

Investigation of Medicinal Plants at Katakhal Pouroshova of Rajshahi District, Bangladesh and their Conservation Management

A.H.M. Mahbubur Rahman*, Ashit Kumar Sarker

Plant Taxonomy Laboratory, Department of Botany, University of Rajshahi, Rajshahi-6205, Bangladesh

*Corresponding author: ahmmahbubur_rahman@yahoo.com

Abstract Investigation of medicinal plants at Katakhal Pouroshova of Rajshahi district and their conservation management was carried out from December 2013 to July 2015. A total of twenty six field trips were made for documentation. During the field interview, the information was noted in the documentation data sheet. All the information regarding plant species, biological forms, habitat, local names and uses was documented. Medicinal information was obtained through informal interviews following semi-structured from knowledgeable person's particularly local Kabiraj/Herbalists and elderly people. One hundred and forty three (143) medicinal plants have been documented with their uses for the cure of more than 109 diseases, and some of these are abscess, asthma, abortion, cough, cold, chicken pox, constipation, dysentery, diarrhea, diabetes, eczema, fever, and fracture of bone, headache, heart disease, itches, jaundice, menstrual disease, paralysis, piles, skin diseases, snake-bite, sex problems, toothache, vomiting, worm, wound and others. In majority cases, leaves of the medicinal plants were found leading in terms of their use followed by whole plant, stem, bark, fruits, rhizome, seed, root and flower. For each species scientific name, family, medicinal use and part(s) used are provided.

Keywords: medicinal plants, conservation management, Katakhal, Rajshahi, Bangladesh

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1. Introduction

Plants and man are inseparable. Plants existed on the earth in the geological past from the early history of the earth. The use of plants to alleviate human suffering is as old as the evolution of human civilization itself. From the early stages of human civilization, plants, especially medicinal plants have played a pioneering role for the welfare of human beings. Recently, dramatic changes have taken place in the primary health care system of world population through the development of science, technology and medical science, but till to day 400 cores of people of the world are totally dependent on herbal medicine. It is revealed that even in the developed countries 25%, of the prescribed drugs come from plant sources and herbal medicines are used by about 75-80% of the world's population for primary health care because of their better cultural acceptability, better compatibility with human body and lesser side effects. WHO consultative body of medicinal plants has formulated a definition of medicinal plants in the following way "A medicinal plant is any plant which in one or more of its organs, contains substances that can be used for therapeutic purposes or which is a precursor for synthesis of useful drugs" [60].

Bangladesh has very rich in Bio-diversity. It has more than 500 medicinal plants species [69]. An alarmingly

populous, but size-wise a very small country is rather unique in having diversified genetic resources in a wide range of habitats. Increasing population pressure and multifarious anthropogenic activities on the natural ecosystems are posing severe and serious threats to once dense and rich genetically diversified plant communities of this country. Loss of habitats from the wild forests as well as from the village groves, cultivated plains and wild lands are quite common in this country. A broad genetic base has been replaced by a narrow one, and the old genetic diversity is disappearing both inside and outside of the ancient gene centers. This trend is inevitable with the need for highly efficient and uniform cultivars in advanced and sophisticated farming systems. At present, we have no real protected area for natural genetic resources and also have no specific practical policy on conservation of biodiversity. Although there are several gene banks having limited facilities to preserve some economic crops like rice, jute, wheat, pulses etc in Bangladesh, but there is no centralized organization to maintain germplasms of the wild relatives for agriculture, horticulture, medicinal and economically less important forest species. Bangladesh Agricultural Research Council (BARC) is very worried about this. However, the rich and diverse heritage of traditional medicinal system in the Indian sub-continent including Bangladesh is increasingly threatened by the interplay of a number of factors such as

rapid deforestation and habitat destruction, indiscriminate collection and exploitative trade network.

In Bangladesh there are about 297 Unani, 204 Ayurvedic and 77 Homeopathic drug manufacturing industries where the medicinal plants are extensively used in both raw and semi-processed forms of medicine in various pharmaceutical dose formulations. These plants also serve as important raw materials for many modern medicinal preparations. The market value of drugs produced by these industries from medicinal plants is about Tk. 300 crores. Besides, village Kobiraj, street Vendors and Tribal people also use a large number of medicinal plants for the treatment of various diseases. There is no actual figure how many medicinal plants are used in Bangladesh. Chowdhury at SAARC workshop (held on 16-18 June, 2002) gave a brief idea about the

amount of medicinal plants used annually in Bangladesh. A few of them are mentioned here: Ashwagandha (*Withania somnifera*)-56,000 kg, Anantamul (*Hemidesmus indicus*)-50,000 kg, Kurchi (*Holarrhena antidysenterica*)-1,00,000 kg, Gulancha (*Tinospora cordifolia*)-127,000 kg. According to Hamdard Laboratories (WAQF), in Bangladesh the annual demand for a few medicinal plants are- Satomuli (*Asparagus racemosus*)-800 tons, Sarpagondha (*Rauwolfia serpentina*)-1,000 tons, Ghritokumari (*Aloe vera*)-24,000 tons, Kalomegh (*Andrographis paniculata*)-1,000 tons (Hassan, 2003). Every year Bangladesh imports a large quantity raw materials belonging to of medicinal plants mostly under the banner of spices and spends more than 64 crores Taka annually for this purpose. Ironically, 70% of this imported raw material can be met from the indigenous sources from Bangladesh [15].

Table 1. Medicinal plant species listed by WHO which can be grown in Bangladesh commercially [15,68].

Scientific name	Bengali name	English name	Used parts	Used as patent drugs
<i>Withania somnifera</i> Dunal	Ashwagandha	Winter Cherry	Root, Leaf, Fruit, Seed, whole plant	Syrup Masturin, Arq Ashwaganda, Magun Sohag Soonth
<i>Aloe vera</i> Tour. ex Linn.	Ghritokumari	Aloe	Leaf	Tablet Suranjan, Tablet Mudir, Syrup Belgiri
<i>Andrographis paniculata</i> Wall.ex Nees.	Kalomegh	Creast	Leaf, Stem, whole plant	Syrup Safi, Syrup Kurchi
<i>Asparagus racemosus</i> Willd.	Satomuli	Aspargus	Tuberous root, Leaf, Flower, Fruit	Tablet Abiaj, Khisandha, Ka-4, Sufoof Gigian
<i>Plumbago zeylanica</i> Linn.	Chita		Root	Majoon Falasefa, Syrup Kurchi
<i>Adhatoda zeylanica</i> Nees. (Syn. name- <i>A. vasica</i> Linn.)	Vasak	Vasaka	Leaf, Stem, Bark, Root, Flower	Syrup Saduri, Chawan Prash, Tablet Sualin, Syrup Ajaj
<i>Rauwolfia serpentina</i> (Linn.) Benth.	Swarpagandha	Snake root	Root	Syrup Mangurin
<i>Glycyrrhiza glabra</i> Linn.	Jastimodhu	Liquorice root	Root, Stem	Tablet Sualin, Mauol Hiat, Syrup Badian, Tablet Kafur

Medicinal plants are a potential resource for uplifting state economy so, we should know about growth and productivity of some commercially important medicinal plants. A large number of people in Bangladesh are solely dependent on Ayurvedic treatment for maintaining their health. The medicinal plants as a whole occupy an important position in modern medicine since the industry is showing special interest in synthesizing natural substances as they are found to be more effective in particular applications. It provides a complete system of healing and prevention of diseases. Herbal drugs are becoming popular because they are holistic in nature, able to look beyond the symptoms to the underlying systemic imbalance. When applied by the trained practitioners, herbal medicine offers very real and permanent solution to very real problems. In fact, century old nature friendly medicare system has stood the test of time and holds promise for the present and the future. Cultivation of medicinal plants gives scope to improve the quality of the drugs. There is a growing demand today for plant-based medicines and health products, pharmaceuticals, food supplements, cosmetics etc. in the international market.

Several medicinal plants and ethno-botanical studies in Bangladesh have been carried out. [3,4], documented the ethnobotanical information and medicinal plant use by Marma. Several work also done by [8], [1], [16], [17], [11], [12], [13], [61], [9], [10], [19], [22-59], [62-67], [69,70,71] and [6]. The aim of the present study was to first record of medicinal plants used by the local people living in Katakhal Pouroshova of Rajshahi district, Bangladesh.

2. Materials and Methods

In the present survey of medicinal plants, a total of 143 plant species were collected and recorded for their use in various ailments. A total of 156 local people having an age range 25-65 years were interviewed using semi-structured interviewed method [5]. Professionally they were peasant, day labor, farmer, betel leaf cultivators, house wives, medicine men, small shop keepers etc. Among them 76 were female and rest 80 were male. Regular field studies were made in the study area during the period. The information about the plants used for various diseases was gathered through interviews and discussion with the elderly people, medicine men and traditional medical practitioners were also consulted. Triangulation methods have been followed for data validation in the field. Plant specimens with flowers and fruits were collected and processed using standard herbarium techniques. Herbal plants referred by these people were authentically identified with the help of [7], [20], [21], [42], [43], [14] and [2]. The voucher specimens are stored at the Herbarium, Department of Botany, University of Rajshahi for future reference.

3. Results and Discussion

In the present medicinal plants and their use in different ailments by the local people at the Katakhal pouroshova survey, a total of 143 species were recorded. For each

species scientific name, family, mode of use and part(s) used are provided (Table 2). Analysis of the data based on habits showed that leading medicinal plant species 34.56% belonged to trees, 35.18% herbs, 19.13% shrubs and 10.49% climbers.

Table 2. List of medicinal plants and their use in different ailments by the local people at Katakhalı pouroshova of Rajshahi district, Bangladesh.

S/N	Scientific Name	Family	Parts used	Medicinal use
1	<i>Abelmoschus esculentus</i> (L.) Moench	Malvaceae	Fruit	Chronic dysentery, gonorrhoea, urinary discharges and diarrhoea.
2	<i>Abroma augusta</i> (L.) L.f.	Sterculiaceae	Root bark, Leaves stalk	Irregular menses and pain, dysentery, weakness.
3	<i>Acacia nilotica</i> (L.) Del.	Mimosaceae	Bark, Flowers	Threadworms, scabies, dysentery and insanity
4	<i>Acalypha indica</i> L.	Euphorbiaceae	Whole Plant	Bronchitis, pneumonia, asthma, pulmonary, tuberculosis, ringworm.
5	<i>Adhatoda vasica</i> Nees.	Acanthaceae	Bark, Flowers, Leaves	Cough, asthma, ophthalmia and diarrhoea.
6	<i>Aegle marmelos</i> (L.) Corr. Serr.	Rutaceae	Fruit	Diarrhoea, dysentery and ripe fruit for constipation.
7	<i>Albizia procera</i> (Roxb.) Benth.	Mimosaceae	Bark, Leaves	Ulcer, threadworms, scabies, toothache.
8	<i>Allium cepa</i> L.	Liliaceae	Bulb	Cough, asthma, rheumatism, colic and insect bites.
9	<i>Allium sativum</i> L.	Liliaceae	Bulb	Fevers, coughs, bronchitis, rheumatism, inflammation, leucoderma, piles, indigestion, heart diseases and wounds, gas formation, painful menstruation and pain in abdomen and ears.
10	<i>Alocasia indica</i> (Roxb.) Schott.	Araceae	Root	Inflammations, leprosy and piles.
11	<i>Aloe vera</i> (L.) Burm. f.	Aloaceae	Whole Plant	Viral jaundice, rheumatism, swelling and paralysis.
12	<i>Alstonia scholaris</i> (L.) R.Br.	Apocynaceae	Sap, gum and roots	Cancer
13	<i>Alternanthera philoxeroides</i> (Mart.) Griseb.	Amaranthaceae	Whole Plant	Blood vomiting, night blindness, malaria, diarrhoea, dysentery and puerperal fever.
14	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Amaranthaceae	Whole Plant	Blood vomiting.
15	<i>Amaranthus dubius</i> Mart. ex Thell.	Amaranthaceae	Root bark, Leaves	Blood diseases, burning sensation, leprosy, leucorrhoea.
16	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Whole Plant	Appetite, burning sensation, hallucination, leprosy, piles, bronchitis, leucorrhoea, constipation and flatulence.
17	<i>Amaranthus tricolor</i> L.	Amaranthaceae	Leaves	Blood vomiting.
18	<i>Amaranthus viridis</i> L.	Amaranthaceae	Whole Plant	Burning sensation, hallucination, leprosy, bronchitis, piles, leucorrhoea and constipation.
19	<i>Andrographis paniculata</i> Wall ex Nees	Acanthaceae	Leaves, Bark, Root	Piles, cough, asthma.
20	<i>Annona squamosa</i> L.	Annonaceae	Root, Bark	Drastic purgative, diarrhoea.
21	<i>Anthocephalus chinensis</i>	Rubiaceae	Leaves	Aphthae and stomatitis.
22	<i>Areca catechu</i> L.	Arecaceae	Fruit	Cardio tonic, improves appetite.
23	<i>Argemone mexicana</i> L.	Papaveraceae	Latex	Skin cracks, dropsy, jaundice warts, tumors, cancer, and cutaneous affections.
24	<i>Artocarpus heterophyllus</i> Lamk.	Moraceae	Leaves	Skin diseases
25	<i>Averrhoa carambola</i> L.	Oxalidaceae	Fruit	Influenza fever.
26	<i>Bambusa balcooa</i> Roxb.	Poaceae	Root, Bark	Joint pains and general debility.
27	<i>Basella alba</i> L.	Basellaceae	Root, Leaves	Toothache, constipation.
28	<i>Bauhinia acuminata</i> L.	Caesalpiniaceae	Leaves, Root	Bladder stone, leprosy and asthma.
29	<i>Benincasa hispida</i> (Thunb.) Cogn.	Cucurbitaceae	Fruits	Haemoptysis and other haemorrhages from internal organs, particularly beneficial in phthisis.
30	<i>Boerhaavia diffusa</i> L.	Nyctaginaceae	Leaves, seeds	Dyspepsia, tumors, abdominal pains.
31	<i>Bombax ceiba</i> L.	Bombacaceae	Bark and Thorns.	Wounds, ulcers, skin diseases, hemorrhoids, urinary calculus, cystitis, inflammations, cough and bronchitis.
32	<i>Borassus flabellifer</i> L.	Arecaceae	Juice	Dysentery.
33	<i>Brassica napus</i> L.	Brassicaceae	Leaves, seeds	Stomachic, vesicant.
34	<i>Bryophyllum pinnatum</i> (Lam.) Oken.	Crassulaceae	Leaves	Blood dysentery.
35	<i>Butea monosperma</i> (Lam.) Taub.	Fabaceae	Flower, seeds	Urinary complaints.
36	<i>Cajanus cajan</i> (L.) Millsp.	Fabaceae	Leaves	Jaundice and pneumonia.
37	<i>Calotropis procera</i> (Aiton.) Dryand	Asclepiadaceae	Root bark	Dyspepsia, flatulence, constipation, loss of appetite, indigestion and mucus in stool.
38	<i>Capsicum frutescens</i> L.	Solanaceae	Leaves	Headache, night blindness, pain, adenitis, sores, dysuria and bronchitis.
39	<i>Carica papaya</i> L.	Caricaceae	Fruit, Latex	Dyspepsia, ringworm, wounds, ulcers.
40	<i>Carissa carandas</i> L.	Apocynaceae	Fruit	Diabetes.
41	<i>Catharanthus roseus</i> (L.) G.Don.	Apocynaceae	Whole Plant, Leaves	Diabetes, wasp-sting, menorrhagia.
42	<i>Celosia cristata</i> L.	Amaranthaceae	Whole Plant, Flower	Dysentery and strangury, diarrhoea and excessive menstrual discharges.
43	<i>Centella asiatica</i> (L.) Urban.	Apiaceae	Whole Plant	Improves appetite, voice and memory; dysentery, leucoderma, urinary discharges, bronchitis, inflammations, fevers.

44	<i>Citrus aurantifolia</i> (Christ.) Swingle	Rutaceae	Fruit	Skin irritation and nausea; juice is appetizer, stomachic, antiscorbutic, refrigerant, antiseptic and anthelmintic; used in biliousness, sore throat and eye complaints, relieves vomiting.
45	<i>Citrus grandis</i> L.	Rutaceae	Fruit	Influenza, cough, catarrh and asthma
46	<i>Clerodendrum viscosum</i> Vent.	Verbenaceae	Leaves, Root	Asthma, tumors and certain skin diseases.
47	<i>Coccinia cordifolia</i> (L.) Cogn.	Cucurbitaceae	Whole Plant	Diabetes, anorexia, asthma, fever, dropsy, catarrh, epilepsy and gonorrhoea.
48	<i>Cocos nucifera</i> L.	Arecaceae	Fruit, Root	Diabetes, dysentery, uterine diseases.
49	<i>Colocasia esculenta</i> (L.) Schott.	Araceae	Whole Plant	Tumors, ulcerated polyp, cancer of nose and warts.
50	<i>Commelina benghalensis</i> L.	Commelinaceae	Leaves	Chronic rheumatism.
51	<i>Corchorus capsularis</i> L.	Malvaceae	Leaves	Dysentery.
52	<i>Coriandrum sativum</i> L.	Apiaceae	Fruit	Improves appetite.
53	<i>Croton bonplandianus</i> Baill.	Euphorbiaceae	Leaves, Seed	Cough, eczema and ringworm.
54	<i>Crysopogon aciculatus</i> (Retz.) Trin.	Poaceae	Root	Tonic and antiperiodic.
55	<i>Cucumis melo</i> L.	Cucurbitaceae	Pulp of the fruit	Eczema, biliousness, insanity, ascites and allays fatigue.
56	<i>Cucumis sativus</i> L.	Cucurbitaceae	Fruits	Relieve inflammation, sunburn and eyestrain.
57	<i>Cucurbita lagenaria</i> L.	Cucurbitaceae	Pulp of the fruit	Cholera, muscular pain and dry cough.
58	<i>Cucurbita maxima</i> Duch.	Cucurbitaceae	Pulp of the fruit	Burns, inflammations and boils; migraine and neuralgia.
59	<i>Curcuma longa</i> L.	Zingiberaceae	Rhizome	Scabies, itches, boils, abscess, eczema, leucoderma, eye diseases, pains, bruises and sprains; internally for cough, cold, fever.
60	<i>Cuscuta reflexa</i> Roxb.	Cuscutaceae	Stem	Prevent hair fall.
61	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Whole Plant	Cuts and wounds.
62	<i>Dalbergia sissoo</i> DC.	Fabaceae	Bark, Leaves	Haemorrhages, epistaxis, menorrhagia and bleeding piles. Decoction of the leaves is useful in acute stage of gonorrhoea.
63	<i>Datura metel</i> L.	Solanaceae	Seed, Leaves, Root	Insanity, fever with catarrh, diarrhea, skin diseases and cerebral complications.
64	<i>Dendrophthoe falcata</i> (L.f.) Ett.	Loranthaceae	Bark	Consumption, asthma and mania.
65	<i>Dyospyros perigrina</i> (Gaertn.) Gur.	Ebenaceae	Fruit, seeds	Wounds, ulcers, diarrhea and dysentery.
66	<i>Dyospyros philippensis</i> (Des.) Gam.	Ebenaceae	Fruit, seeds	Wounds, ulcers, diarrhea and dysentery.
67	<i>Eichhornia crassipes</i> (Mart.)	Pontederiaceae	Leaves	Asthma.
68	<i>Erythrina variegata</i> L.	Fabaceae	Leaves	Pain of the joints and inflammations; earache, toothache.
69	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Whole Plant	Abscesses, inflamed glands, ulcers, oedemas and phlegmons.
70	<i>Feronia limonia</i> (L.) Sw.	Rutaceae	Leaves, Fruit, Seeds	Heart diseases, vomiting, diarrhea and dysentery.
71	<i>Ficus benghalensis</i> L.	Moraceae	Whole plant	Toothache, dysentery, diarrhea, piles and diabetes.
72	<i>Ficus hispida</i> L.f.	Moraceae	Whole plant, Fruit	Ulcers, biliousness, psoriasis, anemia, piles, jaundice, hemorrhages of the nose and mouth, diabetes.
73	<i>Ficus racemosa</i> L.	Moraceae	Fruit	Menorrhagia, haemoptysis, bronchitis, dry cough, diseases of kidney and spleen.
74	<i>Ficus religiosa</i> L.	Moraceae	Fruit	Asthma.
75	<i>Glinus oppositifolius</i> (L.) A.DC.	Molluginaceae	Whole plant	Earache, skin diseases.
76	<i>Helianthus annuus</i> L.	Asteraceae	Leaves	Lumber pain, malaria.
77	<i>Heliotropium indicum</i> L.	Boraginaceae	Whole Plant	Ulcers, sores, wounds, gum boils, skin affections, stings of insects and rheumatism.
78	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Flower bud	Burning of the body, urinary discharges, seminal weakness and piles.
79	<i>Impatiens balsamina</i> L.	Balsaminaceae	Seeds, Flower	Pains, lumbago, burns and scalds.
80	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Whole Plant	Leucoderma, leprosy, fever, jaundice, biliousness, bronchitis and liver complaints.
81	<i>Ipomoea batatas</i> (L.) Poir.	Convolvulaceae	Whole Plant, Root	Low fever and skin disease, strangury and diarrhea.
82	<i>Ipomoea fistulosa</i> Mart. ex Choisy.	Convolvulaceae	Leaves	Filariasis, constipation, boils and wounds.
83	<i>Ipomoea quamoclit</i> L.	Convolvulaceae	Leaves	Cancer and breast pain.
84	<i>Ixora coccinea</i> L.	Rubiaceae	Root, Flower	Hiccup, fever, gonorrhoea, diarrhea, dysentery, leucorrhoea, dysmenorrhoea, haemoptysis and catarrhal bronchitis.
85	<i>Jasminum sambac</i> (L.) Aiton.	Oleaceae	Root	In cases of ringworm and herpes.
86	<i>Justicia gendarusa</i> Burm f.	Acanthaceae	Leafs	Insecticidal; chest pain.
87	<i>Lablab purpureus</i> (L.) Sweet.	Fabaceae	Seed	Inflammations.
88	<i>Lansea coromandelica</i> (Houtt.) Merr.	Anacardiaceae	Bark	Impetigenous eruptions, leprosy and obstinate ulcers.
89	<i>Lawsonia inermis</i> L.	Lythraceae	Leaves	Headache, skin diseases, eczema, leprosy, dandruff.
90	<i>Lens esculenta</i> Moench.	Fabaceae	Seeds	Foul and indolent ulcers.
91	<i>Leonurus sibiricus</i> L.	Lamiaceae	Leaves	Chronic rheumatism, psoriasis.
92	<i>Leucas aspera</i> (Roth) Spreng	Lamiaceae	Leaves	Chronic rheumatism, psoriasis and other chronic skin eruption,

93	<i>Litchi chinensis</i> Sonn.	Sapindaceae	Fruit, Seed	Tonic to the heart, brain and liver, various neuralgic disorders and in orchitis.
94	<i>Ludwigia adscendens</i> (L.) Hara.	Onagraceae	Whole plant	Curing dysentery, ulcers and other skin diseases.
95	<i>Luffa acutangula</i> (L.) Roxb.	Cucurbitaceae	Leaves	Splenitis, haemorrhoides, ringworms and leprosy.
96	<i>Lycopersicon esculentum</i> L.	Solanaceae	Fruit	Canker of the mouth.
97	<i>Mangifera indica</i> L.	Anacardiaceae	Unripe fruit	Dysentery and urinary discharges; ophthalmia and eruption.
98	<i>Manilkara zapota</i> (L.) P. Royen.	Sapotaceae	Leaves	Asthma and cough.
99	<i>Melia azadirachta</i> L.	Meliaceae	Bark	Fever, thirst, cough and bad taste in the mouth.
100	<i>Mimosa pudica</i> L.	Mimosaceae	Whole plant	Snake bites.
101	<i>Mimusops elengi</i> L.	Sapotaceae	Stem bark	Antidote to bleeding gums and swelling of the mouth and tongue
102	<i>Momordica charantia</i> L.	Cucurbitaceae	Whole plant, Fruit	Diabetes mellitus, piles, leprosy, jaundice and as vermifuge.
103	<i>Moringa oleifera</i> Lam.	Moringaceae	Leaves, Fruit	Excessive pain, cure hallucinations, dry tumors, hiccough, asthma.
104	<i>Musa sapientum</i> L.	Musaceae	Stem	Stop bleeding, source of iron
105	<i>Nerium indicum</i> L.	Apocynaceae	Root and root bark	Cancers and ulcers on the penis, chronic pain in the abdomen and pain in the joints.
106	<i>Nyctanthes arbor-tristis</i> L.	Oleaceae	Leaves	Fever and rheumatism.
107	<i>Nymphaea nouchali</i> Burm f.	Nymphaeaceae	Rhizome	Piles, dysentery and dyspepsia.
108	<i>Ocimum sanctum</i> L.	Lamiaceae	Leaves	Coughs, colds, catarrh and bronchitis; gastric disorder, earache, ringworm, leprosy and itches.
109	<i>Oxalis corniculata</i> L.	Oxalidaceae	Whole plant	Piles, anemia and tympanites.
110	<i>Paederia foetida</i> L.	Rubiaceae	Leaves	Diarrhea and dysentery.
111	<i>Peperomia pellucida</i> Kunth.	Piperaceae	Whole plant	Eczema, abdominal pains, headache and fever.
112	<i>Phoenix sylvestris</i> (L.) Roxb.	Arecaceae	Fruit, Root	Gonorrhoea and gleans.
113	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Fruit	Insomnia, skin problems, gall pain, leucorrhoea and tympanites.
114	<i>Pistia stratiotes</i> L.	Araceae	Whole plant	Gastric disorder, earache, ringworm, leprosy, eye and ear diseases.
115	<i>Polyalthia longifolia</i> (Sonn.) Thw.	Annonaceae	Bark, Leaves	Fever, against wide range of pathogens.
116	<i>Persicaria hydropiper</i> L.	Polygonaceae	Flower	Gout.
117	<i>Psidium guajava</i> L.	Myrtaceae	Root bark, Root	Diarrhea, dysentery.
118	<i>Punica granatum</i> L.	Punicaceae	Stem	Abdominal pain.
119	<i>Quisqualis indica</i> L.	Combretaceae	Seeds	Worms.
120	<i>Rauwolfia serpentina</i> Benth.	Apocynaceae	Root	High blood pressure.
121	<i>Ricinus communis</i> L.	Euphorbiaceae	Root bark, Leaves	Joint pain, paralysis
122	<i>Sesamum indicum</i> L.	Pedaliaceae	Seed	Piles.
123	<i>Solanum melongena</i> L.	Solanaceae	Fruit	Appetite and lessens inflammation.
124	<i>Solanum nigrum</i> L.	Solanaceae	Fruit	Fevers.
125	<i>Spondius pinnata</i> (L.f.) Kurz.	Anacardiaceae	Bark	Dysentery, diarrhoea and vomiting.
126	<i>Swietenia mahagoni</i> (L.) Jacq.	Meliaceae	Seed	Diabetes.
127	<i>Syzygium cumini</i> (L.) Skeels.	Myrtaceae	Bark	Sore throat, bronchitis, asthma and dysentery.
128	<i>Syzygium samarangense</i> (Bl.) Merr. & Perry.	Myrtaceae	Bark, Leaves	Asthma, fatigue, dysentery and sore-eyes.
129	<i>Tagetes erecta</i> L.	Asteraceae	Whole Plant, Leaves	Rheumatism, cold and bronchitis, Kidney troubles, muscular pains.
130	<i>Tamarindus indica</i> L.	Caesalpiniaceae	Pulp of the ripe fruit	Fever, dyspepsia, gastritis, dysentery and diarrhea; diseases supposed to cause by deranged bile, such as burning of the body and costiveness.
131	<i>Terminalia arjuna</i> (Roxb. ex DC) Wight & Arn	Combretaceae	Stem	Heart disease.
132	<i>Terminalia chebula</i> L.	Combretaceae	Seeds	Vomiting, dysentery.
133	<i>Trapa bispinosa</i> Roxb.	Trapaceae	Fruit	Diarrhea and bilious affections; nervous and general debility, seminal weakness and leucorrhoea.
134	<i>Trichosanthes arguina</i> L.	Cucurbitaceae	Leaves, Stem	Bilious disorders and skin diseases, fever
135	<i>Trichosanthes dioica</i> Roxb.	Cucurbitaceae	Leaves	Dysentery, diarrhea, bronchitis and to arrest bleeding from bruises, and for the restoration of hairs.
136	<i>Tridax procumbens</i> L.	Asteraceae	Leaves	Bronchial catarrh, dysentery, diarrhea
137	<i>Vigna sinensis</i> L.	Fabaceae	Seed	Jaundice, strengthen the stomach and to destroy worms.
138	<i>Vitex negundo</i> L.	Verbenaceae	Leaves	Headache
139	<i>Wedelia chinensis</i> (Osbeck) Merr.	Asteraceae	Leaves	Hair tonic, vomiting.
140	<i>Xanthium indicum</i> Koenig.	Asteraceae	Whole Plant	Urinary and renal complaints in gleans, leucorrhoea and menorrhagia.
141	<i>Zea mays</i> L.	Poaceae	Seed	Piles; lessens pain.
142	<i>Zingiber officinale</i> L.	Zingiberaceae	Rhizome	Constipation, dysentery, vomiting, headache, earache, sprain joints, in sore throats and voice loss.
143	<i>Zizyphus mauritiana</i> Lamk.	Rhamnaceae	Root, Bark	Diarrhea, fever, wounds and ulcers.

Use of plant parts as medicine shows variation. Leaves 60.13% are the leading part used in a majority of medicinal plants followed by 25.17% fruits, 21.68% roots, 20.27% bark, 16.08% whole plant, 3.5% stem, 1.40%

latex, 2.09% bulb, 2.79% rhizomes, 30.07% seed, 3.5% pulp, 2.09% leaf bud, 1.40% petiole, 11.89% flower, 0.70% calyx and 0.70% peduncle (Table 3).

Table 3. List of plant parts used as medicine

S/N	Name of plant parts	Use of plant parts	Percentage (%)	Total number of species
1	Leaf	86	60.13%	143
2	Whole plant	23	16.08%	143
3	Root	31	21.68%	143
4	Stem	5	3.50%	143
5	Bark	29	20.27%	143
6	Fruit	36	25.17%	143
7	Rhizome	4	2.79%	143
8	Leave bud	3	2.09%	143
9	Flower	17	11.89%	143
10	Seed	43	30.07%	143
11	Bulb	3	2.09%	143
12	Latex	2	1.40%	143
13	Pulp	5	3.50%	143
14	Petiole	2	1.40%	143
15	Calyx	1	0.70%	143
16	Peduncle	1	0.70%	143

Based on this study, the important medicinal plants at Katakhal Pouroshova at Rajshahi district, Bangladesh was made that includes 143 angiosperm species (Table 2). The collected information is comparable with the result of other studies in Bangladesh. A total of 86 plant taxa belonged to 84 genera under 46 families are highlighted in Tangail district [6]. Altogether 49 species belonging to 47 genera and 33 families are enumerated in Rajshahi City [23]. A total of 98 species belonging to 88 genera under 50 families were recorded in Jessore district [39]. A total

of 102 plant species under 93 genera and 52 families were collected and recorded in Naogaon district [38]. A total of 73 plant species under 68 genera of 42 families have been documented in Dhaka district [40]. A total of 66 species in 62 genera and 38 families were documented in Bandarban district [10]. A total of 119 medicinal plant species belonging to 109 genera and 50 families were collected and recorded in Bogra district [57]. No published information recorded on the important medicinal plants at Katakhal Pouroshova at Rajshahi district, Bangladesh.

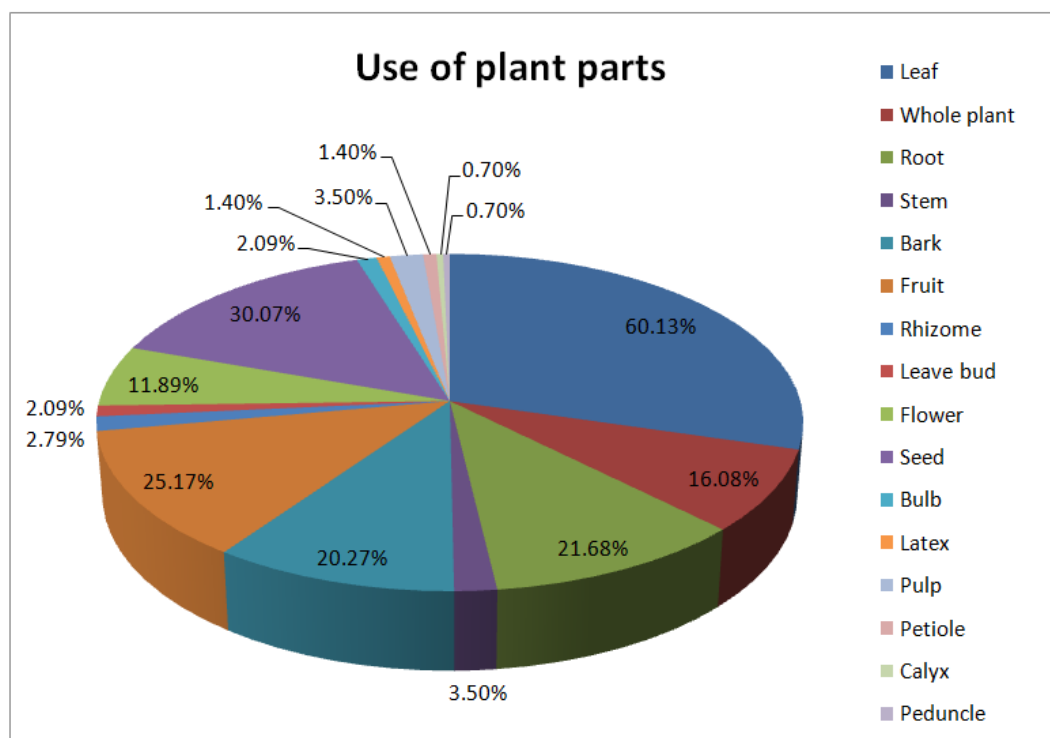


Figure 1. Number of plant parts used for medicinal purpose in pie chart

The most frequently used species for the treatment of various diseases are *Abelmoschus esculentus*, *Abroma augusta*, *Acacia nilotica*, *Acalypha indica*, *Alstonia scholaris*, *Allium cepa*, *Allium sativum*, *Aloe vera*, *Amaranthus viridis*, *Andrographis paniculata*, *Argemone mexicana*, *Artocarpus heterophyllus*, *Averrhoa carambola*, *Boerhaavia diffusa*, *Bombax ceiba*, *Cajanus cajan*, *Carica papaya*, *Centella asiatica*, *Coccinia cordifolia*, *Colocasia esculenta*, *Cynodon dactylon*, *Dyospyros perigrina*, *Ficus raligiosa*, *Glinus oppositifolius*, *Justicia gendarusa*, *Lawsonia inermis*, *Momordica charantia*, *Moringa oleifera*, *Musa sapientum*, *Ocimum sanctum*, *Oxalis corniculata*, *Paederia foetida*, *Phyllanthus emblica*, *Psidium guajava*, *Rauvolfia serpentina*, *Syzygium cumini*, *Tamarindus indica*, *Terminalia arjuna*, *Vitex negundo*, *Wedelia chinensis*, *Xanthium indicum* and *Zizyphus mauritiana*. The survey indicated that the common medicinal plant families in the study area are *Aloeaceae*, *Acanthaceae*, *Amaranthaceae*, *Annonaceae*, *Apocynaceae*, *Apiaceae*, *Arecaceae*, *Caricaceae*, *Cucurbitaceae*, *Cuscutaceae*, *Euphorbiaceae*, *Fabaceae*, *Liliaceae*, *Meliaceae*, *Moraceae*, *Moringaceae*, *Molluginaceae*, *Musaceae*, *Papaveraceae*, *Poaceae*, *Rhamnaceae*, *Rutaceae*, *Solanaceae*, *Verbenaceae* and *Zingiberaceae*. This finding of common medicinal plant families in the study is in agreement with [10,11,17,19,20,33,38,39] and [62-71].

4. Recommendations

Bangladesh falls within one of the World's Biodiversity Centers, encompassing 8 vegetation zones having different habitats of specific species. It has been estimated that about 5,000 plant species (nearly 2.2% of the global species) occurs in Bangladesh. About 2,500 species of both higher and lower plant groups are of medicinal value, among them, more than 500 plants are identified as medicinal plants [68]. But indiscriminate exploitation, overpopulation and deforestation have led to 106 plant species being listed as threatened by the Bangladesh Agricultural Research Council and the Bangladesh National Herbarium [18]. Here some suggestion and recommendation is given to reverse this situation:

i. Appropriate steps must therefore be taken immediately in order to cope up with this situation with regard to growth, conservation and supply of medicinal plants in this country.

ii. We should stop the indiscriminate and extensive collection of rare and commercially important medicinal plant from the wild.

iii. We should aware people by transferring cultivation technologies to homestead growers, cultivators through training, workshops, pamphlets, brochures, seminars etc.

iv. We need Sporadic and diverse researches on various aspects of medicinal plants.

v. We should practice standardized cultivation practice of all commercially important medicinal plant gradually.

vi. If required the threatened plant species may be multiplied through appropriate technique/s and bulk production of seeds/propagules for preservation, distribution to homestead growers and also for commercial purposes.

vii. Necessary steps should be taken for *ex situ* conservation of endangered and commercially important medicinal plants.

5. Conclusion

The current study reveals that the native folks have good knowledge on traditional uses of plants. But to the modernization, this knowledge may be lost in due course. Hence, it is essential to study and document the local knowledge, which can provide valuable information to pharmacologists in screening of individual species and their plants constituents. Therefore, the present study will be useful for researchers in the field of ethnobotany, ethnomedicinal and pharmacology for further studies. All these plants need to be evaluated through phytochemical and pharmacochemical investigations to discover their potentiality in developing effective medicines for curing different diseases in human beings.

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References

- [1] Ahmad S, Alam AMS, Rahman, AHMM, Karim R, Islam R (2010). Biotechnological approach for long term germplasm conservation of *Rauvolfia serpentina* Benth Ex. Kurz. in Bangladesh: A rare medicinal plant for remedy of high blood pressure and others. *Bangladesh Journal of Environmental Sciences*. 19: 25-30.
- [2] Ahmed ZU, Begum ZNT, Hassan MA, Khondker M, Kabir SMH, Ahmad M, Ahmed ATA, Rahman AKA, Haque EU(Eds) (2008-2009). Encyclopedia of Flora and Fauna of Bangladesh. 6-10. Angiosperms; Dicotyledons. Asiat. Soc. Bangladesh, Dhaka.
- [3] Alam MK (1992). Medical ethno-botany of the Marma tribe of Bangladesh. *Economic Botany*. 46(3): 330-335.
- [4] Alam MK, Choudhury J, Hassan MA (1996). Some folk formularies from Bangladesh. *Bangladesh J. Life Sci*. 8(1): 49-63.
- [5] Alexiades MN (Ed) (1996). Selected Guidelines for Ethno Botanical Research: A Field Manual. The New York Botanical Garden, New York. 1996.
- [6] Anisuzzaman M, Rahman AHMM, Rashid MH, Naderuzzaman ATM, Islam AKMR (2007). An Ethnobotanical Study of Madhupur, Tangail. *Journal of Applied Sciences Research*. 3(7): 519-530.
- [7] Ara T, Khokan EH, Rahman AHMM (2011). Taxonomic Studies on the Family Solanaceae in the Rajshahi University Campus. *Journal of Biodiversity and Environmental Sciences*. 4(1): 29-34.
- [8] Chakma S, Hossain MK, Khan BM, Kabir MA (2003). Ethnobotanical knowledge of Chakma community in the use of medicinal plants in Chittagong Hill Tracts, Bangladesh. *MFP News XIII* (3): 3-7.
- [9] Choudhury AR, Rahmatullah M (2012). Ethnobotanical study of wound healing plants among the folk medicinal practitioners several district in Bangladesh. *American-Eurasian Journal of Sustainable Development*. 6(4): 371-377.
- [10] Faruque MO, Uddin SB (2014). Ethnomedicinal study of the Marma community of Bandarban district of Bangladesh. *Academia Journal of Medicinal Plants*. 2(2): 014-025.
- [11] Ghani A (1998). Medicinal Plants of Bangladesh. Asiatic Society of Bangladesh, Dhaka.
- [12] Hassan MA (1988). *Amader Banoushadi Shampad*, Hassan Book House, Dhaka.
- [13] Hassan MA, Huq AM (1993). *Gas Gasra Deeya Chikithsha*, Hassan Book House, Dhaka, Bangladesh.
- [14] Hooker JD (1961). *Flora of British India*. Vols.1-7. L. Reeve and Co. Ltd. London, U.K
- [15] Islam R (2003). 'Chikitshar Upakaran O Oushad Shilper Kachamal Hishabey Oushidhi Udvidaer Avvantorien Baybohar Ebong Raptaner Somvabona O Shamosshya.' Oushodi Udvidaer.

- Baybohar: Somvabona O Shamosshya Bishayak Kormashala (in Bengali), pp. 21-30.
- [16] Khan MS, Huq AM (1975). Medicinal Plants of Bangladesh, BARC, Dhaka, Bangladesh.
- [17] Khan MS (1998). Prospects of Ethnobotany and Ethnobotanical Research in Bangladesh. In: Banik RL, Alam MK, Pei SJ, Rastogi A (eds.), Applied Ethnobotany, BFRI, Chittagong, Bangladesh. P. 24-27.
- [18] Khan MS, Huq AM (2001). The vascular flora of Chunati Wildlife Sanctuary in south Chittagong, Bangladesh. *Bangladesh J. Plant Taxon.* 8(1): 47-64.
- [19] Khisha B (1996). Chakma Talik Chikitsa. Herbal Medicine Centre Committee, Rajban Bihar, Rajbari, Rangamati. Pp.1-136.
- [20] Kirtikar KR, Basu BD (1987). Indian Medicinal Plants. Vol. 1-4. Lalit Mohan Basu, Allahabad, Jayyed Press, New Delhi, India.
- [21] Prain D (1963). Bengal Plants. Vols.1-2. Botanical Survey of India. Calcutta, India.
- [22] Rahman AHMM, Anisuzzaman M, Ahmed F, Islam AKMR, Naderuzzaman ATM (2008). Study of Nutritive Value and Medicinal Uses of Cultivated Cucurbits. *Journal of Applied Sciences Research.* 4(5): 555-558.
- [23] Rahman AHMM, Anisuzzaman M, Haider SA, Ahmed F, Islam AKMR, Naderuzzaman ATM (2008). Study of Medicinal Plants in the Graveyards of Rajshahi City. *Research Journal of Agriculture and Biological Sciences.* 4(1): 70-74.
- [24] Rahman AHMM, Kabir EZMF, Sima SN, Sultana RS, Nasiruddin M, Naderuzzaman ATM (2010). Study of an Ethnobotany at the Village Dohanagar, Naogaon. *Journal of Applied Sciences Research.* 6(9): 1466-1473.
- [25] Rahman AHMM, Gulsan JE, Alam MS, Ahmad S, Naderuzzaman ATM, Islam AKMR (2012). An Ethnobotanical Portrait of a Village: Koikuri, Dinajpur with Reference to Medicinal Plants. *International Journal of Biosciences.* 2(7): 1-10.
- [26] Rahman AHMM (2013). Assessment of Angiosperm Weeds of Rajshahi, Bangladesh with emphasis on medicinal plants. *Research in Plant Sciences.* 1(3): 62-67.
- [27] Rahman AHMM (2013). An Ethno-botanical investigation on Asteraceae family at Rajshahi, Bangladesh. *Academia Journal of Medicinal Plants.* 1(5): 92-100.
- [28] Rahman AHMM (2013). Ethno-botanical Survey of Traditional Medicine Practice for the Treatment of Cough, Diabetes, Diarrhea, Dysentery and Fever of Santals at Abdullahpur Village under Akkelpur Upazilla of Joypurhat District, Bangladesh. *Biomedicine and Biotechnology.* 1(2): 27-30.
- [29] Rahman AHMM (2013). Ethno-medicinal investigation on ethnic community in the northern region of Bangladesh. *American Journal of Life Sciences.* 1(2): 77-81.
- [30] Rahman AHMM (2013). Ethno-medico-botanical investigation on cucurbits of the Rajshahi Division, Bangladesh. *Journal of Medicinal Plants Studies.* 1(3): 118-125.
- [31] Rahman AHMM (2013). Graveyards angiosperm diversity of Rajshahi city, Bangladesh with emphasis on medicinal plants. *American Journal of Life Sciences.* 1 (3): 98-104.
- [32] Rahman AHMM (2013). Medico-botanical study of commonly used angiosperm weeds of Rajshahi, Bangladesh. *Wudpecker Journal of Medicinal Plants.* 2(3): 044-052.
- [33] Rahman AHMM (2013). Medico-botanical study of the plants found in the Rajshahi district of Bangladesh. *Prudence Journal of Medicinal Plants Research.* 1(1): 1-8.
- [34] Rahman AHMM (2013). Medico-Ethnobotany: A study on the tribal people of Rajshahi Division, Bangladesh. *Peak Journal of Medicinal Plants Research.* 1(1): 1-8.
- [35] Rahman AHMM (2013). Traditional Medicinal Plants Used in the Treatment of different Skin diseases of Santals at Abdullahpur Village under Akkelpur Upazilla of Joypurhat district, Bangladesh. *Biomedicine and Biotechnology.* 1(2): 17-20.
- [36] Rahman AHMM, Khanom A (2013). Taxonomic and Ethno-Medicinal Study of Species from Moraceae (Mulberry) Family in Bangladesh Flora. *Research in Plant Sciences.* 1(3): 53-57.
- [37] Rahman AHMM, Akter M (2013). Taxonomy and Medicinal Uses of Euphorbiaceae (Spurge) Family of Rajshahi, Bangladesh. *Research in Plant Sciences.* 1(3): 74-80.
- [38] Rahman, AHMM, Kabir EZMF, Islam AKMR, Zaman ATMN (2013). Medico-botanical investigation by the tribal people of Naogaon district, Bangladesh. *Journal of Medicinal Plants Studies.* 1(4): 136-147.
- [39] Rahman AHMM, Biswas MC, Islam AKMR, Zaman ATMN (2013). Assessment of Traditional Medicinal Plants Used by Local People of Monirampur Thana under Jessore District of Bangladesh. *Wudpecker Journal of Medicinal Plants.* 2(6): 099-109.
- [40] Rahman AHMM, Sultana N, Islam AKMR, Zaman ATMN (2013). Study of Medical Ethno-botany of traditional medicinal plants used by local people at the village Genda under Savar Upazilla of district Dhaka, Bangladesh. *Online International Journal of Medicinal Plants Research.* 2(1): 18-31.
- [41] Rahman AHMM, Nitu SK, Ferdows Z, Islam AKMR (2013). Medico-botany on herbaceous plants of Rajshahi, Bangladesh. *American Journal of Life Sciences.* 1(3): 136-144.
- [42] Rahman AHMM (2013). A Checklist of Common Angiosperm Weeds of Rajshahi District, Bangladesh. *International Journal of Agricultural and Soil Science.* 1(1): 1-6.
- [43] Rahman AHMM (2013). Angiospermic flora of Rajshahi district, Bangladesh. *American Journal of Life Sciences.* 1(3): 105-112.
- [44] Rahman AHMM (2014). Ethno-gynecological study of traditional medicinal plants used by Santals of Joypurhat district, Bangladesh. *Biomedicine and Biotechnology.* 2(1): 10-13.
- [45] Rahman AHMM, Parvin IA (2014). Study of Medicinal Uses on Fabaceae Family at Rajshahi, Bangladesh. *Research in Plant Sciences.* 2(1): 6-8.
- [46] Rahman AHMM, Gulshana MIA (2014). Taxonomy and Medicinal Uses on Amaranthaceae Family of Rajshahi, Bangladesh. *Applied Ecology and Environmental Sciences.* 2(2): 54-59.
- [47] Rahman AHMM, Rahman MM (2014). An Enumeration of Angiosperm weeds in the Paddy field of Rajshahi, Bangladesh with emphasis on medicinal Plants. *Journal of Applied Science And Research.* 2(2): 36-42.
- [48] Rahman AHMM, Rojonigondha (2014). Taxonomy and Traditional Medicine Practices on Malvaceae (Mallow Family) of Rajshahi, Bangladesh. *Open Journal of Botany.* 1(2): 19-24.
- [49] Rahman AHMM, S.M. Jahan-E-Gulsan SM, Naderuzzaman ATM (2014). Ethno-Gynecological Disorders of Folk Medicinal Plants Used by Santhals of Dinajpur District, Bangladesh. *Frontiers of Biological & Life Sciences.* 2(3): 62-66.
- [50] Rahman AHMM, Hossain MM, Islam AKMR (2014). Taxonomy and Medicinal Uses of Angiosperm weeds in the wheat field of Rajshahi, Bangladesh. *Frontiers of Biological and Life Sciences.* 2(1): 8-11.
- [51] Rahman AHMM, Afsana MW, Islam AKMR (2014). Taxonomy and Medicinal Uses on Acanthaceae Family of Rajshahi, Bangladesh. *Journal of Applied Science And Research.* 2(1): 82-93.
- [52] Rahman AHMM (2014). Ethno-medicinal Practices for the Treatment of Asthma, Diuretic, Jaundice, Piles, Rheumatism and Vomiting at the Village Abdullahpur under Akkelpur Upazilla of Joypurhat District, Bangladesh. *International Journal of Engineering and Applied Sciences.* India. 1(2): 4-8.
- [53] Rahman AHMM (2015). Traditional Medicinal Plants in the treatment of Important Human Diseases of Joypurhat District, Bangladesh. *Journal of Biological Pharmaceutical and Chemical Research, India.* 2(1): 21-29.
- [54] Rahman AHMM (2015). Ethnomedicinal Survey of Angiosperm Plants used by Santal Tribe of Joypurhat District, Bangladesh. *International Journal of Advanced Research.* 3(5): 990-1001.
- [55] Rahman AHMM, Akter, S, Rani, R, Islam, AKMR (2015). Taxonomic Study of Leafy Vegetables at Santahar Pouroshova of Bogra District, Bangladesh with Emphasis on Medicinal Plants. *International Journal of Advanced Research.* 3(5): 1019-1036.
- [56] Rahman AHMM, Debnath, A (2015). Ethno-botanical Study at the Village Pondit Para under Palash Upazila of Narsingdi District, Bangladesh. *International Journal of Advanced Research.* 3(5): 1037-1052.
- [57] Rahman AHMM, Keya, MA (2015). Traditional Medicinal Plants Used by local People at the Village Sabgram under Sadar Upazila of Bogra District, Bangladesh. *Research in Plant Sciences.* 3(2): 31-37.
- [58] Rahman AHMM, Jamila, M (2015). Ethnobotanical Study of Chappai Nawabganj District, Bangladesh, Lambert Academic Publishing, Germany.
- [59] Rahman, AHMM (2015). Ethno-botanical Survey of Anti-Diabetic Medicinal Plants Used by the Santal Tribe of Joypurhat District, Bangladesh. *International Journal of Research in Pharmacy and Biosciences.* 2(5): 19-26.
- [60] Sofowora A (1982). Medicinal plants and traditional Medicine in Africa. John Wiley & Sons Limited, New York.

- [61] Tripura SL (1994). Nature and Culture of the Chittagong Hill Tracts. Tribal Culture Institute. Rangamati Hill District. Pp. 1-192.
- [62] Uddin K, Rahman AHMM, Islam, AKMR (2014). Taxonomy and Traditional Medicine Practices of Polygonaceae (Smartweed) Family at Rajshahi, Bangladesh. *International Journal of Advanced Research*. India. 2(11): 459-469.
- [63] Uddin MZ, Hassan MA, Rahman M, Arefin K (2012). Ethno-medico-botanical study in Lawachara National Park, Bangladesh. *Bangladesh J. Bot.* 41(1): 97-104.
- [64] Uddin MZ, Hassan MA, Sultana M (2006). Ethnobotanical survey of medicinal plants in Phulbari Upazilla of Dinajpur District, Bangladesh. *Bangladesh J. Plant Taxon.* 12(1): 63-68.
- [65] Uddin MZ, Khan MS, Hassan, MA (2001). Ethno medical plants records of Kalenga forest range (Habiganj), Bangladesh for malaria, jaundice, diarrhea and dysentery. *Bangladesh J.Plant Taxon.* 8(1): 101-104.
- [66] Uddin M, Roy S, Hassan MA, Rahman MM (2008). Medicobotanical report on the Chakma people of Bangladesh. *Bangladesh J. Plant Taxon.* 15(1): 67-72.
- [67] Uddin SN, Uddin MZ, Hassan MA, Rahman MM (2004). Preliminary ethno-medicinal plant survey in Khagrachari district, Bangladesh. *Bangladesh J. Plant Taxon.* 11(2): 39-48.
- [68] World Health Organization "Guideline for Assessment of the Herbal Medicines" Programme on Traditional. WHO, Geneva, 1991, pp 56-91.
- [69] Yusuf M, Choudhury JU, Wahab MA, Begum J (1994). Medicinal Plants of Bangladesh. Bangladesh Council of Scientific and Industrial Research. Dhaka, Bangladesh. Pp. 1-340.
- [70] Yusuf M, Wahab MA, Choudhury JU, Begum J (2006). Ethno-medico-botanical knowledge from Kaukhali proper and Betunia of Rangamati district. *Bangladesh J. Plant Taxon.* 13(1): 55-61.
- [71] Yusuf M, Begum J, Hoque MN, Choudhury JU (2009). Medicinal plants of Bangladesh-Revised and Enlarged. Bangladesh Coun. Sci. Ind. Res. Lab. Chittagong, Bangladesh.