



Research Paper

Medicinal values of leafy greens grown in the Rajshahi division, Bangladesh

M.M. Khatun and A.H.M. Mahbubur Rahman*

Plant Taxonomy Laboratory, Department of Botany, Faculty of Biological Sciences,
University of Rajshahi, Rajshahi-6205, Bangladesh
*Corresponding Author: drrahmanahmm@ru.ac.bd

Abstract

Leafy vegetables have great importance with their high nutrient and medicinal values. The research aimed to document the medicinally important leafy greens. The present research was focused on fresh materials collected from the Rajshahi division of Bangladesh to cover the seasonal variations. The collected plant parts with flowers or fruits using traditional herbarium techniques. Semi-structured interviewees, observation and guided field walk with informants were employed to obtain medicinal data in the study area. In this study, ninety-five leafy vegetables were documented which are applied for the cure of 49 diseases. Out of 95 investigated species, *Digera muricata* (L.) Mart., *Enhydra fluctuans* Lour., *Glinus oppositifolius* (L.) Aug. DC., *Lasia spinosa* (L.) Thw., *Malva verticillata* L., *Rumex vesicarius* L. was rare. The current research will be useful in identifying the major leafy greens for further investigation and also beneficial to develop herbal medicines.

Keywords: Medicinal uses, Leafy vegetables, Rajshahi division.

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INTRODUCTION

Leafy vegetables are referred to leaves of plants used as vegetables, sometimes accompanied by tender petioles and shoots. A total of 1097 vegetables were identified in a review of the Mansfield Encyclopedia of Agricultural and Horticultural Plants (Meldrum et al., 2018). FAO (2012) has estimated that about 870 million people are chronically undernourished in the period 2010-12 representing 12.5% of the global population, or one in eight people. The daily intake of at least 100 g of fresh leafy vegetables is recommended for the adult by nutrition experts (Reddy, 1999). It has been estimated that 100 g of tropical leafy vegetables can provide 60-140 mg of ascorbic acid, 100 mg of folic acid, 4-7 mg of iron and 200-400 mg of calcium (Saxena, 1999).

Vegetables constitute essential components of the diet such as protein, vitamins, iron, calcium and other nutrients which are usually in very small quantity. Increased awareness of the usefulness of vegetable inclusions in human food has enhanced their consumption as part of the daily diet. The therapeutic

potential of the vegetables is usually attributed to the high content of vital vitamins as well as micronutrients. Vegetables are highly recommended because of the relatively high nutritional value and their consumption gives diversity to daily food intake, adding flavor and taste to the diet. Leafy vegetables are good source of vitamins and minerals. Even though vitamin is required a small amount per day in health, it plays a vital role in our health (Olaniyi, 2000).

The importance of leafy vegetables and their local uses have been documented in previous works in Bangladesh by Ali et al., (1977); Sarker and Hossain, (2009); Hassan, (2010), Rahman et al., (2015); Khatun et al., (2013) and Rashid (1999). Leafy vegetables also contain antioxidants that offer protection against many chronic diseases including heart disease and certain types of cancer (Saxena, 1999). The objectives of this research are to identify and uses indigenous knowledge of leafy vegetables in the Rajshahi division of Bangladesh.

MATERIALS AND METHODS

Study area: Rajshahi division area 18174.40 sq km, located in between 23°48' and 25°16' north latitudes and in between 88°01' and 89°48' east longitudes. It is bounded by West Bengal state of India and Dinajpur and Gaibandha districts on the north, Rajbari and Kustia districts on the south, Jamalpur, Tangail and Manikganj districts on the east, West Bengal state of India on the west (Banglapedia, 2012).

Survey method: The present research is based on fresh materials collected during 29 field visits to the Rajshahi division of Bangladesh from July 2018 to March 2020. A total of 95 species belonging to 53 genera under 28 families were recorded. The field observations covered all types of habitats like roadsides, village grooves, slopes, and river banks and fruit gardens. Semi-structured interviewed methods were followed by knowledgeable persons. One hundred and seventy-nine (179) informants having an age range of 18-81 years were interviewed using the semi-structured interviewed method (Alexiades, 1996). Plant parts with either flowers or fruits were collected using traditional herbarium techniques to make voucher specimens for documentation and voucher specimens have been preserved at Herbarium of Rajshahi University.

Plant identification: Collected plant samples have been examined and identified. Identifications have been confirmed by consulting standard kinds of literature (Hooker, 1877; Prain, 1903) and Ahmed et al., 2008-2009). Updated nomenclature was followed by stand works of literature like Ahmed et al. (2008-2009); Huq (1986) and Pasha and Uddin (2013).

RESULTS AND DISCUSSION

The leafy vegetables are used for medicinal purposes in the Rajshahi division of Bangladesh was highlighted. Ninety-five medicinal plants were focused on their uses for the cure of more than 49 ailments. The medicinal leafy greens are used by the local people to cure following the diseases, especially for piles, diarrhoea, sex problems, skin diseases, anaemia, headache, asthma, worm, burning sensation, wound, blood disease, bronchitis, cough, chickenpox, constipation, dysentery, diabetes, eczema, fever, itches, jaundice, menstrual disease, paralysis, snake-bite, toothache and others. According to Anisuzzaman *et al.* (2007) *Allium sativum*, *Allium cepa*, *Boerhaavia repens*, *Portulaca oleracea*,

Bacopa monnieri, *Paederia foetida*, *Ipomoea aquatica*, *Momordica charantia*, *Chenopodium album*, *Colocasia esculenta*, *Amaranthus spinosus* and *Spinacea oleracea* have great medicinal importance. *Hygrophila auriculata*, *Alternanthera sissilis*, *Trichosanthes dioica* are useful for dysentery and diarrhea (Faruque and Uddin, 2014). Rahman *et al.* (2015) reported that leaves of *Solanum nigrum*, *Paederia foetida*, *Corchorus capsularis*, *Boerhaavia repens*, *Moringa oleifera*, *Glinus oppositifolius*, *Momordica dioica*, *Colocasia esculenta* and *Lagenaria siceraria* are used for asthma, anemia, bleeding piles, diabetes, dry cough, dysentery, fever, gonorrhoea, hypertension, tonic, liver disorders, worms, jaundice, urinary complaints, anorexia hiccup and intestinal ulcers, burning sensation, eczema, leprosy, bronchitis, leucorrhoea and constipation. *Azadirachta indica* leaf decoction is used for scabies, itches, eczema and other skin diseases (Uddin and Hassan, 2014). The leaves of *Ipomoea aquatica*, *Ipomoea batatas* and *Ipomoea quamoclit* are used for the treatment of fever, diarrhoea, bleeding piles, leprosy, jaundice, bronchitis and liver complaints (Sultana and Rahman, 2016; Yusuf *et al.*, 2006).

Plant parts of different spp. are used as medicinal purposes, leaf of 64.21% followed by fruits (18.94%), root (8.75%), stem (1.90%), seed (17.61%), bulb (1.90%), corm (2.85%), flower (2.85%) and whole plant (17.08%) were used (**Fig. 1**). The present research highlighted 49 ailments of uses of 95 medicinal leafy greens (**Table 1**). Total 49 categories of diseases, cough (8.95%), constipation (3.97%), dysentery (11.71%), fever (12.41%), gonorrhoea (7.70%), inflammation (11.21%), piles (11.81%), rheumatism (6.90%) and skin disease (8.50%) were prominent (**Fig. 2**). The present data suggest that the leafy greens contain other phytochemical constituents which need to be investigated in future. Similar research works were compared by Anisuzzaman *et al.* (2007); Ghani (2003); Khan (1998), Choudhury and Rahmatullah (2012), Faruque and Uddin (2014), Uddin and Hassan (2014), Uddin *et al.*, (2015), and Yusuf *et al.* (2006). The present observation discusses that the rural communities were used medicinal leafy greens as their primary health care. The present paper is useful for further researches in the field of ethnobotany, taxonomy and development of the new drug from natural resources.

Table 1: Leafy greens grown in Rajshahi division of Bangladesh used for medication

Name of families	Botanical name and Specimen number	Bangla name	Use of plant parts	Medicinal Uses
Acanthaceae	<i>Hygrophila auriculata</i> (Schum.) Heyne., MMK 102	Puninnya shak	Leaf	Diarrhea, dysentery, urinary discharges, inflammation, biliousness, anemia, constipation, cough
Amaranthaceae	<i>Spinacea oleracea</i> L., MMK 95	Palong shak	Whole plant	Fevers, joint pain, inflammations of the lungs and bowels
Amaranthaceae	<i>Celosia cristata</i> L., MMK 104	Morog phul	Flower	Dysentery, cough, diarrhea, excessive menstrual discharges,
Amaranthaceae	<i>Digera muricata</i> (L.) Mart., MMK 93	Boutibon shak	Leaf	Biliousness, urinary discharges
Amaranthaceae	<i>Alternanthera philoxeroides</i> (Mart.) Griseb., MMK 106	Malancha	Whole plant	Vomiting, constipation, night blindness, malaria
Amaranthaceae	<i>Alternanthera sessilis</i> (L.) R. Br., MMK 91	Sachi Shak	Whole plant	Night blindness, malaria, diarrhea, dysentery
Amaranthaceae	<i>Alternanthera bettzickiana</i> L., MMK 108	Malancha	Leaf	Anemia
Amaranthaceae	<i>Amaranthus oleracea</i> L., 89	Data shak	Leaf	Fever, anemia, kidney disease
Amaranthaceae	<i>Amaranthus polygonoides</i> L., MMK 110	Notey shak	Whole plant	Inflammation, gonorrhoea, dysentery
Amaranthaceae	<i>Amaranthus spinosus</i> L., MMK 87	Kanta notey	Leaf, Root	Burning sensation, eczema, leprosy, piles, bronchitis, leucorrhoea, constipation
Amaranthaceae	<i>Amaranthus tricolor</i> L., 112	Lalshak	Leaf	Cough, dysentery, cholera, worm
Amaranthaceae	<i>Amaranthus viridis</i> L., MMK 85	Noteyshak	Leaf, Root	Burning sensation, leprosy, bronchitis, piles, leucorrhoea
Angiopteridaceae	<i>Angiopteris evecta</i> (Forst.) Hoffm., MMK 114	Dheki shak	Bulb	Constipation
Araceae	<i>Lasia spinosa</i> (L.) Thw., 83	Kanta kachu	Leaf	Throat affections, piles
Araceae	<i>Alocasia indica</i> Schott., 116	Manchu	Whole plant	Influenza, diarrhea, tuberculosis
Araceae	<i>Amorphophalus bulbifer</i> (Roxb.) Blume, 81	Olkochu	Corm	Piles, gonorrhoea
Araceae	<i>Colocasia esculenta</i> (L.) Schott., MMK 118	Kochu	Leaf	Tumors, ulcerated polyp, cancer of nose and warts
Araceae	<i>Xanthosoma atrovirens</i> L., MMK 79	Moulovi kochu	Leaf	Food allergies
Araceae	<i>Thyphonium trilobatum</i> (L.) Schott., MMK 120	Bhot kochu	Corm	Tumors, haemorrhoids, piles
Apiaceae	<i>Centella asiatica</i> (L.) Urb., 77	Thankuni	Whole plant	Eczema, leprosy, bronchitis, inflammations, fevers
Apiaceae	<i>Coriandrum sativum</i> L., 122	Doniya	Leaf, fruit	Hiccup, piles, inflammation, jaundice
Athyriaceae	<i>Diplazium esculentum</i> Retz., 75	Dhekishak	Fronde	Urinary problems and skin diseases
Asteraceae	<i>Lactuca sativa</i> L., MMK 124	Lettuce	Leaf	Headache, ophthalmia, prevents fall of hairs, inflammation
Asteraceae	<i>Xanthium strumarium</i> L., MMK 73	Ghagra	Young stem	Diabetes
Asteraceae	<i>Enhydra fluctuans</i> Lour., MMK 126	Helenchu	Leaf	Skin and nervous affections
Basellaceae	<i>Basella alba</i> L., MMK 71	Puishak	Root	Gonorrhoea, catarrhal affections
Brassicaceae	<i>Brassica juncea</i> L., MMK 128	Rai sorisha	Seed	Arthritis, foot ache, tumor
Brassicaceae	<i>Brassica napus</i> L., MMK 69	Kalo sorisha	Seed	Gout, sciatica
Brassicaceae	<i>Brassica oleracea</i> L. var. <i>botrydis</i> , MMK 130	Fulkopi	Leaf	Cancer
Brassicaceae	<i>Brassica rapa</i> L., MMK 67	Shalgam	Leaf	Cancer, chronic cough, bronchial catarrh
Brassicaceae	<i>Brassica alba</i> Hook., MMK 132	Sada sorisha shak	Leaf	Inflammatory symptoms, rheumatic affections
Brassicaceae	<i>Brassica campestris</i> Roxb., MMK 65	Sorisha shak	Leaf	Inflammatory symptoms rheumatic affections
Chenopodiaceae	<i>Chenopodium album</i> L., MMK 134	Botua shak	Leaf	Piles, dysentery, anorexia hiccup and intestinal ulcers
Chenopodiaceae	<i>Chenopodium ambrosioides</i> L., MMK 63	Banbatua	Whole plant	Cholera ulcers, nervous affections
Cucurbitaceae	<i>Benincasa hispida</i> (Thunb.) Cogn., MMK 136	Chal kumra	Fruit	Epilepsy, heart diseases, tuberculosis, colic pain
Cucurbitaceae	<i>Coccinia cordifolia</i> (L.) Cogn, MMK 61	Telakucha	Whole plant	Diabetes, epilepsy, asthma, fever, dropsy, gonorrhoea
Cucurbitaceae	<i>Coccinia grandis</i> (L.) Voigt., MMK 138	Telucha	Leaf	Diabetes, fever, gonorrhoea
Cucurbitaceae	<i>Cucumis melo</i> L., MMK 59	Bangi	Fruit	Liver and kidney troubles, fever, bronchitis
Cucurbitaceae	<i>Cucumis sativus</i> L., MMK 140	Sosha	Leaf	Throat affection
Cucurbitaceae	<i>Cucurbita maxima</i> Duch., MMK 57	Misti kumra	Leaf	Burns, boils, inflammation
Cucurbitaceae	<i>Cucurbita sativus</i> Duch., MMK 142	Kumra	Leaf	Throat affection
Cucurbitaceae	<i>Cucurbita pepo</i> DC., MMK 55	Mistikodu	Seed	Biliousness and burning sensation
Cucurbitaceae	<i>Cucurbita moschata</i> Duch., MMK 144	Mistikodu	Seed	Biliousness and burning sensation

Name of families	Botanical name and Specimen number	Bangla name	Use of plant parts	Medicinal Uses
Cucurbitaceae	<i>Lagenaria siceraria</i> (Mol.) Stan., MMK 53	Panilau	Fruit, Leaf	Muscular pain, dry cough, piles, cholera
Cucurbitaceae	<i>Luffa cylindrica</i> (L.) Roem., MMK 146	Dhundol pata	Leaf	Skin problems
Cucurbitaceae	<i>Momordica charantia</i> L., MMK 51	Korola	Fruit, Leaf	Body pain, diabetes, urinary disorder, fever, Jaundice
Cucurbitaceae	<i>Momordica dioica</i> Roxb., MMK 148	Kakrol shak	Leaf	Bleeding piles, urinary complaints, hypertension Diabetes
Cucurbitaceae	<i>Momordica cochinchinensis</i> Roxb., MMK 49	Kakrol	Leaf	Heart disease, ulceration
Cucurbitaceae	<i>Trichosanthes anguina</i> L., MMK 150	Chichinga	Whole plant	Boils, skin diseases
Cucurbitaceae	<i>Trichosanthes bracteata</i> Lam., MMK 47	Makal	Leaf	Ophthalmia, leprosy
Cucurbitaceae	<i>Trichosanthes dioica</i> Roxb., MMK 152	Potol	Fruit	Dysentery, diarrhea, bronchitis
Convolvulaceae	<i>Ipomoea aquatica</i> Forssk., MMK 45	Kalmi Shak	Flower	Leucoderma, leprosy, fever, jaundice, biliousness, bronchitis and liver complaints
Convolvulaceae	<i>Ipomoea batatas</i> (L.) Lamk., MMK 154	Misti Alu	Whole plant	Fever, diarrhea
Convolvulaceae	<i>Ipomoea cairica</i> (L.) Sweet., MMK 43	Raillata	Leaf	Rheumatism, inflammation
Convolvulaceae	<i>Ipomoea indica</i> (Burm.) Merr., MMK 156	Kolmi	Leaf	Broken bones
Convolvulaceae	<i>Ipomoea purpurea</i> (L.) Roth., MMK 41	Begunikolmi	Leaf	Hemorrhage, syphilis
Convolvulaceae	<i>Ipomoea quamoclit</i> L., MMK 158	Torulata	Whole plant	Bleeding piles
Euphorbiaceae	<i>Acalypha indica</i> L., MMK 39	Mukta jhuri	Leaf	Skin disease, asthma, wound, pneumonia, bronchitis
Euphorbiaceae	<i>Phyllanthus niruri</i> L., MMK 160	Vuiamla	Whole plant	Liver disease, kidney troubles, spleen disorder
Fabaceae	<i>Pisum sativum</i> L., MMK 37	Motor	Seed	Burning of the skin
Fabaceae	<i>Cicer arietinum</i> L., MMK 162	Chola, boot	Seed	Skin disease
Fabaceae	<i>Lens culinaris</i> Medik., MMK 35	Mosur	Leaf, Seed	Constipation, intestinal affections.
Fabaceae	<i>Vigna mungo</i> (L.) Hepper, MMK 164	Mash kalai	Leaf	Piles, asthma, leucoderma, paralysis, rheumatism, cough
Fabaceae	<i>Vigna sinensis</i> (L.) Endl., MMK 33	Borboti	Leaf	Jaundice
Liliaceae	<i>Allium cepa</i> L., MMK 166	Piaj	Bulb	Cough, asthma, rheumatism, colic, insect bites
Liliaceae	<i>Allium sativum</i> L., MMK 31	Rosun	Bulb	Fever, cough, bronchitis, rheumatism, indigestion, heart diseases
Malvaceae	<i>Malva verticillata</i> L., MMK 168	Napashak	Leaf	Disorders of the skin, gastrointestinal tract, respiratory tract
Malvaceae	<i>Hibiscus cannabinus</i> L., MMK 29	Mestapat	Leaf	Pains, earache, dysentery, biliousness
Malvaceae	<i>Hibiscus sabdariffa</i> L., MMK 170	Lalmesta	Leaf	Dysentery and diarrhea
Marsileaceae	<i>Marsilea minuta</i> (L.) Mant., MMK 27	Susnishak	Whole plant	Cough, respiratory troubles, hypertension, sleeping disorders, headache
Marsileaceae	<i>Marsilea quadrifolia</i> L., MMK 172	Susnishak	Whole plant	Snakebite, abscesses
Meliaceae	<i>Azadirachta indica</i> A. Juss., MMK 25	Neem	Leaf, Friut	Skin diseases, itches, lice killer worm, ringworm
Molluginaceae	<i>Glinus oppositifolius</i> (L.) Aug. DC., MMK 174	Gimashak	Leaf	Diabetes
Molluginaceae	<i>Mollugo pentaphylla</i> L., MMK 23	Tita shak	Leaf	Asthma, mouth infections, eye diseases
Molluginaceae	<i>Mollugo spargula</i> L., MMK 176	Gima shak	Whole plant	Sore legs, menstrual discharge
Moringaceae	<i>Moringa oleifera</i> Lamk., MMK 21	Sajna	Leaf, fruit	General weakness, blindness, headache, paralysis and gastric problem
Nyctaginaceae	<i>Boerhaavia repens</i> L., MMK 178	Punarnava	Leaf, Root	Dysentery, jaundice, anemia, gonorrhea
Oxalidaceae	<i>Oxalis europea</i> L., MMK 19	Amrul	Leaf	Boils, abscess
Oxalidaceae	<i>Oxalis corniculata</i> L., MMK 180	Amrul	Leaf	Cough, dysentery, anemia, piles, dyspepsia, fever
Polygonaceae	<i>Rumex vesicarius</i> L., MMK 101	Chuka palong	Leaf	Heart troubles, constipation, hiccup, asthma, bronchitis, piles
Polygonaceae	<i>Rumex dentatus</i> L., MMK 182	Bon Palong	Root	Coetaneous disorders
Polygonaceae	<i>Rumex maritimus</i> L., MMK 103	Bon Palong	Leaf, Seed	Ringworms, skin diseases
Polygonaceae	<i>Rumex sanguineus</i> L., MMK 184	Bon Palong	Seed	Pain of back and lumber region, cures gleans
Portulacaceae	<i>Portulaca oleracea</i> L., MMK 105	Borononia shak	Whole plant	Scurvy, diseases of the liver, spleen, kidney gonorrhea, dysentery
Portulacaceae	<i>Portulaca quadrifida</i> L., MMK 186	Choto noniashak	Whole plant	Piles, swellings, rheumatism
Rubiaceae	<i>Paederia foetida</i> L., MMK 107	Gondho Vaduli	Leaf	Liver, stomach troubles, diarrhea, dysentery
Scrophulariaceae	<i>Bacopa monnieri</i> (L.) Pennel., MMK 188	Brammi Shak	Whole plant	Indigestion, diarrhea, epilepsy
Solanaceae	<i>Capsicum frutescens</i> L., MMK 109	Morich	Leaf	Headache, night blindness, bronchitis, cough

Name of families	Botanical name and Specimen number	Bangla name	Use of plant parts	Medicinal Uses
Solanaceae	<i>Solanum americanum</i> L., MMK 190	Tit Begun	Fruit	Hepatitis B
Solanaceae	<i>Solanum nigrum</i> L., MMK 111	Tit Begun	Leaf, fruit	Liver disease, piles, dysentery, fever, diarrhea, bronchitis
Solanaceae	<i>Solanum indicum</i> L., MMK 192	Tit Begun	Leaf	Diabetes, asthma, dry cough, worms, fever
Solanaceae	<i>Solanum villosum</i> L., MMK 113	Tit Begun	Leaf	Stomachache, fever, hypertension
Solanaceae	<i>Solanum filisifolium</i> L., MMK 194	Tit Begun	Whole plant	Spleen, cough
Tiliaceae	<i>Corchorus capsularis</i> L., MMK 115	Deshpat	Leaf, Root	Dysentery, tonic, dyspepsia, liver disorders, gonorrhoea
Tiliaceae	<i>Corchorus olitorius</i> L., MMK 196	Patshak	Leaf	Dyspepsia, liver disorders

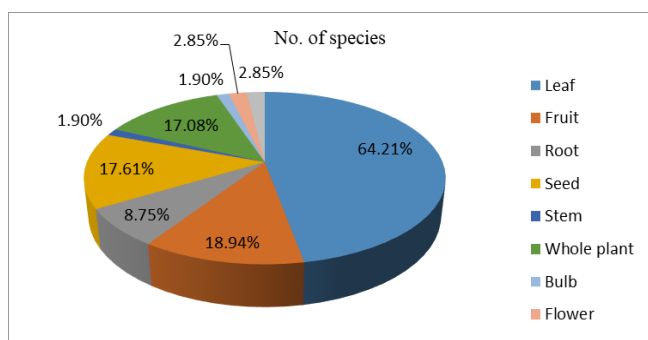


Fig. 1: Ratio of different plant parts used for medicinal uses

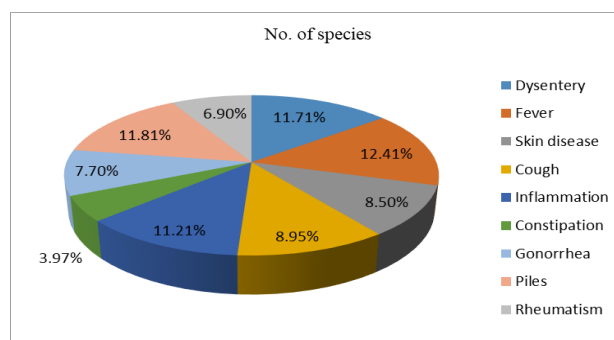


Fig. 2: Ratio of disease infestation in the study area

CONCLUSION

Leafy vegetables are used for medicinal purposes has a moderately rich resource of leafy vegetables, it witnesses some threats which might drive this resource to an endangered stated. Observations and group discussions with local people during field visits noted that urbanization, modern agriculture, brickfields, deforestation, and lack of awareness, invasive plant species, and filling the water bodies etc. were the major threats in declining the explore of leafy vegetable production. Therefore, efforts should be undertaken through *ex-situ* and *in situ* conservation approaches, public awareness, and habitats protection to ensure for healthy production of leafy vegetables.

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