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Lalhming Sanga
Department of Vegetable Science, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh, India

Pandey AK
Department of Vegetable Science, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh, India

Sarma P
Department of Vegetable Science, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh, India

Siddhartha Singh
Department of Basic Sciences and Humanities, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh, India

Correspondence
Lalhming Sanga
Department of Vegetable Science, College of Horticulture and Forestry, CAU, Pasighat, Arunachal Pradesh, India

Studies on biochemical profile of wild brinjal (*Solanum gilo* Raddi)

Lalhming Sanga, Pandey AK, Sarma P and Siddhartha Singh

Abstract
Wild brinjal (*Solanum gilo* Raddi) known as bitter brinjal is commonly seen growing due to its wider adaptability across the different locations in the entire North Eastern Himalayas. 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 North Eastern Region of India and evaluated for its 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 biochemical attributes. Among all the genotypes, highest ascorbic acid content (16.73 mg/100 g), total alkaloid (4.68 mg/100 g) and terpenoid content (3.23 mg/100g) was found in G-4. G-5 had highest total phenol (15.27 mg/100 g) and solasodine content (8.78 mg/100g). Highest steroid content (174.26 µg/100g**)** was observed in G-8. Maximum flavonoid content (13.58 mg/100g) was found in G-10 while highest phytosterol content (8.12%) was found in G-9. Hence, for medicinal purpose these genotypes were best suited for cultivation in different parts of NEH region.

Keywords: Wild brinjal, *Solanum gilo* Raddi, biochemical, medicinal

Introduction
Solanum gilo Raddi is commonly known as bitter brinjal. Among the different underutilized vegetable crops grown, it is widely grown by the tribals in homestead and *jhum* field as mixed cropping with ginger, chilli, brinjal, beans, tuber crops etc. under rainfed conditions and forms an integral part of dietary system. 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. It has very tiny seeds and its stalk is curved or erects (Knapp, 2011) [8]. This species of garden egg have bitter tastes and is cultivated in the same way with other species. The fruit turn red or orange in colour when ripened. 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) [2]. Fruits possess analgesic, anti-inflammatory, anti-asthmatic, anti-glaucoma, hypoglycaemic, hypolipidemic properties (Odetola *et al*., 2004) [10]. These pharmacological properties have been attributed to the presence of certain chemical substances in the plants, such as fiber, ascorbic acid, phenols, anthocyanin, glycoalkaloids and α-chaconine (Sanchez-Mata *et al*., 2010) [11]. Keeping in view the potentiality of the crop, fifteen landraces of bitter brinjal were collected from famers' field and homestead gardens from different parts of North eastern region and evaluated for its biochemical profile at the College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh, during 2015 to 2016.

Materials and method
The biochemical component of fruits from each genotypes of each replication was worked out and observations were recorded. The principle spectrophotometric method was adopted for assay of solasodine alkaloids through calorimetric method (Sarthak Bhattacharya *et al.* 2013) [12]. The value of absorbance was substituted as 'x' in the regression equation and the quantity of solasodine in 25 mg of plant sample was worked out. The total phenol content was determined by the method described by Malick and Singh (1980) [9]. The concentration of phenols in the test sample was calculated from the standard curve and expressed as mg phenols/100 g material.

The ascorbic acid content was determined by the method described by Jagota and Dani (1982) [6]. The concentration of ascorbic acid in the sample was calculated from the slope of the ascorbic acid standard curve. Total alkaloid content was determined by the method described by Vijay and Rajendra (2014) [15]. The absorbance for test and standard solutions were determined against the reagent blank at 470 nm with an UV/Visible spectrophotometer. The total alkaloid content was expressed as mg /100g of extract. Steroid content was determined by the method described by Jaroslav and Maurice (1979) [7]. The absorbance for sample was determined against the reagent blank at 470 nm with an UV/Visible spectrophotometer. Steroid content was expressed as µg. Flavonoid content was determined by the method described by Vijay and Rajendra (2014) [15]. The absorbance for test and standard solutions were determined against the reagent blank at 510 nm with an UV/Visible spectrophotometer. The total flavonoid content was expressed as mg /100g of extract. Phytosterol content was determined by the method described by Larissa *et al.* (2013). The amount of phytosterol content was calculated as β-sitosterol (%) using the photometric standard. Terpenoid content was determined by the method described by Narayan *et al.* (2012). Total terpenoid concentration of sample was calculated using the regression equation of Linalool standard curve. Statistical analysis of the data was carried out by the method of analysis of variance as outlined by (Gomez and Gomez, 1983) [5].

Result and discussion

The biochemical constituents varied in all the genotypes (Table 1). Wild brinjal (*Solanum gilo*) is very nutritive and useful vegetable because it is rich source of protein, minerals, crude fibre, phenolic content, antioxidant activity and important essential amino acids. In the present investigation, G-5 had the lowest (8.78 mg/100g) solasodine content followed by G-8 (10.49 mg/100g) while maximum value was found in G- 3 (28.25 mg/100g). Highest total phenol content was observed in G-4 (27.39) while G-5 (15.27) had lowest total phenol content. The genotypes with low total phenol content can be exploited for breeding quality fruits; the genotypes with low solasodine and total phenol content can be exploited for breeding quality fruits. G-4 (16.73) had the highest ascorbic acid content followed by G-9 (15.81) while minimum ascorbic acid content was recorded in G-13 (9.76). G-6 (2.68) had the lowest total alkaloid content which was statistically at par with G-7 (2.81) while highest content was recorded in G- 12 (4.68). Minimum steroid content was observed in G-8 (174.26) while maximum content was observed in G-3 (195.48). Maximum flavonoid content was observed in G-12 (13.58) which was statistically at par with G-4 (13.24) while minimum flavonoid content was observed in G-2 (9.81mg/100 g). Minimum terpenoid content was observed in G-14 (1.79 mg/100g) which was statistically at par with G-7 (1.95 mg/100g) and G-6 (1.89 mg/100g) while maximum terpenoid content was observed in G- 4 (3.23 mg/100g). G-9 had the highest (8.12%) phytosterol content which was statistically at par with G-4 (7.85%) and G- 12 (7.69 %) while lowest content was recorded in G- 6 (5.68 %). The present findings of variability in biochemical components are in agreement with Umesh *et al*. (2015) [14], Eze and Kanu (2014) [4], Tripathi *et al*. (2014) [13], Amadi *et al.* (2013) [1] and Chinedu *et al*. (2011) [3]. Bitter brinjal fruits contained appreciable amounts of the investigated compounds which are bioactive and could be behind the nutritional and medicinal potential of the fruits.

Table 1: Biochemical components of different wild brinjal (*Solanum gilo* Raddi) genotypes

S.N.	Genotype	Solasodine content (mg/100g	Total phenol (mg/100g)	Ascorbic acid (mg/100g)	Total alkaloid (mg/100g)	Steroid content (µg/100g)	Flavonoid content (mg/100g)	Terpenoid content (mg/100g)	Phytosterol content (%)
1.	G-1	16.55	19.58	12.74	3.90	179.70	10.80	2.60	7.58
2.	G-2	12.74	18.36	14.76	3.76	176.89	9.81	2.41	6.60
3.	G-3	28.25	22.41	11.54	3.15	195.48	13.24	2.13	6.36
4.	G-4	25.31	27.39	16.73	4.32	190.49	12.49	3.23	7.85
5.	G-5	8.78	15.27	10.61	3.78	174.50	11.81	2.37	6.82
6.	G-6	20.57	16.74	9.87	2.68	184.84	10.61	1.89	5.68
7.	G-7	17.76	20.67	12.78	2.81	180.45	10.56	1.95	5.93
8.	G-8	10.49	17.63	10.72	3.60	174.26	11.64	2.34	6.52
9.	G-9	23.50	25.60	15.81	4.43	187.80	12.86	2.93	8.12
10.	G-10	27.49	23.36	12.79	3.59	192.68	13.58	2.30	6.45
11.	G-11	13.30	18.44	13.87	3.81	178.47	10.70	2.48	7.24
12.	G-12	14.59	24.29	15.78	4.68	178.28	11.91	2.84	7.69
13.	G-13	26.56	26.32	9.76	3.98	190.84	12.69	2.56	7.51
14.	G-14	18.61	21.46	13.37	2.94	183.72	10.85	1.79	6.19
15.	G-15	17.44	20.65	14.50	3.82	182.73	11.17	2.50	7.18
Mean		18.79	21.21	13.04	3.69	183.41	11.65	2.42	6.91
SEm±		0.16	0.15	0.13	0.07	0.18	0.14	0.08	0.14
CD or LSD (5%)		0.47	0.43	0.40	0.20	0.53	0.41	0.24	0.43

Conclusion

Bitter brinjal is one of the preferred crops in the north eastern region due to its typical taste, medicinal value and being source of food and nutrition.

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