges from 45.91 - 63.18 cm, average fruit yield (0.81 - 1.97 kg per plant), number of fruits per plant (61.00 - 93.66), single fruit weight (16.70 - 27.37 g), total carbohydrates (315.51 - 375.78 mg/100 g), total phenol (15.27 - 27.39 mg/100 g), ascorbic acid (9.76 - 16.73 mg/100 g), flavonoid

(9.81 - 13.58 mg/100 g), total protein (128.76 - 160.34 mg/100 g) and anti-nutritional factor like steroids ranging from 174.26 - 195.48 μ g/100 g.

Conclusion

This crop plays an important role in mitigating hunger through diet diversification as they are reservoirs of minerals, vitamins, carbohydrates, proteins, antioxidants also it can be considered as risk aversion crop and a resilient crop towards climate change owing to its wider phenological and soil adaptability in this difficult region. The added advantages can be pinpointed as the crop is easier to grow, resistant to pests and diseases produces good crop even under adverse conditions. However, negligence and meagre efforts on research and conservation of bitter brinjal renders the crop hidden. This has resulted in loss of valuable genetic resources of the crop. Most of the land races are still in wild forms which are yet to be properly identified, domesticated and used which is essential to preserve them. Popularization of this crop is required to generate awareness for its cultivation and conservation at farm and community level. Bitter brinjal is one of the preferred crop in the region due to its typical taste, medicinal value and being source of food and nutrition to the tribals betokens the sweet essence of this bitter crop.

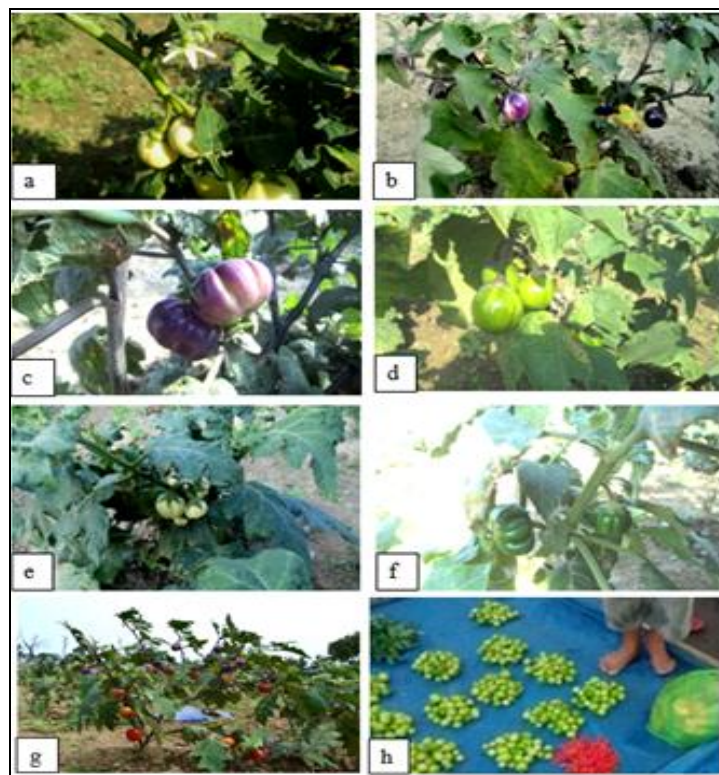


Fig 1: A, B, C, D, E and F: Different landraces of bitter brinjal collected; G: Ripening stage; H: Fruit sold at local market

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