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Review Article

Bioprospecting Bottle Gourd Plant Species (Lagenaria Siceraria.) As A Cultural Musical Instrument 'Zumbara' Making Material in Berta Community of Assosa Zone, Benishangul Gumuz Regional State

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Abstract

Ethiopia is rich country in floral and faunal biodiversity resources. Due to this fact the country is among the Vavilovian centers of origin and diversity for different cultivable plant species including bottle gourd. Bottle gourd (*Lagenaria siceraria*) is a white flowered running or climbing vine which is categorized under the gourd family (Cucurbitaceae). It has diversified uses in dish preparation, as an ingredient in medicine and raw material for making of decoration and utensils and cultural musical instrument. Its Jiuce is utilized as medicine to treat different diseases like flatulence, diabetes mellitus, hypertension, liver diseases, and as a diuretic. The fruit edible part is light source of ascorbic acid, beta carotene and good source of vitamin B complex, pectin dietary soluble fibers and contains highest source of choline level-a lipotropic factor, a healer of mental disorders, along with required metabolic and metabolite precursors for brain function, amongst any other vegetable crops.

Keywords: Calabash; Bottle Gourd; Bioprospecting; Ethnic Tribes; Zumbara

Introduction

Ethiopia is among the most biodiversity-rich countries in the world. Due to this fact it is blessed with huge diversity of plant, animal and microbial genetic resources [1]. The country is one of the best places for the existence of large and unique biodiversity both in plants and animals as there are different agroecological conditions and diverse floral resources. Ethiopia is blessed with so many crop genetic diversity resources as it is the place of various cultures, tribes, farming practices and various agro-ecological conditions. Thus, the country is categorized among the Vavilovian centers of origin and diversity for different crop species [1].

Assosa Zone is an administrative province in Benishangul-Gumuz Regional state west of Ethiopia. Sudan, Mao komo special district and Kamashi Zone are neighbors of the zone in the west south and northeast respectively. The population number of this administration area is 310,822, of which 158,932 are men and 151,890 women and 87.14% of the population is rural inhabitants. It is reported that among the four known largest ethnic tribes in this Zone Berta accounts for 59.95% and the others are the Amhara, the Oromo (10.31%), and the Tigrayans (1.5%). Main languages are the Rutana/Berta (59.31%), Amharic (25.7%), Oromo (10.68%), and Tigrigna (1.07%). The higher population of the inhabitants reported were Muslim, with 74.08% of the population, while the other 16.51% are Ethiopian Orthodox Christianity, and 8.57% were Protestant [2].

Ethiopia has legal frameworks for processing of bureaucracy to access genetic resources and community knowledge (Proclamation No 482/2006 and Regulation 169/2009). The main frame works of this law are ownership, user rights, and conditions for access, benefit sharing, types of benefits, authorities and responsibilities

between users and providers. The procedures are processed in the Access and Benefit Sharing department of the Ethiopian Biodiversity Institute. Access and benefit sharing thematic areas on the Convention of Biological Diversity (CBD) has been implementing in the country based on the above-mentioned frameworks.

Therefore, the objective of this information is to promote a plant species for bioprospecting that are mainly cultivated to be used as raw material for making of the amazing cultural musical instrument of Berta community i.e., Zumbara.

Description of the Plant and its Distribution

Bottle gourd, (*Lagenaria siceraria*), is a white-flowered gourd having a running or climbing vine of the gourd family (Cucurbitaceae), found in tropical Africa and grown in warm climates of the world for various uses such as ornamental and useful hard-shelled fruits [3]. The immature fruits are consumable and are usually cooked as a vegetable [4]. When matured, it is processed into water cans, spoons, pipes, and many other utensils and containers; it can also be designed into birds' nests, ornaments, lamps, and cultural artistic instruments. Besides, the vine's, eye appeal make it a popular screen and ornamental plant [5].

Bottle gourd is an annual plant species with quick-growing nature. It has hairy stems, long clefted tendrils, and a musky odour. The calabash gourd have been grown with different forms for predetermined function, and the sizes of the vines, leaves, and flowers, as well as the sizes and shapes of the fruits, significantly differ [5]. The fruit length of some cultivated varieties may reach more than 1 metre long. The plant is propagated sexually with seed and it needs a long hot growing season to mature [3] (Figure 1).

Significance of the plant worldwide and in Ethiopia

According to [8], Bottle gourd (*L. siceraria*) is a valuable species grown throughout the world for various uses such as for food, medicine, decoration, to make household tools, and artistic instruments. Its juice can also be utilized as medicine to treat different epidemics like flatulence, diabetes mellitus, hypertension, liver diseases, and as a diuretic [7]. The seed of this plant has abundant essential amino acids and oil. Some bottle gourd varieties are cultivated solely for their seeds [9]. Bottle gourd plants can also be used as a rootstock in watermelon cultivation to diminish soil born biotic and abiotic factors [10,11].

Figure 1: Bottle gourd plant with fresh fruit.

Bottle gourd shows significant genetic variation with regard to fruit size and shape [11,13], fruit shell thickness, fruit length and fruit width [13,15,16], and seed morpho types [12,13,17,18]. This phenotypic diversity is due to farmers' long term tradition of selection, which is often caused by specific socio-cultural inclination and use, cultural practices, and the environment [19]. Crop improvement by selection depends on the existence of genotypes possessing favorable alleles for targeted traits [20].

In Ethiopia bottle gourd grow in the warm tropics of western part of the country where the Berta and Gumuz tribal communities and native dwellers exist. These people cultivate this plant species in their backyard basically for its dried fruit. Although the dried fruit is used for making of several utensils serving in their home, it is basically grown to get the long and erect dried calabash for making of popular 'Zumbara', a huge cultural musical instrument which is symbolic for the Berta tribal community (Figure 2).

Chemical composition of the plant

The fruit edible part is light source of ascorbic acid, beta carotene and good source of vitamin B complex, pectin dietary soluble fibers and contains highest source of choline level-a lipotropic factor, a healer of mental disorders, along with required metabolic

and metabolite precursors for brain function, among any other vegetable crops. It is also good source of carbohydrate and dietary constituents, minerals, amino acids and vitamins [21,22].

Figure 2: Berta ethnic tribe playing 'zumbara' a cultural musical instrument during a wedding ceremony.

Attributes	With peel	Without peel
Iron	11.87	2.33
Phosphorus	240.33	187.33
Potassium	3320.00	3356.33
Zinc	3.77	3.47
Magnesium	162.33	146.33
Copper	0.19	0.24
Sodium	27.88	36.68
manganese	0.26	0.31

Table 1: Mineral content of Bottle gourd (mg/100g dry weight basis) [22].

Traditional medicinal uses

In India, bottle gourd fruits are culturally utilized as cardioprotective, cardiotonic, general tonic, diuretic, aphrodisiac, antidote to specific poisons, scorpion strings, alternative purgative and cooling effects. It treats various kinds of diseases like ulcers, fever and used for pectoral cough, asthma and other bronchial disorders [23,24]. The fruit pulp can be taken as cooling, diuretic, antibilious and crucial in coughs and as remedy to certain poisons [25].

Items	Fruit	Seed
Amino acid (g)		
Tryptophan	0.003	0.431
Threonin	0.018	0.903
Isolucine	0.033	1.264
Leusin	0.036	2.079
Methionin	0.004	0.551
Cystine		0.301
Pherry lalanine	0.015	1.222
Valine	0.027	1.972
Arginine	0.014	4.033
Histidine	0.004	0.681
Vitamins (mg)		
Vitamin c	10.100	1.900
Thiamin	0.029	0.210
Riboflavin	0.022	0.320
Niacin	0.320	1.745
Vitamin B6	0.040	0.224
Pantothenic acid	0.152	0.339
Vitamin E	16.02/g	1.000

Table 2: Amino acids and vitamins content of *Lagenaria siceraria* fruit and seed [23].

Conclusion

Ethiopia is blessed with various crop genetic resources as it is rich in various cultures, languages, farming systems and different agro-ecological conditions. bottle gourd,(*Lagenaria siceraria*), is found in the gourd family (Cucurbitaceae), indigenous to tropical Africa but grown in warm climate parts of the world for its ornamental and useful hard-shelled fruits. Bottle gourd (*L. siceraria*) is a valuable plant species cultivated throughout the world for various utilities such as for food, medicine, decoration, to make household tools, and musical instruments. Its juice prepared from the green fruit can also be utilized as medicine to treat different epidemics including flatulence, diabetes mellitus, hypertension, liver diseases, and as a diuretic.

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