

Biodiversity of Medicinal Plants in Homestead Garden of Bolpur-Sriniketan Block of West Bengal, India

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Abstract

Original Research Article

Medicinal and Aromatic plants are economically important plants, rich in secondary metabolites and potential source of drugs, which provide basic raw materials for medicines, perfumes, flavours and cosmetics. The use of medicinal plants has attained an important role in health system all over the world. A comprehensive effort was made throughout Bolpur-Sriniketan block of West Bengal during 2018–2019 to know the present status of medicinal plants in homestead garden. Among 80 households surveyed at 8 different villages in 4 Gram Panchayats of Bolpur-Sriniketan block, 36 households (45%) have planted different types of medicinal plants in their Homestead garden. Nearly 77.78% marginalized tribal community started for nutritional gardening whereas 22.22% were from other communities. Different kinds of vegetables (20 numbers of 11 different families), fruits (7 numbers of 7 different families), flowers (3 numbers of 3 different families) and medicinal plants (15 numbers of 11 different families) were recorded in the homestead gardens. The most common medicinal plants recorded in the homestead garden are basak, Asiatic pennywort (thankuni), tulsi (holi basil), four leaf waterclover (sushni sag), turmeric (haladi), Indian aloe (ghritokumari), ginger (ada), thornapple (dhuntra), garlic (rasun), ashoka, golden apple (bael), belelvine (pan), waterhyssop (brahmi), swampweed (kulekhara), creat (kalmegh), stinkvine (gandal), air plant (patharkuchi) and neem. A parallel medical system has developed for curing common ailments. Though, it is an option for alternative livelihood but the local healers are unaware about the modern ayurveda system.

Keywords: Biodiversity, homestead garden, medicinal plant, traditional medicine.**Copyright @ 2020:** This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited

INTRODUCTION

The World Health Organization (WHO) estimates that four billion people of the global population presently use flavouring medication for primary health care. Herbal medicine is a major element in people's traditional medicine and also a standard part in Homeopathic, ayurvedic, naturopathic, traditional oriental and Indian medicine. Herbal medicine refers to using a part of plants such as seeds, berries, roots, leaves, bark, or flowers for medicinal purposes. Herbal medicine broadly classified into various basic system: (i) Ayurvedic herbalism, which is derived from Ayurveda (ii) Traditional Chinese Herbalism, which is a part of Traditional Oriental Medicine and (iii) Western herbalism, originally came from Greece and Rome to Europe and then to North and South America. India is a land of biodiversity and rich source of Medicinal and Aromatic plants among them around 70% of the plants are spread across tropical forests of Western Ghats, Terai region, North East and Himalayas' regions. Among all the plants more than 20,000 plants are having therapeutic

activity and they are now as modern medicinal crops from the wild plants by sustainable agricultural development in favourable climate and environmental conditions [1]. India has a very rich diversity of plant species in a wide range of ecosystems, about 17,000 species of higher plants, of which approximately 8,000 species are considered medicinal and utilized by village communities, particularly tribal communities, or in traditional medicinal systems, such as the Ayurveda [2]. The use of medicinal plants has attained an important role in health system all over the world. This involves the use of medicinal plants not only for the treatment of diseases but also as potential material for maintaining good health and conditions. Many countries in the world in that two-third of the population depend on herbal medicine for primary health care. The reason for this is because of their better cultural acceptability, better compatibility and adaptability with the human body and poses lesser side effects (<https://www.tsijournals.com>). Medicinal and Aromatic plants are economically important plants which provide basic raw materials for

medicines, perfumes, flavours and cosmetics. These plants and their products help nation to earn valuable foreign exchange by way of export and also serve as valuable source of income for small holders and entrepreneurs. Medicinal plants such as aloe vera, Tulsi, Neem, Turmeric, Ginger cure several common ailments. These are considered as home remedies in many parts of country. It is known that lot of peoples are using in their daily life for making medicine, black tea, in worship and other activities (<https://agriinfo.in>).

Red and Lateritic zone of West Bengal is one of the major sources of medicinal and aromatic plants. Some parts of the Birbhum district are tribal dominated. They used to cure their ailments mainly by collecting different types of herbs grown naturally in jungle, road side or surrounding their home. Very little information has available about the cultivation of medicinal plants in homestead garden of the study area. Emphasis was given to record such information and their traditional uses in Birbhum district of West Bengal.

MATERIALS AND METHODS

A numbers of households were surveyed at 8 different villages in 4 Gram Panchayats (GP) of

Bolpur-Sriniketan block during February, 2018 to March, 2019 to record the presence of medicinal plants in homestead gardens. Stratified random sampling method was followed for the study. During survey some basic information viz. medicinal plants present in each homestead garden, plant parts used to cure ailments etc. were recorded. Besides, unstructured interviewing was made to some elderly local healers under tribal communities for collecting data regarding the use of such medicinal plants to cure common ailments.

RESULTS AND DISCUSSION

Status of Homestead Garden in Bolpur-Sriniketan Block

The experiment revealed that among 80 households surveyed at 8 different villages (viz. Amdahara, Saheb danga, Sukhbazar, Damdama, Keodaha, Kuchudanga, Barodanga and Sriniketan) in 4 Gram Panchayats (viz. Kankalitala, Sian Muluk, Albandha Sarpolehona and Ruppur) of Bolpur-Sriniketan block, 36 households (45%) tried to cultivate different types of medicinal plants in their homestead garden for different purposes like curing ailments, for beautification or extra earnings (Table 1).

Table-1: Status of medicinal plants in homestead Garden in Bolpur-Sriniketan block

Location	Households surveyed*(No.)	Household having medicinal plant (No.)	Household having medicinal plants (%)
GP – Kankalitala			
Amdahara	10	5	50
GP – Sian Muluk			
Saheb danga	10	3	30
Sukhbazar	10	6	60
GP – Albandha Sarpolehona			
Damdama	10	2	20
Keodaha	10	4	40
Kuchudanga	10	3	30
Barodanga	10	5	50
GP - Ruppur			
Sriniketan	10	8	80
Total	80	36	-
GP= Gram Panchayats, Average percentage of household having medicinal plants in their homestead garden: 45, *No. of Tribal household = 28 (77.78%), others = 8 (22.22%)			

Most of the villagers having medicinal plants in their homestead garden under the study area were from marginalized tribal community (77.78%) except a few (22.22%) (Table 1). The area is drought prone, and monocropping with rice is their traditional practice. It was also recorded from unstructured interviewing of the tribal respondents that the average annual income of each household is nearly Rs. 25000.00 (rupees twenty-five thousand only). As their income from agriculture is very low they were forced to shift their way of earnings as labour of mason or to migrate other places. Some are well known as *Janguru*, *Gunin*, *Ojha* or

Baidya, they are actually local healers. They are practicing through generations to cure common ailments of local people using different herbs. Previously they were collected such medicinal plants from road side or forests, but presently the local healers have taken interest to grow common medicinal plants in their homestead garden as alternative livelihood. During survey, it was also found that the medicinal plants in homestead garden are suffering from different biotic and abiotic stresses that should be investigated to minimize the situation.

Common vegetation in the homestead garden

Different kinds of vegetables (20 numbers of 11 different families), fruits (7 numbers of 7 different families) and flowers (3 numbers of 3 different families) plants were recorded in the homestead garden. The most common plants recorded in the homestead garden are amaranthus, poi, chilli, brinjal, tomato, okra, elephant foot yam, kidney been, papaya, jack fruit, citrus, marigold and periwinkle (Table 2). Most of the homestead gardens of tribal families have more or less similar lay out and same type of cropping pattern but there was some choice based cropping pattern recorded

in the homestead garden of other than tribal families. The garden is generally maintained by woman and child members of the family. The tribal farmers are not aware about the recent technologies for managing their garden. So, management of the garden is very poor and consequently they are receiving lower yield. It is an interesting and hopeful observation that the tribal farmers are unaware with the chemical pesticides. They try to manage their garden by traditional way. On the other hand, a few gardeners other than tribal families are using pesticides for mznaging their nutritional garden.

Table-2: Common crops recorded in homestead garden

Common name	Botanical name	Family
Vegetables		
Amaranthus	<i>Amaranthus spp.</i>	Amaranthaceae
Beet	<i>Beta vulgaris</i> L.	Amaranthaceae
Onion	<i>Allium cepa</i> L.	Amaryllidaceae
Colocasia	<i>Colocasia esculenta</i> (L.) Schott.	Araceae
Elephant foot yam	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Araceae
Basella (Poi)	<i>Basella alba</i> L.	Basellaceae
Cabbage	<i>Brassica oleracea</i> L.var. <i>capitata</i> L.	Brassicaceae
Cauliflower	<i>Brassica oleracea</i> L.var. <i>botrytis</i> L.	Brassicaceae
Knolkhol	<i>Brassica oleracea</i> L. var. <i>gongylodes</i> L.	Brassicaceae
Radish	<i>Raphanus sativus</i> L.	Brassicaceae
Bottle gourd	<i>Lagenaria siceraria</i> (Molina) Standl.	Cucurbitaceae
Pumpkin	<i>Cucurbita maxima</i> Duchesne	Cucurbitaceae
Ivy gourd	<i>Coccinia grandis</i> (L.) Voigt	Cucurbitaceae
Kidney been	<i>Phaseolus vulgaris</i> L.	Fabaceae
Okra	<i>Abelmoschus esculentus</i> (L.) Moench	Malvaceae
Chilli	<i>Capsicum annuum</i> L.	Solanaceae
Tomato	<i>Solanum lycopersicum</i> L.	Solanaceae
Brinjal	<i>Solanum melongena</i> L.	Solanaceae
Potato	<i>Solanum tuberosum</i> L.	Solanaceae
Carrot	<i>Daucus carota subsp. sativus</i> (Hoffm.) Schübl. & G. Martens	Umbelliferae
Fruits		
Mango	<i>Mangifera indica</i> L.	Anacardiaceae
Papaya	<i>Carica papaya</i> L.	Caricaceae
Jackfruit	<i>Artocarpus heterophyllus</i> Lam.	Moraceae
Drumstick	<i>Moringa oleifera</i> Lam.	Moringaceae
Banana	<i>Musa paradisiaca</i> L.	Musaceae
Guava	<i>Psidium guajava</i> L.	Myrtaceae
Citrus	<i>Citrus aurantifolia</i> (Christm.) Swingle	Rutaceae
Flowers		
Periwinkle	<i>Catharanthus roseus</i> (L.) G. Don	Apocynaceae
Marigold	<i>Tagetes erecta</i> L.	Asteraceae
Chinese rose	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae

Medicinal plants in the homestead garden

Different kinds of medicinal plants were recorded in the homestead garden. The most eleven common medicinal plants recorded in the homestead garden are basak, Asiatic pennywort (thankuni), tulsi (holi basil), four leaf waterclover (sushni sag), turmeric (haldi), Indian aloe (ghritokumari), ginger (ada), thornapple (dhuntra), garlic (rasun), ashoka, golden

apple (bael), belelvine (pan), waterhyssop (brahmi), swampweed (kulekhara), creat (kalmegh), stinkvine (gandal), air plant (patharkuchi) and neem (Table 3). These plants were under 15 different botanical families. Besides, some vegetables and fruits (papaya is used against constipation and indigestion, latex of papaya is used to cure Jaundice; drumstick leaves against small pox infection, citrus is against indigestion and skin

diseases) and flower (marigold as antiseptic to heal wounds; periwinkle to cure leukemia, diabetes and malaria) are also using by them as medicinal plants. They used such plants in curing ailments of human and animals. In most cases, tribal are very much reluctant to go to the hospital. Generally, they do not like to disclose or share their problems to others. That's why, a parallel medical system has developed and the man/woman who has engaged to such system (local healer) is popularly known as *Janguru, Gunin, Ojha or Baidya* [3]. Basically, they collect different parts of

plants having medicinal value from jungle, rode side or from surrounding their home, and prepare dose for specific diseases (Table 3). The local healers do not take honorarium for discussion regarding the ailments; they take price of medicine in terms of money. This system of treatment has developed by trial and error method since long, and has passing through generation to generation. This is an alternative way of earnings but the local healers should learn about the modern ayurveda system.

Table-3: Name and parts of plants used by the local healers as medicine

Name of plant	Plant parts used	Used for curing
Basak (<i>Justicia adhatoda</i> L., Family: Acanthaceae)	Leaves	Cough and Cold, Asthama, Bronchitis
Thornapple (<i>Datura metel</i> L., Family: Solanaceae)	Leaves, Seeds	Asthma, Whooping cough, Bronchitis, Skin diseases, Pain
Holy basil (<i>Ocimum basilicum</i> L., Family: Lamiaceae)	Leaves	Cough, Bronchitis, Skin diseases
Betelvine (<i>Piper betle</i> L., Family: Piperaceae)	Leaves and vine	Indigestion, Respiratory problems, Asthma, Chest and Lung congestion
Air plant (<i>Bryophyllum pinnatum</i> (Lam.) Oken, Family: Crassulaceae)	Leaves and shoots	Diarrhoea
Indian Aloe (<i>Aloe vera</i> (L.) Burm. f., Family: Aloaceae)	Leaves	Skin diseases, Constipation, Piles
Creast (<i>Andrographis paniculata</i> (Burm.f.) Nees, Family: Acanthaceae)	Leaves and roots	Jaundice, Intestinal worms, Dysentery
Asiatic Pennywort (<i>Centella asiatica</i> (L.) Urban, Family: Apiaceae)	Leaves	Dysentery, Eczema, Indigestion
Four Leaf Waterclover (<i>Marsilea quadrifolia</i> L., Family: Marsileaceae)	Whole plant	Insomnia, Cough, Bronchitis, Diabetes
Water hyssop (<i>Bacopa monnieri</i> (L.) Pennell, Family: Plantaginaceae)	Whole plants	Cancer, Cholesterol, Diabetes, Improve memory and liver health
Swampweed (<i>Hygrophila auriculata</i> Schumach., Family: Acanthaceae)	Whole plant including seeds and roots	Anaemia, Diarrhoea, Urinary problems
Turmeric (<i>Curcuma longa</i> L., Family: Zingiberaceae)	Rhizome	Skin diseases and Wounds, Septic, Blood contamination
Ginger (<i>Zingiber officinale</i> Rosc., Family: Zingiberaceae)	Rhizome	Breath problem, Indigestion
Garlic (<i>Allium sativum</i> L., Family: Amaryllidaceae)	Bulb	Pulmonary infection, Whooping cough, Bronchitis, Hysteria
Ashoka (<i>Saraca asoca</i> (Roxb.) Willd., Family: Fabaceae)	Flower, Bark	Astringent, Menstrual disorder, Diabetes
Golden apple (<i>Aegle marmelos</i> (L.) Correa, Family: Rutaceae)	Fruit	Constipation, Bile problem
Stinkvine (<i>Paederia foetida</i> L., Family: Rubiaceae)	Leaves	Dysentery, Diarrhoea
Neem (<i>Azadirachta indica</i> A. Juss., Family: Meliaceae)	Leaves, Seeds	Jaundice, Intestinal worms, Small pox, Leprosy, Skin diseases

CONCLUSION

The local healers are the treasure of information. Need more intervention to record and conserve such useful information from local healers for future use. If more people express their interest in growing medicinal plants in homestead garden, proper marketing channel will be developed, which will open a new window for employment of the rural youth.

CONFLICT OF INTEREST

The authors declare that no conflict of interest exists in the course of conducting this research. All authors had final decision regarding the manuscript and the decision to submit the findings for publication.

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