A Review on Pharmacological and Phytochemical Study on Bangladeshi Medicinal Plants

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Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Approval

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Abstract

Medicinal plants have always played an important role in discovering new drug entities. As a source of lead compounds, they are a great attraction for researchers. In this regard, the medicinal plant of Bangladesh can play a vital role. The flora of Bangladesh includes 5000 of medicinal plants distributed in 200 families. Over the past few years, there has been a vast investigation on pharmacological and phytochemical properties of Bangladeshi medicinal plants. In this paper, the pharmacological and phytochemicals of the past 10 years are reviewed. Pharmacological screening of the plant showed the presence of anticancer, antimicrobial, antioxidant, anti-tumor and etcetera. Alkaloids, Carbohydrates, Tannins, and Flavonoids like phytochemicals presence were observed. So, this proves the richness of the pharmacological activity of the plants of Bangladesh. There are also plants yet to be discovered for their activity. Pharmacological and phytochemical studies of these plants may help to discover new lead for drugs.

Keywords: Phytochemistry, Pharmacological, Medicinal plants of Bangladesh

Dedication

Dedicated to my beloved family and respected teachers who supported and guided me through thick and thin and assisted me to achieve my goals.

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Firstly, I would like to give graces to Almighty Allah for limitless blessings to empower me the courage to complete this project work given.

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Chapter 1

Introduction

WHO defines medicinal plants as plants with some properties that can be used in therapeutic purposes and contains some compounds that can be the lead to produce drug (Kumar & Janagam, 2011). Since the ancient time medicinal plants are used in treatment of diseases. They have always played a distinctive role in the treatment of disease (Oladeji, 2016).According to WHO more than 80% of people use non-allopathic medicines for the treatment of disease (Kadir, Sayeed, & Mia, 2013). In Bangladesh treatment of diseases with medicinal plants are known as kabirajee. Even after the advancement of science and technology in pharmaceuticals, medicinal plants are still used in the treatment of disease by the rural people and the knowledge is passed down from generation to generation (Bardhan, Ashrafi, & Saha, 2018a). Statistics shows in Bangladesh there are about 5000 of plants belonging to 200 families. Among these plants around 500 are used in traditional medicine (Rashid et al., 2015)and also as raw materials in pharmaceuticals. Although, there are many plants used in kabirajee in treatment of diseases but their efficacy is not scientifically proved. These plants on diseases may seem to work but their seem to less scientific data to prove their efficacy (Sofowora, Ogunbodede, & Onayade, 2013). Proper scientific evaluation of phytochemicals and pharmacological properties of these plants may show promising potential in discovering new lead compounds for drugs. In this paper, pharmacological and phytochemical studies of 183 plants of Bangladesh are reviewed. The motive behind the study was to prolong the scientific importance and possibilities of medicinal plants of Bangladesh.

1.1 Phytochemicals

The chemical compounds derived from plant roots, fruit, bark or leaves and produced in small amount in plants by secondary metabolism are known as phytochemicals (Elijah, Onyechi, & Nkechi, 2010). They are produced in small amount plays role in growth and development of plant by providing protection against insects, microbes and many stressful events (Martinez et al., 2017). Among the phytochemicals there are some phytochemical compounds that exhibit the ability to interact with living cells and shows biological activity. Phytochemicals are categorized into six major groups. They are Carbohydrate, Lipids, Terpenes, Phenolic acids, Alkaloids, Saponins (Huang, Xiao, Burton-Freeman, & Edirisinghe, 2016). These are further divided into subcategorize.

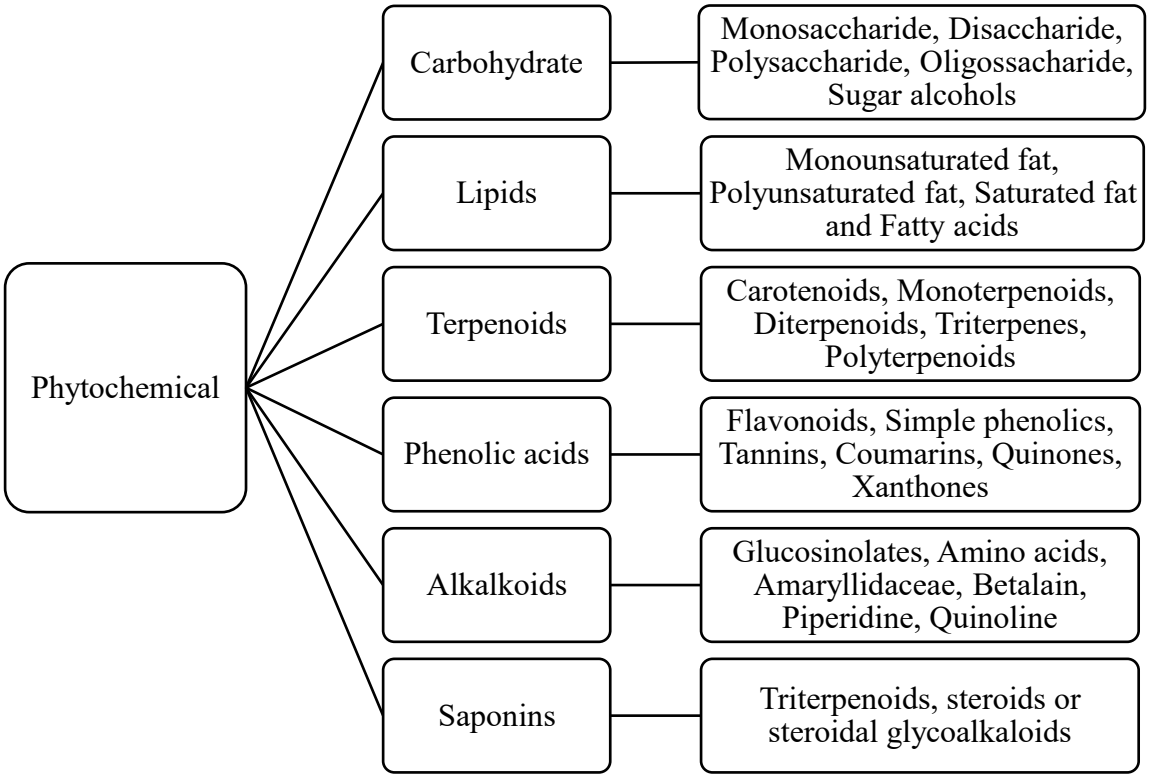

Figure 1:Categorization of Phytochemical

Documented studies shows more than 50000 structures are identified but less than 20% plants are studied (Yazdani, Tan, Abidin, & Jaganath, 2011). Many of these phytochemicals are pharmacologically active and are being used in traditional or herbal medicine. For example, salicins found in willow bark have activity to reduce inflammation and pain reliving. After being synthetically produced now it's known as drug named aspirin (Kawale & Koche, 2010). Similarly quinine from cinchona bark is used in malaria treatment, for urinary tract infection proanthocyanidins from cranberries are used (Martinez et al., 2017). Saponins, Tannins, Flavonoids, Alkaloids, Anthraquinone, Cardiac glycosides are mostly found phytochemicals in plants (Soetan & Aiyelaagbe, 2009). Some of the major pharmacologically active phytochemicals are described below-

Phenolics

Phenolics are the mostly found secondary metabolites of plants and are considered to be the largest group of secondary metabolites. In plants they contribute to color and flavor of plants. Many of the phenolics show pharmacological activity as anti-inflammatory, antioxidant and free radical scavengers. Depending on their structure Phenolics are further classified into

- Simple Phenolics – Phenolic acids are most commonly found in plants but it's rare to find them as free phenols. Gallic acid is the most widely found among them. Most common activity of gallic acid is known as astringent property. But it also shows activity like antiviral, antifungal, anti-inflammatory, antitumor, bronchodilatory action. Depending on their functional group they can vary as hydroxyl, aldehydic, carboxylic group. Another widely distributed Phenolic is Hydroquinone. Occurs in plants as glycoside arbutin (Hussein & El-Anssary, 2019). Most recognized

pharmacological properties of simple phenols are antimicrobial activity by arbutin and anti-inflammatory activity by salicylates (Hussein & El-Anssary, 2019).

- Tannins - Tannins are Phenolic compounds with weight ranging from 500 Da to 3000 Da. Depending on their chemical structure tannins are divided into two groups: hydrolysable and condensed tannins (Hassanpour, Maheri-sis, Eshratkhah, & Mehmander, 2011). Both of the tannins have many common properties but hydrolysable tannin shows potential to cause toxicity (Paulsen, 2010). Tannis are derived from variety of plant. For example,*Calycopteris floribunda, Cerbera odollam, Caesalpinia bonducella, Acorus calamus, Pouzolzia zeylanica, Clerodendrum inerme* and many more.Research suggests tannins have remarkable pharmacological activities like antiviral, antibacterial activity ,anti-diarrheal, inhabitation of lipid-peroxidation, mutagenicity of carcinogens, tumor promotion, host-mediated antitumor effects specific to particular tannin structure(Okuda, 2005). Tannins have also been reported to fasten the wound healing effect due to their astringent properties (Oladeji, 2016).
- Coumarins – Coumarins are widely distributed in higher plants. They can be found in seed, fruit, flower, leaves or stems. Their main function in plants is to defense agains microorganisms attack (Matos et al., 2015). In plan variation of common coumarin structure is seen. Documents shows that there are about 300 simple Coumarins and 1000 naturally occurring known Coumarins (Seigler, 1998). Among the Coumarins most widely distributed Coumarins are 1. Umbelliferone, 2. Esculetin, 3. Scopo- letin. Most common biological activity of coumarins are anti-inflammatory, anticoagulant, anticancer, anti-alzheimer(Hussein & El-Anssary, 2019). For example, from table 2 we found coumarin is present in *Adhatoda vasica*and shows anti-inflammatory activity(Ashvin Godghate & Sawant, 2013).

- Flavonoids - Flavonoids are subgroup of Phenolic acids. Flavonoid present in flower function is to provide color. In leaves they promote survival by protecting it from fungal pathogens and UV- B radiation (Cushnie & Lamb, 2005). About 2000 of this flavonoids are known and among them 500 occurs in free state (Hussein & El-Anssary, 2019). In living cell they exhibit a wide range of biological activity(Robak & Gryglewski, 1996). Research suggested Flavonoids shows antiallergic, anti-inflammatory, antioxidant, vasodilating, antimicrobial activity. Among these antioxidant is the most established bioactivity of flavonoid. Its due to their free radical formation and to scavenge free radicals (Pietta, 2000). Flavonols, Flavones and anthocyanins are mostly found flavonoids in plants (Hussein & El-Anssary, 2019)
- Chromones and Xanthones – Among all the compounds chromones and xanthones are with less pharmacological importance. Gentianceae is a great source of xanthones. Research on *Polygala nyikensis* reported that*Polygala nyikensis* root contains xanthones and shows antifungal activity (Hussein & El-Anssary, 2019).
- Stilbenes – Stilbenes are widely found in plants but they are small group of secondary metabolites. They are mostly found in heartwood of trees. An example of stilbenes is resveratrol which is known to have estrogen like activity (Hussein & El-Anssary, 2019). Stilbenes found in *Cajanus cajan*a Bangladeshi plant showed hypocholesterolemic activity in mice(Luo, Sun, Si, & Chen, 2008)
- Lignans – Report shows lignans are formed by two molecules of phenylopropene derivative. Dibenzulbutane, Dibenzylbutryolactones, monoepoxy lignans and bisepoxylignans are major subtype of lignans. Antimicrobial and Antifungal are mostly known pharmacological activity of lignans (Hussein & El-Anssary, 2019).

Alkaloids

Alkaloids are secondary metabolites with basic nitrogen in heterocycle (Achilonu & Umesiobi, 2015) and they are synthesized from few common amino acids, lysine tyrosine, typtohan (Richard, Temsamani, Cantos-Villar, & Monti, 2013). There are about 2000 of known alkaloid compounds. About 20 percent of these compounds are from flowering species. Alkaloids mostly found in plants as salts of organic acids like malic, lactic, tartaric and other acids. Even though many of the alkaloids discovered are toxic some of them shows a wide variety of biological activity in lower dose (Richard et al., 2013). For example, quinoline exhibits extensive bioactivity. They are protective agent against predators in arthropods. Benzoquinone, naphthoquinone, and Anthraquinone exhibit significant antibiotic are antitumor properties. Serotonin alkaloid is a neurotransmitter in cardiovascular system, blood cells and central nervous system. Similarly isoquinoline exhibits immune-stimulatory, cytotoxic and animalarial activity(Achilonu & Umesiobi, 2015).

Saponins

Saponins are pentoses, hexoses or uronic acid composed sugar units(Hussein & El-Anssary, 2019). They are widely spread in nature and shows vast functional diversity. Report shows that they are present in more than 500 plants belonging to 90 different families (Hussein & El-Anssary, 2019). Depending on their structure they are classified in to Triterpenoids, steroids or steroidal glycoalkaloids. Saponins shows a wide variety of pharmacological activity like antitumor, piscicidal, sedative, analgesic properties (Moses, Papadopoulou, & Osbourn, 2014).

Terpenoids

Terpenoids are the most diverse group of secondary metabolites (Hussein & El-Anssary, 2019). They are also known as isoprenoids classified based on number and structural organization of carbons. They are mainly classified as hemiterpenoids, monoterpenoids, sesquiterpneoids, diterpneoids, sesterterpenoid, Triterpenoids, tetraterpenoids, polyterpenoids. Some of the plants containing Terpenoid are *Acanthus ilicifolius,Achyranthes aspera, Ageratum conyzoides, Alocasia indica.*They exhibits a wide range of biological activities like antibacterial, anticancer activity of limonene a monoterpenoid, antifungal, hepatorpotective, anti-inflammatory (Ludwiczuk, Skalicka-Woźniak, & Georgiev, 2017). Terpenoids also are natural antioxidant used in the protection and treatment of chronic diseases.

Lipids

Naturally occurring fixed oils, waxes, essential oils, phospholipids are known as lipids. Lipids are the component of biological membrane. They serve as vitamin and hormone with fuel for cellular activities. Before lipids were considered as primary metabolite but some researches shows they have some pharmacological activities. For example, fixed oils contain some polyunsaturated fatty acids that reduced the excretion of lipid peroxidant resulting in anti-inflammatory and antioxidant activity. Essential oil of plants shows antiseptic, antimicrobial, analgesic, sedative activity (Hussein & El-Anssary, 2019). Essential oil from Bangladeshi plant *Blumera lacera* leaves showed analgesic, hypothermic and tranquillizing activity (Khair et al., 2014)

Carbohydrates

Carbohydrates are considered as primary metabolites but through glycosidation linkage they show influence on secondary metabolites. Being the first product of photosynthesis they are widely distributed in nature and starting point for all phytochemicals. Carbohydrates can be classified into monosaccharides, disaccharides, oligosaccharides and polysaccharides. Some carbohydrates show important pharmacological activity. For example mucilage act as minor pain reliver and anti-inflammatory agent (Hussein & El-Anssary, 2019).

1.2 Pharmacological Activity

Pharmacological activity or biological activity is defined as the biological effect in living cell achieved by specific molecular entity (Batista-Navarro, 2013). The secondary metabolites found in plants exhibit many of these pharmacological activities. These activities include anti-inflammatory, anticancer, anti-diabetic, antimicrobial, analgesic activity. For these medicinal plants are increasing the attention of researchers for secondary metabolites and their pharmacological activity. Some of these pharmacological activities are explained below-

Anti-inflammatory- Inflammation is defined as the first response of body to any infection or injury. Inflammation has both benefits and draw backs. For example, healing process is facilated by inflammation but can also be harmful by resulting in anaphylactic shock. Anti-inflammatory is the response of any substances that reduces inflammation. This anti-inflammatory activity is exhibited by many medicinal plants. The bioactive compounds present in these plant shows anti-inflammatory response in living cell. Some Phenolic compounds like condensed tannins, flavonoids, Gallo tannins show anti-inflammatory response by inhibiting some molecular targets. Condensed tannins (proanthocyanidins) exert anti-inflammatory response in two ways. They show response as antagonist of particular

hormone or inhibitors of COX enzymes. Proanthocyanidins also shows biological activity like antioxidant, anti-asthmatic, anticancer. Gallotannins shows anti-inflammatory by scavenging of radicals and cytokines, inducible nitric-oxide synthase, COX-2 inhibitation. Isoquinoline, indole, diterpene are some examples of alkaloids found in plants that show anti-inflammatory. Other than condensed tannins, flavonoids, Gallo tannins some derivatives of Coumarins, sterols showed anti-inflammatory activity. For example, phytochemical investigation of plants like *Baliospermum montanum, Eucalyptus camaldulensis, and Lantana camara*showed the presence ofPhenolic compounds like flavonoids, tannins and pharmacological investigation of these plants showed anti-inflammatory activity.

Antimicrobial- Antimicrobials are agents that kill the microorganisms. For example, antibiotics are used against bacteria's and antifungal. But the increasing antibiotic resistances engage scientists to discover new antimicrobial agents. Plants secondary metabolites are a great source of antimicrobials. Alkaloids, Flavonoids, Tannins, Terpenes, Quinones shown some great potential as antimicrobial agents (Compean & Ynalvez, 2014). From table 2 *Adhatoda vasica, Centella asiatica, Paederia foetida, Nyctanthes arbor-tristis, Ocimum tenuiflorum*are are some of the plants that showed the presence of alkaloids, flavonoids in phytochemical investigation and possess anti-inflammatory activity.

Wound Healing – The process of repairing the injury of skin or other tissues is known as wound healing. Its reported that wound healing still not issued safe as it cannot minimize the hospitalization of patients suffering from wound (Taweepraditpol, Md, Boonvisut, Chuangsuwanich, & Pradniwat, 2017). As a result, many studies were done to evaluate the wound healing potential of plants through in vivo and in vitro preclinical models and mechanism of wound healing. Reports demonstrates medicinal plants exhibit wound healing activity by angiogenesis, activation of NF-κB, favoring pro-inflammatory cytokines,

increased expression if inducible nitric oxide synthase and alpha 1 type 1 collagen and antioxidant activity (Firdous & Sautya, 2018). Flavonoids like kaempferl, myristin are some common phytochemicals found in plants that shows wound healing activity (Barku, 2019). *Baliospermum montanum, Carcia papaya, Lantana camara, Acrostichum aureum, Desmodium gangeticum* are some of the examples of Bangladeshi plants with wound healing activity.

Immunomodulatory- Immunomodulatory is referred as the process that alters the immune response by stimulation or suppression that may result in disease free state. It's observed there is a worldwide increase in infectious disease. So there is always a need for Immunomodulatory agent. Secondary plant metabolites Diterpenes, lignans, xanthones isolated from plant extract shows Immunomodulatory activity by in vitro anticomplementary activity and inhabitation of T-cell proliferation (Kijjoa, 2002).

Anti-diabetic – They are the agents used in diabetic mellitus and help to control blood glucose levels. Report shows there are 1.5 million of deaths for diabetic each year (Hasan & Sultana, 2018). Though there are medications like biguanides, sulphonylureas, thiazolidinediones are available they exhibit a number of side effects. So there is an urgency of search for new safer medicine with fewer side effects. Medicinal plants can play role in this perspective. Research shows there are number of medicinal plants that show antidiabetic activity. Secondary metabolites like flavonoids, quercin, metformin, anthocyanin, catechin, flavones, Coumarins found in plants have shown major impact on diabetics. Probable mechanism of these plants activity is stimulation of insulin secretion, promote β- cell regeneration, inhibit activities of α-glucosidase. Some examples of Bangladeshi plants with anti-diabetic activity are *Desmodium gangeticum, Luffa actangula, Camellia sinesis, Kalanchoe pinnata*.

Anti-ulcer-Protection of mucosal layer from ulceration and inflammation is provided by anti –ulcer agents**.** Among the secondary metabolites alkaloids, flavonoids, terpenoids mostly shows anti-ulcer activity. *Abutilon indicum, Acanthus ilicifolius, Aegle marmelos, Calotropis procera, Eucalyptus camaldulensis, Mikania cordata*are some Bangladeshi plants with phytochemical flavonoids, alkaloids, terpenoids present in them shows anti-ulcer activity.

1.3 Rationale of the study

Medicinal plants are considered as the major source of medicine even after the development in pharmaceuticals and drug developments. They are rich source of chemicals known as lead compounds. These lead compounds show variety of desired biological and pharmacological activity that can be used against diseases. However, lead compound gives adverse side effects with their biological activity. As a result, many drug strategies are undertaken to minimize the side effects and improve the pharmacodynamic and pharmacokinetic properties of lead compound. Lead compounds are also considered as the starting point of drug design. It's observed many of the synthetic medicine used today came from medicinal plants that were previously being used as a part of traditional or folk medicine. For example, widely used Acetylsalicylic acid is a modified form of salicylic acid from willow bark. Similarly, artemisinin, an endoperoxide sesquiterpene lactone isolated from *Artemisia annua* L. is used as lead product for an anti-malarial drug known as Arteether. *Artemisia annua* L. was previously used in Chinese medicine for fever (Fairhurst & Wellems, 2015). Another example is Tiotropium plant derived natural product used for the treatment of chronic obstructive pulmonary disease shows long lasting effects when compared with other available drugs for COPD. Tiotropium is derived from *Atropa belladonna* L. and other members of Solanaceae family (Balunas & Kinghorn, 2005). The plant derived drug discovery also led to

the discovery of many anticancer drugs like vinblastin, vincristin are alkaloids derived from *Madagascar periwinkle*. For these reasons medicinal plants are always a field of interest for researcher. So, this study on Bangladeshi plants was undertaken to compile some of the pharmacological and phytochemical study on Bangladeshi plants. This study may increase the knowledge on Bangladeshi plants and help to identify new research area which may help to discover new lead compounds for future drug designing.

1.4 Aim of the study

The aim of the present study was to make a reference for researchers and academics, increase the knowledge on medicinal plants bydocumenting the pharmacological and phytochemical study on some Bangladeshi medicinal plants.

1.5 Objectives

The main objective of this study was,

1. Increase the knowledge on medicinal plants of Bangladesh.
2. Documentation of pharmacological and phytochemical study on Bangladeshi medicinal plants.
3. Identifying a new research area for medicinal plants.
4. Reference for researchers and academics.

Chapter 2

Methodology

To begin with, this review has been conducted preliminarily by scanning and scheming through a heap of scholarly articles relevant to the aforementioned topic from various authentic sources. Next, the most relevant scientific article from various credible sources such as online scholarly data bases, newspaper, books, peer-reviewed journals and publications were selected according to need. A thorough review of literature was performed. The required information was then extracted and utilized as per the requirement of this study. Subject specific professional websites were referred to. Online search engine and journal data bases such as Pubmed, ScienceDirect, Google scholar, ACS publications, Nature, SpringerLink, Wiley Online Library, and etcetera were used whenever required. Furthermore, Mendely by Elsevier had been used to cite the array of articles as per the need of this review paper.

Chapter 3

Medicinal Plants of Bangladesh

Bangladesh is a repository of medicinal plants. Since the ancient time medicinal plants are used in treatment purposes by people of Bangladesh. In Bangladesh traditional system of treating diseases is known as kabirajee. Being easily affordable kabirajee has become the first choice of treatment for rural people of Bangladesh. Different tribes like chakma, marma, garo existence also aids to the traditional medicine of Bangladesh (Bardhan, Ashrafi, & Saha, 2018b). In addition, medicinal plants are also important for pharmaceuticals as a source of drugs. Its estimated that the medicinal plant market of Bangladesh is equivalent to US14$ billion(Rashid et al., 2015). Pharmaceutical companies use medicinal plant materials for the isolation of single purified drugs, e.g. digitoxin extracted from Digitalis, vincristine from *Catharanthus roseus*, senna from *Cassia senna*(Rahman & Fakir, 2015). Statistics also shows there are 142 different crude drugs also used by various pharmaceuticals of Bangladesh (Rashid & Eakram, 2010). Moreover, Bangladesh being a developing country, traditional way of treatment of diseases with medicinal plants is the first choice of treatment for many people as they are cheaper with low or no side effects. As a result, medicinal plant has become the first choice of treatment for people.

3.1 Traditional Use of Bangladeshi Plants

In Bangladesh for common diseases like cold, cough, pain, diarrhea medicinal plants are widely used. They also show activities like antihelminthics, anti-diabeitc, antifungal, anti-inflammatory, analgesic and etcetera. In table 1 traditional use of some medicinal plants are collected together.

From table 1 it’s clearly evident that Leguminosae family is mostly contributed to the plant species. For the treatment leaves, bark, stems, flower or fruits are used. Sometimes they are

used alone for treatment or with honey to mask the bitter flavor of the plants. They are also used with mixture of other medicinal plants for treatment purposes. For example, Acacia catechu is used in combination with opium to cure diarrhea.

Table 1:Traditional use of some medicinal plants of Bangladesh

SL no	Scientific name	Family	Local name	Traditional use
1	*Abelmoschus esculentus*	Malvaceae	Derosh	Gastric ulcer Leaves in tumor treatment
2	*Abroma augusta*	Malvaceae	Ulantkambal	Anti-fertility Uterine tonic
3	*Abrus precatorius*	Leguminosae	Josthimodhu	Bronchitis
4	*Abutilon indicum*	Malvaceae	Potari	To treat infection
5	*Acacia auriculiformis*	Leguminosae	Akashmoni	Anti-malarial
6	*Acacia catechu*	Leguminosae	Kharir	Bark as cure for cold and cough To cure tongue and mouth ulcer In combination with opium to cure diarrhea
7	*Acacia nilotica*	Leguminosae	Babul	Gastroprotective Anti-asthmatic Liver tonic Branches in teeth cleaning
8	*Acalypha indica*	Euphorbiaceae	Mukta jhuri	Respiratory problems Anti-parasite
9	*Acanthus ilicifolius*	Acanthaceae	Hsargoza	Asthma Paralysis of limb Snake bite Diabetics

				Rheumatoid arthritis
10	*Achyranther aspera*	Amaranthaceae	Apang	Leaf juice to stop bleeding Edema
11	*Acorus calamus*	Acoraceae	Bach	Anti-diabetic To promote memory Cough Asthma
12	*Acrostichum aureum*	Pteridaceae	Lagolo	To treat wound Peptic ulcer
13	*Adhatoda vasica*	Acanthaceae	Vasaka	Cold Asthma Chronic bronchitis
14	*Adiantum philippense*	Pteridaceae	Goyalelata	Cold and cough Fever Digestive disorder
15	*Aegiceras corniculatum*	Primulaceae	Kholisha	Asthma Fish poison Diabetics Rheumatism
16	*Aegle marmelos*	Rutaceae	Bhel	Diarrhea Dysentery Peptic ulcers Laxative
17	*Ageratum conyzoides*	Asteraceae	Wila	Urinary tract infections Analgesic
18	*Alocasia indica*	Araceae	Mankachu	Anti-inflammatory Astringent Leaves as diuretics
19	*Alstonia scholaris*	Apocynaceae	Chattim	Diarrhea Epilepsy

				Skin diseases Snake bite
20	*Alternanthera sessilis*	Amaranthaceae	Mati konduri	Relive tiredness Anti-inflammatory Analgesic
21	*Amaranthus spinosus*	Amaranthaceae	Kantanotya	In treatment of Jaundice Diuretic
22	*Amorphophallus campanulatus*	Araceae	Oal	Anti-inflammatory Tumors Arthralgia
23	*Andrographis Paniculata*	Acanthaceae	Kalmegh	Cold Diarrhea In treatment of jaundice
24	*Annona muricata*	Annonaceae	Ata	Anti-inflammatory Diabetics Liver diseases
25	*Aphanamixis polystachya*	Meliaceae	Pithraj	Astringent Liver and spleen diseases Rheumatism
26	*Argemone mexicana*	Papaveraceae	Shialkata	Antimalarial Diuretic Skin diseases Destroy worms
27	*Artocarpus lacucha*	Moraceae	Dahu Depharl	Wound healing Skin diseases
28	*Averrhoa carambola L*	Oxalidaceae	Dumur	Chronic headache Fever Cough Diarrhea Ringworm infections
29	*Azadirachta indica*	Meliaceae	Neem	Anti-diabetic

				Skin diseases Anti-inflammatory Fever
30	*Baccaurea ramiflora Lour*	Phyllanthaceae	Latkan	Anti-inflammatory Rheumatoid arthritis To treat injuries
31	*Bacopa monnieri*	Plantaginaceae	Brahmi Shak ful	Memory enhancer Plant juice as cardiac tonic Antimalarial
32	*Baliospermum montanum*	Euphorbiaceae	Danti	Root as laxative Antihelminthic Diuretic
33	*Bambusa arundinacea*	Poaceae	Baash	Cough Skin disease
34	*Barleria lupulina*	*Acanthaceae*	Sornamukhi	Anti-inflammatory To stop bleeding
35	*Barleria prionitis*	*Acanthaceae*	Pitajhinti	Anti-inflammatory Fever Toothache
36	*Barringtonia acutangula*	Lecythidaceae	Hijol	To treat pain in body Abdominal disorder Cold Asthma
37	*Barringtonia racemosa*	Lecythidaceae	Samudrapha	Asthma Diarrhea Seed in ophthalmic problems
38	*Basella alba*	Basellaceae	Puishak	Laxative
39	*Bauhinia purpurea*	Leguminosae	Rokto kanchon	Anti-inflammatory Rheumatism Dysentery
40	*Blumea lacera*	Asteraceae	Kukursunga	To treat inflammation

41	*Boehmeria Macrophylla*	Urticaceae	Jangli Chotta	Tonic for treating boils
42	*Boerhavia diffusa*	Nyctaginaceae	Punarnava	Renal and urinary tract information Anti-inflammatory Diuretic
43	*Bombax ceiba*	Bombacaceae	Shimul	To treat boils and acne
44	*Borassus flabellifer*	Arecaceae	Tal	Fruit in cough and pulmonary diseases
45	*Brassica oleracea*	Brassicaceae	Badhakoopy	Anti-inflammatory
46	*Caesalpinia bonduc*	Leguminosae	Lalkanta	Helminthiasis Leaf paste in skin infection
47	*Caesalpinia pulcherrima*	Leguminosae	Krishnachura	Anti-inflammatory Diarrhea Dysentery Certain skin infection
48	*Cajanus cajan*	Leguminosae	Tur	Leaves in food poisoning Diabetics Constipation
49	*Calotropis gigantea*	Apocynaceae	Akondo	Cough Dysentery
50	*Calotropis procera*	Apocynaceae	Akond	Edema in pregnant woman Cough
51	*Calycopteris floribunda*	Combretaceae	Goache-lata	Antihelminthic Astringent Dysentery Jaundice
52	*Camellia sinensis*	Theaceae	Cha	Anti-inflammatory Hypoglycemic
53	*Carica papaya*	Caricaceae	Papaya	Green fruit in treatment of high blood pressure Constipation

54	*Carissa carandas*	Apocynaceae	Karamcha	Antihelminthics
55	*Cassia fistula*	Leguminosae	Sonali	Mild laxative
56	*Cassia occidentalis*	Leguminosae	Kalkasunde	Antibacterial Antifungal Anti-diabetic Anti-inflammatory
57	*Cassia sophera*	Leguminosae	Tankai/ Dan-ji-bong	In vomiting tendency Anti-diabetics
58	*Catharanthus roseus*	Apocynaceae	Nayantara	Leaf juice in diabetics, Leukemia, Helminthiasis
59	*Centella asiatica*	Apiaceae	Thankuni	Leaf juice in diarrhea and gastric problems
60	*Cerbera odollam*	Apocynaceae	Dabur	Laxative
61	*Ceriops decandra*	Rhizophoraceae	Jalia garan	Gastrointestinal disorder Snakebites Inflammation
62	*Cissus quadrangularis*	Vitaceae	Harbhanbga	Whole plant in bone fracture
63	*Clerodendrum inerme*	Lamiaceae	Banajai	Fever Skin diseases Asthma
64	*Clerodendrum infortunatum*	Lamiaceae	Bhant	Leaf juice in dysentery Antihelminthic Skin diseases
65	*Clitoria ternatea*	Leguminosae	Oporajita	Snake bite Indigestion Tumor
66	*Coccinia grandis*	Cucurbitaceae	Telakucha	Root juice in mental diseases Whole plant in diabetic treatment

67	*Cocos Nucifera*	Arecaceae	Narkel	Leaf juice in diarrhea Oil to strengthen hair
68	*Commelina benghalensis*	Commenlinaceae	Dholpata	Headache
69	*Coriandrum sativum*	Apiaceae	Dhaniya	Insomnia Loss of appetite Pain in the joint
70	*Costus speciosus*	Costaceae	Khewa	In treatment of kidney stones
71	*Crataeva nurvala*	Capparaceae	Barun tiktoshak	Inflammation Gastric irritation Rheumatic fever Constipation
72	*Curculigo orchioides*	Hypoxidaceae	Talamuli	Diarrhea Arthritis of the lumber and knee joints Leaf juice in ear problems
73	*Curcuma longa*	Zingiberaceae	Holud	Wound healing Hepatic disorder Rheumatism Skin diseases Cough
74	*Cuscuta reflexa*	Convolvulaceae	Swarnalata	Jaundice Liver diseases Uterus and liver pain
75	*Cyperus rotundus*	Cyperaceae	Nagarmutha	Eczema Tubers in treatment of constipation Pain reliever
76	*Datura stramonium*	Solanaceae	Dhattura	Rheumatism Skin disorder Cough Pain reliever Asthma

77	*Delonix regia*	Leguminosae	Radhachura	Fruits in treatment of piles Leaves applied in treatment of boils
78	*Dendrophthoe falcata*	Loranthaceae	Bandah	Crushed whole plant in treatment of rheumatism Asthma Skin diseases
79	*Derris trifoliata*	Leguminosae	Panlata	Aerial part as stimulant Diarrhea
80	*Desmodium gangeticum*	Leguminosae	Chalani	Digestive track disorder Hepatic disorder Cardiovascular disorder
81	*Drynaria quercifolia*	Polypodiaceae	Pankha	Stem juice in diabetics Fever Skin diseases
82	*Enhydra Fluctuans*	Asteraceae	Helencha	Neurological disorder Hepatic disorder Renal disorder Leaves and stem juice in diabetics
83	*Erythrina variegata*	Leguminosae	Mandar ful	Bark in treatment of helminthiasis Bark in eye treatment
84	*Eucalyptus camaldulensis*	Myrtaceae	Eucalyptus	Ulcer Fever Diphtheria
85	*Euphorbia royleana*	Euphorbiaceae	Thor	Skin diseases
86	*Excoecaria agalloch*	Euphorbiaceae	Gewa	Myopathic spasm Leprosy Dermatitis
87	*Ficus hispida*	Moraceae	Dumoor	Diabetics Dermatitis

88	*Ficus racemosa*	Moraceae	Joggo dumur	Fruit in treatment of diabetics Liver condition Inflammation Diarrhea
89	*Flemingia paniculata*	Leguminosae	Udumbara	To induce sleep To reduce pain
90	*Garcinia mangostana*	Guttiferae	Tamal	To treat inflammation To treat diarrhea
91	*Heliotropium indicum*	Boraginaceae	Hatisur	Antidote to poisoning Leaf paste in bone fracture
92	*Hemidesmus indicus*	Apocyanaceae	Anantamul	Urinary tract infection Leaves in treatment of skin infections
93	*Heritiera fomes*	Malvaceae	Sundri	Bark in diabetics In treatment of gastrointestinal disorder
94	*Holarrhena antidysenterica*	Apocyanaceae	Kurchi	Anti-diarrheal In treatment of Jaundice
95	*Justicia gendarussa Burm*	Acanthaceae	Jagatmadan	Leaf juice in bone fracture and rheumatic pain
96	*Kaempferia galangal*	Zingiberaceae	Ekangi	Toothache Anti-dandruff
97	*Kalanchoe pinnata*	Crassulaceae	Patharkuchi	Blood dysentery Kidney and gall bladder stone
98	*Lagerstroemia speciosa*	Lythraceae	Jarool	Bark in treatment of diabetics Seed in treatment of diarrhea
99	*Lannea coromandelica*	Anacardiaceae	Jiola	Bark in chronic dysentery Bark and root in treatment of diabetics
100	*Lantana camara*	Verbenaceae	Chaturaangi, Jangoli-janglog	Whole plant in cough, mental diseases, fever Leaf and root in treatment of malaria

				tumor, tetanus
101	*Lasia spinosa*	Araceae	Bonadi, Kalo kata	Blood purification Rheumatoid arthritis
102	*Lawsonia inermis*	Lythraceae	Mehedi	Leaves in cancer, fever and to keep head cool
103	*Leea indica*	Vitaceae	Kurkur	Leaf paste to treat painful joints Leprosy Eczema
104	*Leucas aspera*	Lamiaceae	Dondo-kolosh	Leaf juice in tooth infection Leaf juice in headache
105	*Luffa acutangula*	Cucurbitaceae	Jhinga	Diuretic Leprosy
106	*Luffa cylindrica*	Cucurbitaceae	Dhundul	Emetic Cathartic Demulcent
107	*Madhuca longifolia*	Sapotaceae	Mahua	Skin diseases Rheumatism Anti-ulcer Fruit pulp in treatment of diarrhea
108	*Mangifera indica*	Anacardiaceae	Aam	Leaves and stem in treatment of dysentery
109	*Manilkara zapota*	Sapotaceae	Sopheda	In treatment of Jaundice Vitamin supplement
110	*Michelia champaca*	Magnoliaceae	Champa	Chronic headache
111	*Mikania cordata*	Asteraceae	Asaam lota	To stop bleeding Arthritis Liver disorder
112	*Mikania cordifolia*	Asteraceae	Refusi lata	Wound healing

113	*Mikania micrantha*	Asteraceae	Asham ludi	Leaf paste is used in wound healing
114	*Mimosa pudica*	Leguminosae	Lajjaboti	Toothache Anti-inflammatory Jaundice
115	*Mimusops elengi Linn*	Sapotaceae	Bakal	Seed in dental diseases Roots as diuretics
116	*Momordica charantia*	Cucurbitaceae	Karala	Leaves in treatment of diabetics Chicken pox
117	*Moringa oleifera*	Moringaceae	Shajna	Stems in treatment of rheumatism Flower in treatment of chicken pox
118	*Morus alba*	Moraceae	Tunth	Skin disorder Allergy
119	*Murraya paniculata*	Rutaceae	Kamini	Helminthiasis Liver disease Rheumatoid arthritis
120	*Neolamarckia cadamba*	Rubiaceae	Cadam	Anti-diabetic Fever Cold
121	*Ocimum sanctum*	Lamiaceae	Tulsi	Leaves in cough, bronchitis, asthma
122	*Olea europaea*	Oleaceae	Jolpie	Fruits in heart diseases Skin cleanser
123	*Oroxylum indicum*	Bignoniaceae	Khona	Urinary tract infections Heart diseases
124	*Paederia foetida*	Rubiaceae	Gondhobala	Tonic Rheumatoid arthritis
125	*Pandanus fascicularis*	Pandanaceae	Keora	Leaves in asthma and cold
126	*Pandanus foetidus*	Pandanaceae	Keya-kanta	Skin diseases Small pox Scabies

127	*Peltophorum pterocarpum*	Leguminosae	Radhachura	In treatment of unhealthy skin Constipation Ringworms
128	*Phyllanthus emblica*	Phyllanthaceae	Amla	Dysentery Cholera Gastric problems
129	*Piper betle*	Piperaceae	Paan	Toothache Lowers blood sugar Aid in digestive process
130	*Pisum sativum*	Leguminosae	Matarsuti	Treatment of constipation
131	*Polyalthia longifolia*	Annonaceae	Debdaru	Snake bite Skin infection
132	*Polyalthia suberosa*	Annonaceae	Murmuri	Rheumatism Various skin infections
133	*Polygonum hydropiper*	Polygonaceae	Bishcatali	Anti-inflammatory
134	*Pouzolzia zeylanica*	Urticaceae	Bishkatali	Leaf juice in Helminthiasis Anti-ulcer
135	*Premna integrifolia*	Lamiaceae	Agnimantha	Roots are used in diabetics, inflammation, antibiotic and constipation
136	*Punica granatum*	Punicaceae	Dalim	Leaves in diarrhea To increase strength
137	*Rauwolfia serpentine*	Apocynaceae	Sharpagandha	Root juice in hypertension
138	*Rhododendron arboreum*	Ericaceae	Baras	To treat coughs, diarrhea and dysentery
139	*Richardia scabra*	Rubiaceae	Riim-raaz	Tonic Asthma Emetic Dermatitis

140	*Ruellia tuberosa*	Acanthaceae	Potpoti	Roots in nervous breakdown and anemia
141	*Sansevieria trifasciata*	Asparagaceae	Bagha-chokro	Tonic Snake bite Alopecia Anti-malarial
142	*Saraca indica*	Leguminosae	Ashoka	Anti-inflammatory
143	*Schleichera oleosa*	Sapindaceae	Kusum gachh	Oil in skin problems like acne, itching To relieve pain of rheumatism
144	*Scoparia dulcis*	Plantaginaceae	Bon-dhonya	Leaf juice in diabetics
145	*Sesbania grandiflora*	Leguminosae	Buko	Eye diseases Dermatitis Small pox
146	*Sida cordifolia*	Malvaceae	Berela	Dysentery Neurological disorder Rheumatism
147	*Sida rhombifolia*	Malvaceae	Svetbarela	Anti-inflammatory To build immunity
148	*Solanum sisymbriifolium*	Solanaceae	Swetrangani	Fever Respiratory tract infection Diarrhea
149	*Solanum torvum Swartz*	Solanaceae	Tita bagoon	Leave in skin infection
150	*Sonneratia apetala*	Lythraceae	Keora	Fruits in diabetics

151	*Sonneratia caseolaris*	Lythraceae	Choilani	Anti-diabetic Astringent Antiseptic
152	*Spilanthes acmella*	Asteraceae	Vhadalika	Toothache
153	*Stephania japonica*	Menispermaceae	Akanadi	Leaves and roots in fever, urinary diseases and diarrhea
154	*Sterculia villosa*	Malvaceae	Udal ful	To treat rheumatism
155	*Streblus asper*	Moraceae	Sehora	Bark juice in malaria and fever Stem in tooth problem
156	*Swertia chirata*	Gentianceae	Chireta	Roots in obesity and gastric problems
157	*Swietenia macrophylla*	Meliaceae	Mehgoni	Leaves and bark are used in diabetics
158	*Syzygium cumini*	Myrtaceae	Kalojam	Bark in sore throat, bronchitis, asthma and dysentery
159	*Syzygium malaccense*	Myrtaceae	Malaka Jamrul	Helminthiasis
160	*Syzygium samarangense*	Myrtaceae	Jamrul	Diabetics Leaf juice in cold and waist pain
161	*Tabernaemontana divaricata*	Apocynaceae	Tagar	Leaf juice as antidote for poisoning Flower juice in eye disorder
162	*Tamarindus indica*	Leguminosae	Tatul	Abdominal pain Dysentery Parasitic infection
163	*Tectona grandis*	Lamiaceae	Saguna	Laxative Sedative To treat dysentery
164	*Terminalia arjuna*	Combretaceae	Arjun	In heart diseases

165	*Terminaliabellerica*	Combretaceae	Horitoki	Stimulation of appetite Hair loss In treatment of intestinal worms
166	*Terminalia chebula*	Combretaceae	Bohera	Stimulation of appetite, Digestive aid and acidity
167	*Thevetia peruviana*	Apocynaceae	Kolkaphul	Acne Helminthiasis Flower juice in burning sensation of eye
168	*Tragia involucrata*	Euphorbiaceae	Bichuti	Root juice is applied on allergy
169	*Trema orientalis*	Cannabaceae	Chikan	Leaf juice in dysentery and in tiredness due to heat
170	*Trichosanthes dioica*	Cucurbitaceae	Potol	Leaves in acne and allergy
171	*Tridax procumbens*	Asteraceae	Phool-jori	Bronchitis To stop bleeding
172	*Triticum aestivum*	Poaceae	Gom	To treat diabetics
173	*Uraria lagopodies*	Leguminosae	Chakuley	Antimalarial
174	*Urena lobata*	Malvaceae	Okhra	Urinary tract infection
175	*Vernonia anthelmintica*	Asteraceae	Tulsi	Cold Asthma Sore throat Anti-inflammatory
176	*Vernonia cinerea*	Asteraceae	Joanbir	Fever
177	*Vernonia patula*	Asteraceae	Kukshim	Fever Skin disease
178	*Vitex negundo*	Lamiaceae	Nishinda	Leaf paste applied to rheumatic and joint pain
179	*Vitis vinifera*	Vitaceae	Angur	To treat tuberculosis

180	*Xanthium indicum*	Asteraceae	Ghagra	Whole plant is applied on small pox, boils
181	*Xylocarpus granatum*	Meliaceae	Dhundul	Astringent Fever Diarrhea Anti-malarial
182	*Zanthoxylum budrunga*	Meliaceae	Bajna	Bark and fruits as astringent, antiemetic and stimulant
183	*Ziziphus mauritiana*	Rhamnaceae	Boroi	Leaf and bark are used in chicken pox, measles

The ethno medical use of these plants indicates the richness of Bangladeshi medicinal plants. It's estimated the demand of medicinal plants is increasing 15% to 20% each year and by 2050 the trade will be US$ 5Trillion (Hishe, Asfaw, & Giday, 2016)

3.2 Pharmacological and Phytochemical Study on Bangladeshi Plants

It's observed that in recent years there have been prominent advances in synthetic medicine; still there are many diseases like cancer, glioblastoma, diabetics and cronhn's disease we don't have proper medication for. So, the interest of research in medicinal plants is increasing. Since the past twenty years there has been a vast investigation on phytochemical and pharmacological activities of Bangladeshi plants. The plants included in table 1 are all investigated for their phytochemical and pharmacological activities. The phytochemical screening of the plants reported the present of phytochemicals like alkaloids, tannins, saponins, flavonoids.

Alkaloids are a broad class of nitrogen containing compounds. They are mostly found in higher plants. From table 1 its observed alkaloids were almost found in all plants. Anthraquinone type of alkaloids was found to be present in 16 of the plants. Anthraquinone is known to posse's laxative activity. Among the plants alkaloid was not found in *Abutilon indicaum, Bambusa arundinacea, Ficus racemosa, Justicia gendarussa, Lawsoni inermis, Luffa acutangula, Mikania cordifolia, Morus alba, Pisum sativum, Xylocarpus granatum.*

By studying table 2 we observed among the plants flavonoids were found in 89 of the plants. For example, 2-10% acactechin was found in Acacia catechu. Again*Garcinia mangostana* showed the presence of epicatechin, anthocyanin. From the flower and leaves of Acalypha indica Flavonoids like mauritianin, clitorin, nicotiflorin, biorobin were isolated (Nahrstedt, Hungeling, & Petereit, 2006). Acrostichum aureum showed the presence of 5 types of flavonoids and they are (quercetin-3-O-β-D-glucoside, quercetin-3-O-β-D-glucosyl-(6→1)-α-L-rhamnoside, quercetin-3-O-α-L-rhamnoside, quercetin-3-O-α-L-rhamnosyl-7-O-β-D-glucoside and kaempferol) (Uddin, Grice, & Tiralongo, 2012). Two flavonoids luetoline and 7-methoxy luetoline was isolated from *Barleria prionitis* (Hemalatha, Hareeka, & Sunitha, 2012).

Saponins were also present in phytochemical investigation of the plants in table 2. Saponins are pentoses or uronic acid composed of sugar units. They can be subdivided into Triterpenoids, steroid, steroidal glycosides. From table 2 it's observed 24 of the plants shows the present of triterpenoids. The plants containing triterpenoids shows activity like hepatoprotective, immunomodulatory, anticarcinogenic (Rao & Gurfinkel, 2000). It's also observed from table 2 104 of the plants show presence of steroids. Sterols presence was also observed in the plants. For example, β-sterols were found in *Cassia sophera* and *Clitoria ternatea*. B-sitosterol was found in almost all plants like *Abutilon indicum*. It has cholesterol like structure.

Presence of phenolic compounds like tannins, coumarins was also found in phytochemical screening of plants. Tannins were found in 153 of plants. Phlobatannin was found in 10 plants from table 2. Coumarin was found in *Adhatoda vasica, Borassus flavellifer, Calotropis procera, Coriandrum sativum, Drynaria quercifolia, Mimosa pudica, Morus alba, Murraya paniculata, Phyllanthus emblica, Piper betle, Premna integrifolia, Punica grantum, Rhododendrom arboreum, Tectona grandis*. The plants with coumarins showed the presence of bioactivities like anti-tumor, anti-hypertension, analgesic like activity.

For the screening of the pharmacological activity of the plants the desired part of the plant leaves, root, bark or whole plant was separated and dried, ground to coarse powder than extracted using ethanol, methanol or other organic solvents. After that the crude extracts were tested for their desire pharmacological activity or phytochemicals. For pharmacological screening of activities like anti-diabetic, anti-tumor, antihelminthics, anti-inflammatory, anti-ulcer the plant extracts were introduced into rat model. Among the activities antimicrobial activity was determined by zone inhabitation in mm. Standardized zone inhabitation technique was used to determine antibacterial and antifungal activity.

Table 2:Pharmacological activity and phytochemicals of some Bangladeshi plants

Scientific name	Local name	Traditional use	Pharmacological activity	Phytochemical	Reference
Abelmoschus esculentus	Derosh	Gastric ulcer Leaves in tumor treatment	Analgesic CNS depressant Anti-diarrheal Anti-inflammatory Anti-hyperlipidemic Anti-diabetic Anti-fatigue Gastroprotective Immunomodulatory Antioxidant Anticancer Anti-adhesive Antibacterial Anti-tumor Laxative	Tannin Steroids Flavonoids Saponins Alkaloids Anthraquinone Phenols Resin Terpenoids Cardiac Glycosides	(Abobaker, Edrah, & Altwair, 2017)
Abroma augusta	Ulantkambal	Anti-fertility Uterine tonic	Antimicrobial Anti-inflammatory Antifungal Antibacterial Insecticidal Anti-diabetic	Alkaloid Carbohydrate Flavoinoid Tannin	(Das, Datta, & Nandy, 2012)
Abrus precatorius	Josthimodhu	Bronchitis	Anti-inflammatory Antioxidant Antiproliferative Anti-fertility Antispasmodic Anti-diabetic Anti-serotonergic Larvicidal	Saponin Tannin Triterpenes Alkaloids Flavoinoids Glycosides	(Shourie & Kalra, 2013)

			Antibacterial Anticancer Antimicrobial Anti-migraine Anti-allergic		
Abutilon indicum	Potari	To treat infection	Antimicrobial Anti-inflammatory Analgesic Anti-diabetic Antipyretic Hepatoprotective Anti-diarrheal Anti-ulcer	Flavonoids Terpenes Amino acids Aldehyde Hydrocarbon Ketone Fatty acid Esters	(Ramasubramani araja, 2011)
Acacia auriculiformis	Akashmoni	Anti-malarial	Antioxidant Antimalarial Antimutagenic Chemopreventive Hepatoprotective Anti-diabetic Wound healing Memory enhancing CNS depressant Antimicrobial	Alkaloid Flavonoids Tannins Steroids Triterpenoids Fats Saponin glycosids	(Chaki et al., 2015)

Acacia catechu	Kharir	Bark as cure for cold and cough To cure tongue and mouth ulcer In combination with opium to cure diarrhea	Anti-diabetic Antioxidant Anti-inflammatory Chemopreventive Antibacterial Antifungal Anticancer Antidiarrheal Antimicrobial Antipyretic Sore throat Wound healing Anti-ulcer	Catechutanninc acid Acacatechin Tannic acid Quercetin Catechu-red Epicatechin	(Patel, Kumar, & Bhatt, 2009)
Acacia nilotica	Babul	Gastroprotective Anti-asthmatic Liver tonic Branches in teeth cleaning	Anti-inflammatory Antipyretic Analgesic Antioxidant Anti-diarrheal CNS depressant Antihelminthic Antihypertensive Antispasmodic Antibacterial Antifungal Anti-platelet Anti-diabetic Hypolipidemic Anticancer Anti-mutagenic Anti-plasmodial Anti-asthmatic Gastroprotective	Saponon Saponin glycosides Hydrolysable tannin Triterpenoid Tannin Flavonoids Phenol Alkaloid	(Solomon-Wisdom & Shittu, 2010)

Acalypha indica	Mukta jhuri	Respiratory problems Anti-parasite	Analgesic Anti-inflammatory Diuretic Antihelminthic Wound Healing Antibacterial Anti-asthmatic	Alkaloids Catachols Flavonoids Phenolic compounds Saponins Steroids	(Saha & Ahmed, 2017)
Acanthus ilicifolius	Hsargoza	Asthma Paralysis of limb Snake bite Diabetics Rheumatoid arthritis	Antioxidant Hepatoprotective Anti-allergic Antihelminthic Anti-inflammatory Antimicrobial Anticancer Anti-leishmanial Osteoblastic Anti-ulcer Anti-diabetic Anti-rheumatic Anti-asthma	Saponins Tannin Terpenoids Flavonoids Alkaloids Anthraquinones	(Poorna, Maney, Santhoshkumar, & Soniya, 2011)

Achyranther aspera	Apang	Leaf juice to stop bleeding Edema	Antibacterial Spermicidal Antiparasitic Hypoglyceamic Anticancer Hepatoprotective Anti-inflammatory Nephroprotective Anti-depressant Cardiovascular Bronchoprotective Anti-allergic Wound Healing Antioxidant	Alkaloids Tannins Cardiac Glycosides Steroids Flavonoids Terpenoids Reducing sugar Saponins	(V. Sharma, Chaudhary, Singh, & Agarwallll, 2013)
Acorus calamus	Bach	Anti-diabetic To promote memory Cough Asthma	Antifungal Anti-yeast Antioxidant Anti-cellular Immunosuppressive Antitumor Anti-inflammatory Anti-diabetic	Alkaloids Flavonoids Phenolic compounds Tannins Glycosides Amino acids Protein Steroids Terpenoids Carbohydrates Oil and Fats Saponins Organic acids Inorganic acids	(Mamta & Jyoti, 2012)

Acrostichum aureum	Lagolo	To treat wound Peptic ulcer	Anti-tumor Wound Healing Anti-diarrheal Antioxidant Analgesic Anti-inflammatory	Amino acids Glycosides Steroids Triterpinoids Saponins Flavonoids	(Raja S & Ravindranadh K, 2014)
Adhatoda vasica	Vasaka	Cold Asthma Chronic bronchitis	Anti-asthmatic Bronchodilator Wound healing Anti-ulcer Insecticidal Cholagogue Anti-allergy Anti-bacterial	Steroids Saponin Coumarins Alkaloids Diterpenes Phenols Phlobatannin Flavonoids	(Ashvin Godghate & Sawant, 2013)
Adiantum philippense	Goyalelata	Cold and cough Fever Digestive disorder	Thrombolytic Antioxidant Anti-inflammatory Analgesic Antinociceptive	Tannin Flavonoids Steroid Anthocyanin Emodins Alkaloids Phenols Terpenoid Glycosides Anthraquinones	(Mengane, 2016)
Aegiceras corniculatum	Kholisha	Asthma Fish poison Diabetics Rheumatism	Anti-inflammatory Antioxidant Hepatoprotective Anti-diabetic Anti-rheumatic	Alkaloids Glycosides Steroids Flavonoids Saponins Tannins	(Bose, Bala, Rahman, & Shahid, 2010)

Aegle marmelos	Bhel	Diarrhea Dysentery Peptic ulcers Laxative	Anti-proliferative Anti-ulcer Hypoglycemic Antioxidant Anticancer Anti-diarrheal	Alkaloids Proteins Amino acids Glycosides Flavonoids Tannins Steroids Phenols	(G. N. Sharma, Dubey, Sati, & Sanadya, 2011)
Ageratum conyzoides	Wila	Urinary tract infections Analgesic	Antinociceptive Antioxidant Analgesic Anti-inflammatory Antibacterial Wound Healing Radioprotective Antihelminthic Nematicidal	Alkaloids Flavonoids Tannins Saponins Glycosides Steroids Cumarins Charomones Terpenoids Resins Cardenolides Phenols	(Amadi, Duru, & Agomuo, 2012)
Alocasia indica	Mankachu	Anti-inflammatory Astringent Leaves as diuretics	Anti-inflammatory Analgesic Antimicrobial Anti-diabetic Antioxidant Anti-diarrheal Antibacterial Diuretic	Alkaloids Tannins Saponins Steroids Phloba-tannins Terpenoids Flavonoids Cardiac glycosides	(J. Ganesh, K, & M, 2014)

Alstonia scholaris	Chattim	Diarrhea Epilepsy Skin diseases Snake bite	Antimicrobial Anti-inflammatory Analgesic Antimalarial Anticancer Anti-tussive Anti-Asthmatic Antidiarrheal Anticonvulsant	Alkaloids Flavonoids Amino acid Carbohydrates Phenolic compound Terpenoids Cardiac glycosides Oil and Fats Steroids and Sterols	(Dhruti, Bhavika, & Meonis, 2016)
Alternanthera sessilis	Mati konduri	Relive tiredness Anti-inflammatory Analgesic	Anti-hyperglycemic Analgesic Antimicrobial Wound Healing Anticancer Anti-inflammatory	Alkaloids Flavonids Amino acids Carbohydrates Phenols Steroids Terpenoids Saponins Glycosides	(Sivakumar & Sunmathi, 2016)
Amaranthus spinosus	Kantanotya	In treatment of Jaundice Diuretic	Anti-ulcer Antinociceptive Hepatoprotective Anti-inflammatory Diuretic Anti-diarrheal Bronchodilator Laxative Antidepressant Anti-diabetic	Flavonoids Tannins Saponins Glycosides	(Amabye, 2016)

Amorphophallus campanulatus	Oal	Anti-inflammatory Tumors Arthralgia	Antibacterial Antifungal Curative Protective Hepatoprotective Immunomodulatory Antihelminthic Anti-inflammatory Anti-tumor	Alkaloids Glycosides Saponin Anthauinone glycosides Cardiac glycosides Tannins Phenolic compounds Flavonoids Proteins Fats and oils Carbohydrates	(Nandan & Ghosh, 2010)
Andrographis Paniculata	Kalmegh	Cold Diarrhea In treatment of jaundice	Anti-diabetic Anticancer Immunostimulatory Antimicrobial Antioxidant Anti-angiogenic Anti-inflammatory Anti-malarial Anti-bacterial Anti-obesity Anti-diarrheal Hepatorptective	Alkaloids Amino acids Carbohydrates Flavonoids Phenolic groups Saponins Steroids Tannin	(RAJA & PANDIYAN, 2017)

Annona muricata	Ata	Anti-inflammatory Diabetics Liver diseases	Antimicrobial Anti-inflammatory Antinociceptive Antioxidant Insecticide Larvicide Anticancer Wound healing Hepatoprotective Anti-diabetic	Tannins Flavonoids Saponins Terpenoids Carbohydrates Monosaccharide Pentos Ketoses Starch Protein Arginine Cystine Aromatic amino acids Phenolic Amino acids Alkaloids Steroids Phenolics	(Agu & Okolie, 2017)
Aphanamixis polystachya	Pithraj	Astringent Liver and spleen diseases Rheumatism	Antimicrobial Antioxidant Thrombolytic Insecticidal Analgesic Anti-ulcer Anticancer Anti-rheumatic Hepatoprotective	Alkaloid Anthraquinones Cardiac glycosides Flavonoids Tannins Terpenoids	(Apu et al., 2013)

Argemone mexicana	Shialkata	Antimalarial Diuretic Skin diseases Destroy worms	Anti-proliferative Antifungal Anti-inflammatory Analgesic Anti-diarrheal Antihelminthic Antibacterial Antimalarial	Alkaloids Flavonoids Glycosides Phenol Lognin Saponins Sterols Tannins	(Bhatt, Joshi, Suresh Dhyani, & Nain, 2013)
Artocarpus lacucha	Dahu/ Depharl	Wound healing Skin diseases	Anti-mycobacterial Antibacterial Wound healing	Triterpenoids Resin Steroids Tannin Saponin Phenolic compound Flavonoids	(Panday & Bhantnagar, 2009)
Averrhoa carambola L	Dumur	Chronic headache Fever Cough Diarrhea Ringworm infections	Antihyperglycemic Analgesic Anti-diarrheal Anti-inflammatory Anti-tumor Anti-ulcer Anti-helmintic	Alkaloids Flavonoids Phenols Proteins glycosides Tannins Saponins Steroids	(Vijayalakshmi & Brindha, 2017)
Azadirachta indica	Neem	Anti-diabetic Skin diseases Anti-inflammatory Fever	Wound healing Anti-inflammatory Antipyretic Hepatoprotective Neuroprotective Immunomodulatory Anti-fertility Anti-diabetic Cardioprotective	Alkaloids Steriods Saponin Tannin Flavonoids	(Susmitha, Vidyamol, Ranganayaki, & Vijayaragavan, 2013)

			Anti-microbial Anti-cancerous		
Baccaurea ramiflora Lour	Latkan	Anti-inflammatory Rheumatoid arthritis To treat injuries	Antioxidant Analgesic Anti-inflammatory Neuropharmacological Anti-diarrheal Anti-rheumatic Wound healing	Glycosides Saponins Alkaloids Tannins Flavonoids Mucilage Carbohydrates Proteins Phytosterols	(S. Saha, Gouda, & Srinivas, 2017)
Bacopa monnieri	Brahmi Shakful	Memory enhancer Plant juice as cardiac tonic Antimalarial	Anti-inflammatory Cardioprotective Anti-ulcerogenic Analgesic Anti-diarrheal Antidepressant Antinociceptive Antioxidant Antimalarial	Tannin Phlobetannin Saponin Flavonoid Cardiac glycoside Phenol Steroid Alkaloid Carbohydrate	(Jain, Sharma, Basri, Priya, & Singh, 2017)
Baliospermum montanum	Danti	Root as laxative Antihelminthic Diuretic	Antihelminthic Antibacterial Wound Healing Antioxidant Anti-allergic Anti-inflammatory Anticancer Hepatoprotective Diuretic	Alkaloid Carbohydrates Cardiac glycosides Flavonoids Protein Amino acids Phenols Saponins Steroids Tannin Terpenoids	(Bijekar, Gayatri, & Rajanna, 2014)

Bambusa arundinacea	Baash	Cough Skin disease	Anti-inflammatory Antiulcer Anti-diabetic Anti-oxidant Antihelminthic Laxative Antimicrobial	Flavonoids Phenol Steroids Tannins Quinones	(Hari, Thamizharasan, Umamaheswari, & Ulagaratchagan, 2015)
Barleria lupulina	Sornamukhi	Anti-inflammatory To stop bleeding	Anti-diabetic Neuropharmacological Anti-inflammatory Analgesic Antiperoxidative Antiulcer Wound healing	Alkaloids Glycosides Lignins Tannins Saponins Steroids Terpenoids Phenols Flavonoids Resin	(A. Singh & Navneet, 2017)
Barleria prionitis	Pitajhinti	Anti-inflammatory Fever Toothache	Antimicrobial Antibacterial Antifungal Antioxidant Anti-diabetic Anti-inflammatory Anti-arthritic Hepatoprotective Diuretic Antinociceptive Anti-diarrheal	Alkaloid Flavonoids Saponins Tannin Phytosteroids Phenolic compounds Terpenoids Steroids	(Talukdar, Rahman, & Paul, 2015)

Barringtonia acutangula	Hijol	To treat pain in body Abdominal disorder Cold Asthma	Antinociceptive CNS depressant Anti-diarrheal Antimicrobial Anti-inflammatory Antioxidant Anti-arthritic Hypoglycemic	Carbohydrate Tannins Saponin Flavonoid Alkaloid Quinones Cardiac glycosides Terpenoids Triterpenoids Phenol Coumarins Steroids Phytosteroids	(Florida & Sekar, 2012)
Barringtonia racemosa	Samudrapha	Asthma Diarrhea Seed in ophthalmic problems	Antibacterial Antifungal Anti-arthritic Anti-tumor Antinociceptive Antioxidant Anti-inflammatory Analgesic Anti-diarrheal	Sterols Phenols Flavonoids Essential oil Tannins Terpenoid Carbohydrate Cardiac glycosides Saponins Resins Alkaloids	(Umaru, Fashihuddinbadruddin, Otitoju, & Hanuwa, 2018)
Basella alba	Puishak	Laxative	Antibacterial Anti-inflammatory Hepatoprotective Anti-ulcer Anti-depressant Skeletal Muscle Relaxant Laxative	Alkaloids Cardiac glycosides Saponins Diterpenes Phenols Tannins Flavonoids	(Tongco, Anis, & Tamayo, 2015)

Bauhinia purpurea	Rokto kanchon	Anti-inflammatory Rheumatism Dysentery	Anti-inflammatory Anti-arthritic Thrombolytic Analgesic Antinociceptive Antipyretic Antimalarial Antimycobacterial Antifungal Anti-diabetic Cardiac activity Hormone regulation Wound Healing Antioxidant Nephroprotective Anti-diarrheal Anti-rheumatic	Carbohydrate Alkaloids Steroids Sterols Glycosides Saponins Flavonoids Tannin Phenolic compounds Protein Amino acids Fixed oil	(Krishnaveni, 2015)
Blumea lacera	Kukursunga	To treat inflammation	Antipyretic Analgesic Anti-inflammatory Antioxidant Anti-diarrheal Anxiolytic Anti-atherothrombosis	Alkaloids Glycosides Phenolic compounds Tannin Flavonoids Proteins Amino acids Steroids Triterpene Fats and oils	(V. K. Yadav, Irchhiaya, & Ghosh, 2018)

Boehmeria Macrophylla	Jangli Chotta	Tonic for treating boils	Antibacterial Analgesic Antimicrobial	Tannins Flavonoids Saponin Steroids Alkaloids Terpenoid	(Hossain et al., 2016)
Boerhavia diffusa	Punarnava	Renal and urinary tract information Anti-inflammatory Diuretic	Hepatoprotective Anti-inflammatory Diuretic Antifungal Antibacterial Antimalarial Thrombolytic Antioxidant	Alkaloids Anthraquinones Cardiac glycosides Flavonoids Saponins Steroids Tannins Terpenoids	(Apu et al., 2012)
Bombax ceiba	Shimul	To treat boils and acne	Anti-tumor Antimicrobial Anti-diabetic Analgesic Anti-inflammatory Hepatoprotective Antiangiogenic Antioxidant Antibacterial Hypotensive Anti-acne Cardioprotective Antipyretic	Carbohydrates Pentose sugars Hexose sugars Non-Reducing sugars Amino acids Steroids Cardiac glycosides Alkaloids Flavonoids Tannins Phenol compounds	(Biswas & Pandita, 2015)

Borassus flabellifer	Tal	Fruit in cough and pulmonary diseases	Antioxidant Analgesic Antipyretic Anti-inflammatory Antihelminthic Antibacterial Antifungal Anti-asthmatic Hypoglycemic	Saponins Quinones Cardiac glycosides Terpenoids Phenols Steroids Coumarins Beta-cyanin	(Rani, Mirabel, Priya, Nancy, & Kumari, 2018)
Brassica oleracea	Badhakoopy	Anti-inflammatory	Anticancer Antioxidant Anti-inflammatory Hypolipidemic Hypoglycemic Anticoagulant	Carbohydrates Proteins Amino acids Alkaloids Steroids Tannins Phenols Flavonoids Glycosides Saponins Terpenes	(Ahmed, Rao, Ahemad, & Ibrahim, 2012)
Caesalpinia bonduc	Lalkanta	Helminthiasis Leaf paste in skin infection	Antibacterial Anti-diarrheal Anti-diabetic Anti-inflammatory Anti-mitotic Antioxidant Antipsoriatic Antimicrobial Anti-helminthic	Alkaloids Saponins Terpenoids Phenolic compounds Flavonoids Polysaccharides	(Shukla et al., 2009)

Caesalpinia pulcherrima	Krishnachura	Anti-inflammatory Diarrhea Dysentery Certain skin infection	Analgesic Anti-diarrheal Antipyretic Antioxidant Anti-inflammatory Antinociceptive Antitubercular Antibacterial Fungicidal	Alkaloids Carbohydrates Tannins Flavonoids Phenolic compounds	(Nandhini & Ananthi, 2016)
Cajanus cajan	Tur	Leaves in food poisoning Diabetics Constipation	Antidiabetic Antimicrobial Antibacterial Hypocholesterolemic Neuroactive Antioxidant Anticancer Hepatoprotective Antihelminthic Glycemic	Flavonoids Tannins Alkaloids Saponins Cyanogenic glycoside Glycosides Anthocyanin	(Aja, Alum, Ezeani, Nwali, & Edwin, 2015)
Calotropis gigantea	Akondo	Cough Dysentery	Antibacterial Anti-inflammatory Insecticidal Hepatoprotective Analgesic Antiviral Anti-arthritic	Alkaloids Glycosides Tannins Saponins Flavonoids	(Kori & Alawa, 2014)

Calotropis procera	Akond	Edema in pregnant woman Cough	Antioxidant Antibacterial Analgesic Anti-diarrheal Antimicrobial Antinociceptive Antihelminthic Anti-inflammatory Hepatoprotective Wound Healing Anti-ulcerative	Carbohydrate Gums and Mucilage Fats and oils Alkaloids Triterpenoids Steroids Flavonoids Glycosides Saponins Tannins Phenolic compounds Coumarins Proteins Amino acids	(Rajesh, Preethi Priyadharshni, Eswar Kumar, & Satyanarayana, 2014)
Calycopteris floribunda	Goache-lata	Antihelminthic Astringent Dysentery Jaundice	Antimicrobial Antihelminthic Antibacterial Hepatoprotective	Alkaloids Carbohydrates Glycosides Phytosterols Fixed oils and fats Saponins Phenolic compounds Tannins Protein Amino acid Flavonoids	(Santharam, Subburayalu, Ganesh, Sornam, & Murugalakshmikumari, 2017)
Camellia sinensis	Cha	Anti-inflammatory Hypoglycemic	Antioxidant Anti-inflammatory Antimicrobial Anti-diabetic Anti-hyperglycemic Anticancer	Alkaloids Tannins Flavonoids Glycosides Phenolics Steroids Terpenoids	(Paul, Vibhuti, & Raj, 2016)

Carica papaya	Papaya	Green fruit in treatment of high blood pressure Constipation	Antimicrobial Antihelminthic Antimalarial Antifungal Anti-amoebic Hepatoprotective Diuretic Immunomodulatory Histaminergic Wound Healing Antihypertensive Laxative	Saponins Alkaloids Tannins Glycosides Phenols	(Doughari, Manzara, & Elmahmood, 2007)
Carissa carandas	Karamcha	Antihelminthics	Antinociceptive Antipyretic Analgesic Anti-inflammatory Antioxidant Anti-diabetic DNA damage inhibition Anti-convulsant Sedative Hepatoprotective Diuretic Cardiovascular Anti-ulcer Anti-cancerous Antihelminthic Antimalarial	Alkaloids Flavonoids Saponins Cardiac glycosides Triterpenoids Phenolic compounds Tannins	(Anupama, Madhumitha, & Rajesh, 2014)

Cassia fistula	Sonali	Mild laxative	Anti-inflammatory Antioxidant Hepatoprotective Antibacterial Antifungal Antitumor Laxative	Alkaloids Carbohydrates Tannins Phenolic compounds Glycosides Protein Amino acids Flavonoids Saponins Triterpenoids Anthraquinone	(Panda, Padhi, & Mohanty, 2011)
Cassia occidentalis	Kalkasunde	Antibacterial Antifungal Anti-diabetic Anti-inflammatory	Antibacterial Antimutagenic Antifungal Anti-diabetic Antimicrobial Antimalarial Anti-inflammatory Analgesic Anticancerous Hepatoprotective	Tannins Cardiac glycosides Saponins Anthraquinone	(Sadiq et al., 2012)
Cassia sophera	Tankai/ Dan-ji-bong	In vomiting tendency Anti-diabetics	Anti-inflammatory Antihyperglycemic Analgesic Anticonvulsant Antiasthmatic Anti-diabetic Antiemetic	Carbohydrates Anthorquinones Alkaloids Flavonoids Steroids Triterpenoids Tannins Phenolic compounds	(Kharat, Kharat, Kumar, & Das, 2013)

Catharanthus roseus	Nayantara	Leaf juice in diabetics, Leukemia, Helminthiasis	Anticancer Anti-diabetic Wound healing Antioxidant Antihelminthic	Alkaloids Terpenoids Phenols Tannins Saponin Quinines Proteins	(Kabesh, Senthilkumar, Ragunathan, & Kumar, 2015)
Centella asiatica	Thankuni	Leaf juice in diarrhea and gastric problems	Neuroprotective Nerve-regenerative Immunomodulatory Anti-depressive Anti-inflammatory Antioxidative Anti-cancer Antimicrobial Wound Healing Cardioprotective Anti-diabetic Gastroprotective	Alkaloids Carbohydrate Flavonoids Glycosides Saponins Steroids Tannins Terpenoids	(Nair, Prathapan, S, & Kumar., 2017)
Cerbera odollam	Dabur	Laxative	Antioxidant Antimicrobial Thrombolytic Laxative Membrane stabilizing Antinociceptive Sedative Anticancer Antibacterial CNS depressant	Alkaloids Phenol Steroids Tannins Terpenoids	(Chu, Singh, Ahmad, Mamat, & Lee, 2015)

Ceriops decandra	Jalia garan	Gastrointestinal disorder Snakebites Inflammation	Antioxidant Anti-inflammatory Antidiarrhoeal Anti-diabetic	Protein Carbohydrate Phenols Saponins Glycosides Terpenoid Alkaloids	(Thirunavukkarasu et al., 2018)
Cissus quadrangularis	Harbhanbga	Whole plant in bone fracture	Anti-inflammatory Antipyretic Analgesic Gastroprotective Hepatoprotective Anti-ulcer Antioxidant Antimicrobial Anti-opsteoporosis Antibacterial Antiocnvulsant Sedative	Alkaloids Glycosides Tannins Phenolic compounds Protein Amino acids Flavonoids Saponins Steroids Sterols	(Teware, Singh, & Mehta, 2015)
Clerodendrum inerme	Banajai	Fever Skin diseases Asthma	Analgesic Anti-inflammatory Antinociceptive Antioxidant Anticancer Antibacterial Antifungal Hypotensive Anti-asthmatic Hepatoprotective Antipyretic Anti-diabetic	Alkaloids Phenol Tannins Steroids Protein Diterpene Terpenoids Flavonoids Flavanones Quinones	(Chethana, Venkatesh, & Gopinath, 2013)

Clerodendrum infortunatum	Bhant	Leaf juice in dysentery Antihelminthic Skin diseases	Antihelminthic Analgesic Anticonvulsant Anti-inflammatory Antioxidant Antibacterial Anti-diabetic	Alkaloids Sterols Terpenoid Carbohydrate Tannin Glycoside Saponin Proteins Amino acids	(Hazarika & Saha, 2017)
Clitoria ternatea	Oporajita	Snake bite Indigestion Tumor	Anti-allergy Anti-tussive Antioxidant Antihelminthic Anti-asthmatic Anti-histaminergic Analgesic Anti-tumor Antipyretic Anti-inflammatory	Alkaloids Tannins Glycosides Resins Flavonoids Anthraquinones	(Manjula, Mohan, Sreekanth, Keerthi, & Devi, 2013)
Coccinia grandis	Telakucha	Root juice in mental diseases Whole plant in diabetic treatment	Membrane stabilizing Anti-diabetic Thrombolytic Antioxidant Antimicrobial Antihelminthic Hepatoprotective Antidyslipidemic Anti-inflammatory Analgesic Antipyretic Anti-ulcer	Alkaloid Flavonoids Saponin Carbohydrate Gums and Mucilage Phenol Tannins Terpenoids Protein Steroids Glycosides Phlobatannins	(Asif, Tariq, Khan, & Siddiqui, 2017)

Cocos Nucifera	Narkel	Leaf juice in diarrhea Oil to strengthen hair	Analgesic Antiviral Antihypertensive Anti-inflammatory Antioxidant Antimicrobial Anti-diabetic Anti-diarrheal Anti-nioplastic Antihelminthic Antimalarial Antifungal	Alkaloids Flavonoids Saponins Resin Tannins Steroids Terpenoids Glycosides Carbohydrates	(Elijah et al., 2010)
Commelina benghalensis	Dholpata	Headache	Analgesic Sedative Anxiolytic Antimicrobial Anti-inflammatory	Phlobatannins Carbohydrate Tannin Glycosides Volatile oils Resins Balsams Flavonoids Saponins	(Jemilat, Chioma, & Omoregie, 2010)
Coriandrum sativum	Dhaniya	Insomnia Loss of appetite Pain in the joint	Antibacterial Antioxidant Anti-inflammatory Anticancer Antinociceptive Anti-edema Hypoglycemic Hypolipidemic Hepatoprotective	Sterols Saponins 2-Deoxy sugars Cardenolides Flavonoids Cyanidin Tannins Alkaloids Coumarins Carbohydrates Reducing sugars	(Ahmed, Abadi, & Mohammed, 2018)

Costus speciosus	Khewa	In treatment of kidney stones	Antioxidant Hypolipidemic Antihyperglycemic Anticancer Anti-inflammatory Anti-diabetic Hepatoprotective Antimicrobial	Carbohydrates Alkaloids Tannins Saponins Steroids Flavonoids Anthorquinones Anthocyanates Protein	(Khayyat1 & AL-Kattan, 2017)
Crataeva nurvala	Barun tiktoshak	Inflammation Gastric irritation Rheumatic fever Constipation	Nephroprotective Hepatoprotective Anti-arthritic Anti-inflammatory Laxative Anti-diabetic Anti-fertility Anti-nociceptive Anti-cancer	Alkaloids Saponins Tannins Flavonoids Phytosterols Triperpene	(Bhattacharjee, Shashidhara, & Aswathanarayana, 2012)
Curculigo orchioides	Talamuli	Diarrhea Arthritis of the lumber and knee joints Leaf juice in ear problems	Antioxidant Antihistaminic Immunostimulant Anti-arthritic Anti-inflammatory Anitproliferative	Alkaloids Carbohydrates Glycosides Saponins Proteins Amino acids Phytosteroids Gums and Mucilages Phenolic compounds Flavonoids	(Kumar, Panda, Meher, Padhan, & Khaliquzzama, 2010)

Curcuma longa	Holud	Wound healing Hepatic disorder Rheumatism Skin diseases Cough	Anti-inflammatory Antioxidant Antidepressant Anticancer Anticoagulant Anti-diabetic Wound healing Antimicrobial Antiallergic Hepatoprotective	Alkaloids Tannins Phenolic compounds Terpenoids Phytosterols Flavonoids Saponins Glycosides Fixed oils Fatty acid	(Rajesh et al., 2013)
Cuscuta reflexa	Swarnalata	Jaundice Liver diseases Uterus and liver pain	Thrombolytic Antioxidant Membrane stabilizing Hepatoprotective Antimicrobial Anti-inflammatory Anti-cancer	Alkaloids Flavonoids Terpenoids Fixed oils Phytosterols Phenolic compounds Fats Carbohydrates Proteins Glycosides Tannins	(Ramya et al., 2010)

Cyperus rotundus	Nagarmutha	Eczema Tubers in treatment of constipation Pain reliever	Anti-inflammatory Analgesic Antimicrobial Antioxidant Anti-urolithatic Anti-diarrheal Anti-obesity Wound Healing Antimalarial Anti-diabetic Anti-allergic Anti-platelet Hypolipidemic Laxative Gastro-protective Hepatoprotective Antifungal	Flavonoids Phenolic compounds Alkaloids Tannins Proteins Amino acids Steroids Anthraquinone Anthocyanin Saponins	(Elezabeth & Arumugam, 2014)
Datura stramonium	Dhattura	Rheumatism Skin disorder Cough Pain reliever Asthma	Analgesic Antioxidant Antimicrobial Anti-diabetic Anti-inflammatory Anti-asthma Anticancer Antifungal	Alkaloids Flavonoids Amino acids Tannins Saponins Carbohydrates Terpenoids	(Waza, Anthony, & Dar, 2015)

Delonix regia	Radhachura	Fruits in treatment of piles Leaves applied in treatment of boils	Anti-diabetic Antibacterial Antioxidant Antifungal Anti-inflammatory	Carbohydrate Glycoside Tannins Protein Amino acids Flavonoids Sterol Triterpenoid	(Singh & Sonia, 2018)
Dendrophthoe falcate	Bandah	Crushed whole plant in treatment of rheumatism Asthma Skin diseases	Antioxidant Antinociceptive Anticonvulsant Antimicrobial Anti-inflammatory Anti-rheumatic	Carbohydrate Glycosides Steroids Tannins Phenolic compounds Flavonoids Saponins Triterpenes	(Sahu, Raghuveer, Alok, & Himanshu, 2010)
Derris trifoliata	Panlata	Aerial part as stimulant Diarrhea	Anti-diarrheal Antiplasmodial Larvicidal Antinociceptive	Steroids Reducing sugar Gum Saponins Tannins Flavonoids	(Mamoon & Azam, 2011)
Desmodium gangeticum	Chalani	Digestive track disorder Hepatic disorder Cardiovascular disorder	Immunomodulatory Antioxidant Hepatoprotective Anti-inflammatory Antinociceptive Cardioprotective Wound Healing	Alkaloids Carbohydrates Phenols Flavonoids Terpenoids Tannins	(Preeti & Gaurava, 2018)

Drynaria quercifolia	Pankha	Stem juice in diabetics Fever Skin diseases	Antihyperglycemic Antipyretic Thrombolytic Antibacterial Analgesic Anti-inflammatory CNS depressant Anti-diabetic	Coumarins Flavones Lignans Phenolics Proteins Saponins Starch Sugars Tannins Triterpenes	(Ramesh et al., 2011)
Enhydra Fluctuans	Helencha	Neurological disorder Hepatic disorder Renal disorder Leaves and stem juice in diabetics	Analgesic Anti-diarrheal Antimicrobial Anticancer Hepatoprotective CNS depressant Antihelminthic	Flavonoids Triterpenes Carbohydrate Reducing sugars Saponins Phenols Diterpenes Proteins Tannins	(Kuri et al., 2014)
Erythrina variegata	Mandar ful	Bark in treatment of helminthiasis Bark in eye treatment	Antibacterial Antioxidant Analgesic Anti-inflammatory Antihelminthic CNS depressant Antipyiretic Hypoglycemic	Alkaloids Flavonoids Tannins Phenolic compounds Amino acids Proteins Cardioglicosides Saponins Oils and Fats Steroids	(Hemmalakshmi, Priyanga, & Devaki, 2016)

Eucalyptus camaldulensis	Eucalyptus	Ulcer Fever Diphtheria	Anti-ulcer Anti-inflammatory Analgesic Anti-diarrheal Antifungal	Tannins Saponins Glycosides Anthraquinones	(Sani, Abdulhamid, & Bello, 2014)
Euphorbia royleana	Thor	Skin diseases	Immunosuppressive Anti-inflammatory Antioxidant Antimicrobial Antitumor	Alkaloids Glycosides Tannins Steroids	(Biswas, Bokshi, Rana, Mohosin, & Rahman, 2013)
Excoecaria agalloch	Gewa	Myopathic spasm Leprosy Dermatitis	Anticonvulsants Antimicrobial Anti-inflammatory Analgesic Anti-diabetic Immunosuppresive	Alkaloids Proteins Amino acids Carbohydrates Cardiac glycosides Anthroquinone glycosides Tannins Phenolic compounds Steroids Sterols Saponins Flavonoids	(Patra, Panigrahi, Rath, Dhal, & Thatoi, 2009)

Ficus hispida	Dumoor	Diabetics Dermatitis	Antihyperglycemic Induce Apoptotic Antinociceptive Chemopreventive Anticancer Nephroprotective	Glycosides Carbohydrates Sterols Saponins Tannins Flavonoids	(Singh, Thakur, Semwal, & Kakar, 2014)
Ficus racemosa	Joggo dumur	Fruit in treatment of diabetics Liver condition Inflammation Diarrhea	Hypolipidemic Hypoglycemic Antifungal Antibacterial Anti-diarrheal Wound Healing Antioxidant Antihelmintic Hepatoprotective Anti-diabetic	Carbohydrates Glycosides Proteins Amino acids Phenolic compounds Tannins Phytosterols Saponins Gums and Mucilage	(Sachan & Kumar, 2010)
Flemingia paniculata	Udumbara	To induce sleep To reduce pain	Antibacterial Antifungal Analgesic Anti-inflammatory	Carbohydrates Glycosides Proteins Amino acids Phenolic compounds Tannins Phytosterols Saponins Gums and Mucilage	(Rahman, Gray, Khondkar, & Sarker, 2008)
Garcinia mangostana	Tamal	To treat inflammation To treat diarrhea	Antioxidant Anithelmintic Anti-inflammatory Analgesic Anticancer	Alkaloids Flavonoids Tannins Saponins Triterpenoids	(Hasan, Nashrianto, Juhaeni, & Artika, 2016)

			Antibacterial		
Heliotropium indicum	Hatisur	Antidote to poisoning Leaf paste in bone fracture	Antimicrobial Thrombolytic Membrane stabilizing Antioxidant Antibiotic Wound Healing Gastroprotective Anti-inflammatory Anti-tumor Muscle relaxant	Alkaloids Carbohydrates Glycosides Phytosterols Phenolic compounds Tannins Saponins Proteins Amino acids Flavonoids	(Basak & Dey, 2016)
Hemidesmus indicus	Anantamul	Urinary tract infection Leaves in treatment of skin infections	Anti-diabetic Antibacterial Anti-inflammatory Antipyretic Antioxidant Anti-arthritic Anticancer Anti-cataractous Anti-hepatocarcinogenic	Steroids Triterpenes Alkaloids Carbohydrates Flavonoids Tannins Glycosides Polyphenols	(Nagat, Barka, Lawrence, & Saani, 2016)
Heritiera fomes	Sundri	Bark in diabetics In treatment of gastrointestinal disorder	Antioxidant Antimicrobial Anti-obesity Antihyperglycemic Antinociceptive Antidiabetic	Reducing sugars Saponins Alkaloids Glycosides Tannins Steroids Flavonoids Gums	(Hossain et al., 2013)

Holarrhena antidysenterica	Kurchi	Anti-diarrheal In treatment of Jaundice	Anti-diabetic Anti-diarrheal Anti-inflammatory Analgesic Antioxidant Anti-urolithic CNS stimulant Antihelminthics Antibacterial Anti-mutagenic Hepatoprotective	Carbohydrates Alkaloids Proteins Amino acids Tannins Phenolic compounds Steroids Saponins	(Shahzadi, Khan, Khan, & Mular, 2017)
Justicia gendarussa Burm	Jagatmadan	Leaf juice in bone fracture and rheumatic pain	Antioxidant Anti-arthritic Antihelminthic Analgesic Anti-inflammatory Anti-anxiety Antiangiogenic Hepatoprotective Antibacterial Anticancer Osteoblastic	Glycosides Tannins Phenolic compounds Terpenoids Flavonoids	(Subramanian, Jothimanivannan, & Moorthy, 2012)
Kaempferia galangal	Ekangi	Toothache Anti-dandruff	Antinociceptive Anti-inflammatory Antioxidant Antineoplastic Larvicidal Analgesic Antimicrobial	Sterols Triterpenoid Alkaloids Saponins Flavonoids Carbohydrates Resins Proteins	(Magadum, Nadaf, Yashoda, Mnjula, & Rajendra, 2011)

Kalanchoe pinnata	Patharkuchi	Blood dysentery Kidney and gall bladder stone	Antinociceptive Analgesic Anti-inflammatory Antileishmaniotic Antimicrobial Antibacterial Antitumor Hepatoprotective Immunosuppressive Neuropharmacological Anti-diabetic Nephroprotective	Carbohydrates Proteins Amino acids Alkaloids Glycosides Flavonoids Tannins Phenolics Steroids Anthraquinone Saponins Triterpenoids Phlobatannins	(Shruti, Bhavitak, Maitreyi, & Divya, 2018)
Lagerstroemia speciosa	Jarool	Bark in treatment of diabetics Seed in treatment of diarrhea	Antinociceptive Antioxidant Antibacterial Antiviral Anti-inflammatory Anti-diarrheal Anti-fibrotic Anti-diabetic	Saponins Tannins Alkaloids Sterols Glycosides Flavonoids	(Tthambi, Chacko, & Chungath, 2013)
Lannea coromandelica	Jiola	Bark in chronic dysentery Bark and root in treatment of diabetics	Antihyperglycemic Antioxidant Antimicrobial Thrombolytic Anti-diabetic	Carbohydrates Steroids Alkaloids Cardiac glycosides Terpenoids Tannins Flavonoids	(Manik, Wahid, Islam, Pal, & Ahmed, 2013)

Lantana camara	Chaturaangi/ Jangoli-janglog	Whole plant in cough, mental diseases, fever Leaf and root in treatment of malaria tumor, tetanus	Hepatoprotective Antioxidant Antibacterial Wound Healing Antioxidant Larvicidal Antifertility Antifungal Anti-diabetic Anti-inflammatory Anti-nociceptive Antimotility Anticancer	Proteins Amino acids Carbohydrates Alkaloids Saponins Phenols Tannins Flavonoids Steroids	(Raj, 2017)
Lasia spinosa	Bonadi, Kalo kata	Blood purification Rheumatoid arthritis	Anti-nociceptive Anti-diarrheal Anti-inflammatory Antioxidant Antimicrobial Anti-arthritic	Alkaloids Carbohydrates Fats and oils Flavonoids Glycosides Proteins Saponins Tannins Phenolic compounds	(Kumar, Mondal, Borah, & Mahato, 2013)

Lawsonia inermis	Mehedi	Leaves in cancer, fever and to keep head cool	Antibacterial Antioxidant Anticancer Anti-arthritic Analgesic Anti-diarrheal Antipyretic Anti-inflammatory Anti-ulcer Anti-tubercular Antimicrobial Antifungal Antifertility Hepatoprotective Hypoglycemic Antihyperglycemic Wound Healing Thrombolytic	Cardioglycosides Terpenoids Carbohydrates Phenols Quinones Tannins	(Gull, Sohail, Aslam, & Amin Athar, 2013)
Leea indica	Kurkur	Leaf paste to treat painful joints Leprosy Eczema	Antioxidative antimicrobial Antitumor Analgesic Anti-inflammatory	Alkaloids Glycosides Cardio glycosides Terpenoids Flavonoids Steroids Tannins	(Rahman, Imran, & Islam, 2013)

Leucas aspera	Dondo-kolosh	Leaf juice in tooth infection Leaf juice in headache	Antinociceptive Antihyperglycemic Anti-inflammatory Antimicrobial Antibacterial	Alkaloids Flavonoids Carbohydrates Tannins Triterpenoids Glycosides Steroids Phenolic compounds Fixed oil and Fats Proteins Saponins	(Annapandian & Rajagopal, 2017)
Luffa acutangula	Jhinga	Diuretic Leprosy	Hepatoprotective Anti-diabetic Antihyperlipidemic Anticancer Antioxidant Analgesic Anti-inflammatory Antibacterial Immunomodulatory CNS depressant Antiulcer Diuretic	Carbohydrates Proteins Amino acids Fixed oils Steroids Saponin glycosides Flavonoids Phenols Vitamin C	(Pimple, Kadam, & Patil, 2011)
Luffa cylindrica	Dhundul	Emetic Cathartic Demulcent	Antioxidant Antibacterial Anti-inflammatory Antimicrobial Bronchodilator Anti-emetic Anti-hemorrhoids	Saponins Flavonoids Glycosides Terpenoids Alkaloids	(Etim, Adebayo, & Ifeanyi, 2018)

Madhuca longifolia	Mahua	Skin diseases Rheumatism Anti-ulcer Fruit pulp in treatment of diarrhea	Antioxidant Antimicrobial Anti-inflammatory Analgesic Anti-ulcer Immunosuppresive Anti-hyperglycemic Hepatoprotective Wound healing Anti-rheumatic Antinociceptive Anti-diarrheal	Phytosterols Triterpenes Glycosides Saponins Tannins Carbohydrates	(Eswawraiah, Elumalai, & Rahman, 2011)
Mangifera indica	Aam	Leaves and stem in treatment of dysentery	Antioxidant Anti-inflammatory Immunomodulatory Anti-allergic Antihelminthic Anti-diabetic Anticancer Antifungal Antibacterial Anti-diarrheal	Flavonoids Tannins Tannins cath. Tannins gall. Alkaloids Terpenoids Steroids Saponins Anthraquinone	(Kassi et al., 2015)
Manilkara zapota	Sopheda	In treatment of Jaundice Vitamin supplement	Anti-inflammatory Antipyretic Anti-arthritic Anti-diabetic Anitlipidemic Hepatoprotective	Phenols Reducing sugars Flavones Glycosides Saponins Alkaloids Proteins Tannins	(Shoba, 2014)

Michelia champaca	Champa	Chronic headache	Antioxidant Analgesic Antifungal Anti-diabetic	Alkaloids Saponins Tannins Glycosides Carbohydrates Flavonoids Sterols Amino acid	(Ganesh et al., 2016)
Mikania cordata	Asaam lota	To stop bleeding Arthritis Liver disorder	Antimicrobial Antinociceptive Anti-inflammatory Antipyretic Antibacterial Anticarcinogenic Anti-ulcer Anti-hemorrhagic	Alkaloids Steroids Gums Tannins	(Nayeem, Khatun, Rahman, & Rahman, 2011)
Mikania cordifolia	Refusi lata	Wound healing	Analgesic Antioxidant Anti-inflammatory Anti-pyretic Wound healing	Tannins Flavonoids Saponins Gums	(Mohammad et al., 2013)
Mikania micrantha	Asham ludi	Leaf paste is used in wound healing	Anti-inflammatory Antioxidant Anti-diabetic Antidermatophytic Anti-proliferative Anticancer Antihelminthic Antiviral Antispasmodic Anti-stress	Alkaloids Reducing sugar Flavonoids Saponins Phenolic compounds Tannins Amino acids Proteins	(Dev, Hossain, & Islam, 2015)

		Wound healing			
Mimosa pudica	Lajjaboti	Toothache Anti-inflammatory Jaundice	Antioxident Antibacterial Antimicrobial Hepatoprotective Analgesic Antiepileptic Anticonvulsant Anti-inflammatory Anti-diabetic Antihelminthes Antifertility	Terpenoids Flavonoids Glycosides Alkaloids Quninines Phenols Tannins Saponins Coumarins	(Mohan, Pandey, & Rao, 2015)
Mimusops elengi Linn	Bakal	Seed in dental diseases Roots as diuretics	Antioxidant Antihyperglycemic Antibacterial Antifungal Antitumor Analgesic Antipyretic Diuretic	Carbohydrates Proteins Glycosides Flavonoids Tannins Steroids Terpenoids Saponins	(Kadam, Deoda, Shivatare, Yadav, & Patil, 2012)
Momordica charantia	Karala	Leaves in treatment of diabetics Chicken pox	Anti-diabetic Anticancer Anti-inflammatory Analgesic Antimicrobial Antioxidant	Glycosides Phytosterols Proteins Alkaloids Flavonoids Phenolic compounds Tannins Saponins Fats and fixed oils	(Leelaprakash, Rose, BM, Javvaji, & Prasad, 2011)

Moringa oleifera	Shajna	Stems in treatment of rheumatism Flower in treatment of chicken pox	Anticancer Analgesic Anti-inflammatory Antipyretic Antioxidant Hepatoprotective Gastroprotective Anti-ulcer Anti-obesity Antiepileptic Anti-diabetic Anti-urolithiatic Diuretic Anti-allergic Antihelminthic Wound healing Antimicrobial Immunomodulatory Anti-diarrheal Anti-arthritic	Tannins Saponins Flavonoids Terpenoids Reducing sugars Alkaloids Anthraquinones	(Sankhalkar & Vernekar, 2016)
Morus alba	Tunth	Skin disorder Allergy	Immunomodulatory Anti-diabetic Antioxidant Anti-inflammatory Antibacterial Hepatoprotective Anti-obesity Anti-allergy Antiviral	Coumarins Flavonoids Tannins Triterpene	(de Oliveira et al., 2015)

Murraya paniculata	Kamini	Helminthiasis Liver disease Rheumatoid arthritis	Antioxidant Antimicrobial Analgesic Anti-inflammatory Antihelminthic Antinociceptive Anti-rheumatic Hepatoprotective	Alkaloids Carbohydrates Glycosides Steroids Saponins Phenolics Tannins Fixed oil and fats Proteins Cardiac glycosides Flavonoids Quinones Coumarins	(Wagay, Shah, & Ahmad, 2017)
Neolamarckia cadamba	Cadam	Anti-diuretic Fever Cold	Anti-diabetic Antioxidant Antiproliferative Antimicrobial Anti-inflammatory Analgesic Antilipidemic Antihelminthic Antipyretic Laxative Antiepileptic	Carbohydrates Glycosides Phytosterols Proteins Amino acids Terpenes	(Islam et al., 2015)
Ocimum sanctum	Tulsi	Leaves in cough, bronchitis, asthma	Analgesic Anti-inflammatory Antimicrobial Anticancer Chemopreventive	Tannins Saponins Phlobatannins Flavanoids Terpenoids	(Bhagat, Mohanty, & Sahoo, 2016)

			Antiproliferative Antihelminthic Antiasthmatic	Glycosides Steroids Alkaloids	
Olea europaea	Jolpie	Fruits in heart diseases Skin cleanser	Antiradical Antioxidant Antiproliferative Antihypertensive Antimicrobial Antihyperglycemic Cardioprotective Neuroprotective	Flavonoids Saponins Unsaturated sterols Terpens Sterol Steroids	(Nora, Hamid, Snouci, Boumedien, & Abdellah, 2012)
Oroxylum indicum	Khona	Urinary tract infections Heart diseases	Antiproliferative Anti-inflammatory Antioxidant Antimicrobial Analgesic Anticancer Cardioprotective	Flavonoids Saponins Alkaloids Sterols Tannins Phenolic compounds Terpenoids	(Priyadarsini, Chakrapani, Swamy, Samshad, & Basha, 2017)
Paederia foetida	Gondhobala	Tonic Rheumatoid arthritis	Antinociceptive Antimicrobial Anti-diarrheal Antioxidant Anti-inflammatory Anti-rheumatic	Alkaloids Phytosterols Fixed oils and fats Phenolic compounds Flavonoids Volatile oils	(Shetti, Chellappan, Sharma, & Kalusalingam, 2012)

Pandanus fascicularis	Keora	Leaves in asthma and cold	Antioxidant Anti-inflammatory Analgesic Antihyperglycemic	Alkalkoids Steroids Terpenoids Phenols Glycosides Carbohydrates Proteins Flavanoids Saponins Tannins	(Jitu, Debnath, Asad, Das, & Sultana, 2017)
Pandanus foetidus	Keya-kanta	Skin diseases Small pox Scabies	Neuropharmacological Anti-diarrheal Antinociceptive Antibacterial	Alkaloids Steroids Flavonoids Tannins Gums Reducing sugars Glycosides	(Lokman, Asm, Kumar, Arif, & Anisur, 2013)
Peltophorum pterocarpum	Radhachura	In treatment of unhealthy skin Constipation Ringworms	Antibacterial Analgesic Anti-inflammatory Anticoagulant Antimicrobial Antioxidant Cardiotonic Hepatoprotective Antiglycemic Laxative	Alkaloids Terpenoids Saponins Phenol Tannins Steroids Proteins Oils Carbohydrates Cyanogenic glycosides	(Enechi, Egbujionuma, Ogugua, & Okagu, 2016)

Phyllanthus emblica	Amla	Dysentery Cholera Gastric problems	Antimicrobial Antioxidant Laxative Anti-inflammatory Anti-diabetic Anti-diarrheal Analgesic Hepatoprotective Anti-proliferative Immunomodulatory Anticancer Cardioprotective Anti-tussive Gastroprotective Neuroprotective	Reducing sugars Carbohydrates Glycosides Flavonoids Alkaloids Tannins Phenols Terpenoids Steroids Saponins Plobatannins Anthraquinones Proteins Amino acids Coumarins Lactones Cardenolides Vitamin C	(Kiruba et al., 2016)
Piper betle	Paan	Toothache Lowers blood sugar Aid in digestive process	Antibacterial Antifungal Gastroprotective Antioxidant Antimicrobial Anti-inflammatory Analgesic Immunomodulatory Antiulcer Antihistaminic	Steroids Diterpenes Tannins Cardiac glycosides Flavonoids Alkalkoids Phenols Emodins Coumarins Saponins	(Patil, Harale, Shevangekar, Kumbhar, & Desai, 2015)

Pisum sativum	Matarsuti	Treatment of constipation	Antioxidant Antihyperglycemic Laxative Anti-fungal	Steroids Triterpenoids Saponins Phenols Terpenoids Flavonoids Cardiac glycosides Resins	(Carloe, Olajide, & Hassan, 2018)
Polyalthia longifolia	Debdaru	Snake bite Skin infection	Antinociceptive Antimicrobial Anticancer Anti-inflammatory Hypotensive Anti-ulcer Antioxidant Hypoglycemic Analgesic	Glycosides Saponins Tannins Steroids Terpenoid Flavonoid Alkaloids	(Chinyem, Ogbeifun, & Edema, 2014)
Polyalthia suberosa	Murmuri	Rheumatism Various skin infections	Analgesic Anti-inflammatory Anti-HIV Antibacterial Anti-diarrheal Antioxidant CNS depressant	Carbohydrates Reducing sugars Tannins Flavonoids Saponins Steroids Alkaloids	(Mazumdar et al., 2016)
Polygonum hydropiper	Bishcatali	Anti-inflammatory	Antinociceptive Anti-pyretic Anti-inflammatory Gastoprotective Antibacterial Antifungal Antioxidant Antihperglycemic Anti-alzheimer	Alkaloid Flavonoids Saponins Tannins Glycosides Anthraqunones Triterpenoids	(Ayaz et al., 2014)

			Antineoplastic		
Pouzolzia zeylanica	Bishkatali	Leaf juice in Antihelminthic Anti-ulcer	Antibacterial Antioxidant Anti-ulcer Antimicrobial Analgesic Anti-inflammatory	Carbohydrates Alkaloids Flavonoids Glycosides Saponin Steroids Tannins	(Hossain et al., 2017)
Premna integrifolia	Agnimantha	Roots are used in diabetics, inflammation, antibiotic and constipation	Analgesic Antibacterial CNS depressant Antioxidant Anti-diabetic Anti-obesity Anti-inflammatory Immunomodulatory Laxative Hyperlipidaemic	Alkaloids Triterpenoids Coumarins Steroids Tannins Saponins Flavonoids Qunones Flavanone Antocyanines Phenols Carbohydrates Glycosides Furan	(Chitra et al., 2018)

Punica granatum	Dalim	Leaves in diarrhea To increase strength	Gastroprotective Hypoglycemic Antioxidative Neuroprotective Anti-inflammatory Analgesic Antimicrobial Antifungal Antibacterial Antiplasmodial Anti-diarrheal Anticancer Thrombolytic	Alkaloids Carbohydrates Reducing sugars Flavonoids Phenol Protein Coumarin Saponins Tannins Steroids Terpenoids	(Sreedevi, Vijayalakshmi, & Venkateswari, 2017)
Rauwolfia serpentine	Sharpagandha	Root juice in hypertension	Anti-diarrhoeal Anti-hypertensive Hyperglycemic Haematinic Antioxidant Hepatoprotective	Alkaloids Carbohydrates Flavonoids Glycosides Cardiac glycosides Phlobatannins Resins Saponins Steroids Tannins Triterpenoids Phenols	(Azmi & Qureshi, 2012)
Rhododendron arboreum	Baras	To treat coughs, diarrhea and dysentery	Antifungal Antioxidant Anti-diarrheal Anti-mutagenic Antihyperglycemic Antihyperlipidemic Cardioprotective Anti-diabetic	Phenol Saponins Proteins Steroids Tannins Xanthoproteins Coumarins Carbohydrates	(Kiruba, Mahesh, Nisha, Miller Paul, & Jeeva, 2011)

			Hepatoprotective		
Richardia scabra	Riim-raaz	Tonic Asthma Emetic Dermatitis	Anti-inflammatory CNS depressant Antimicrobial Neuropharmacological	Alkaloids Tannins Flavonoids Steroids Terpenoids Simple sugars Furanoid Fatty acids	(Poonkodi & Ravi, 2016)
Ruellia tuberosa	Potpoti	Roots in nervous breakdown and anemia	Antihyperglycemic Antinociceptive Anti-inflammatory Antihelminthic	Caumarins Tannins Steroids Phenols Quinine Anthraquinone	(Singh, Dasgupta, & Biswas, 2015)
Sansevieria trifasciata	Bagha-chokro	Tonic Snake bite Alopecia Anti-malalarial	Analgesic Antipyretic Antibacterial Anti-inflammatory Anti-allergic Anti-anaphylactic Antioxidant	Phenols Saponins Steroids Flavonoids Coumarins Fatty acids	(Tanveer, Singh, & Khan, 2017)
Saraca indica	Ashoka	Anti-inflammatory	Anticancer Anti-inflammtory Antihelminthic Cardio protective Anti-diabetic CNS depressant Analgesic Antipyretic	Carbohydrates Flavonoids Saponins Phenols Tannins Glycosides Steroids	(Athiralakshmy, Divyamol, & Nisha, 2016)

			Anti-hyperglycemic Antioxidant Anti-ulcer	Phenolic compounds	
Schleichera oleosa	Kusum gachh	Oil in skin problems like acne, itching To relieve pain of rheumatism	Antiproliferative Antioxidant Antimicrobial Antihelminthic Anti-diabetic Anti-arthritic	Carbohydrates Glycosides Alkaloids Saponins Phenolic compounds Tannins Flavonoids Phytosterols Gums and mucilage	(Muthukrishnan & Sivakkumar, 2018)
Scoparia dulcis	Bon-dhonya	Leaf juice in diabetics	Analgesic Antidiabetic Antibacterial Antifungal Antioxidant	Alkaloids Flavanoids Carbohydrates Saponins Sterols Tannins	(Agarwal, Karthikeyan, & Parthiban, 2014)
Sesbania grandiflora	Buko	Eye diseases Dermatitis Small pox	Antiulcer Antioxidant Antiurolithiatic Hepatoprotechtive Anticancer Chemopreventive Anticonvulsive Anxiolytic Antimicrobial Analgesic Anti-diabetic Antipyretic	Carbohydrates Alkaloids Steroids Glycosides Saponins Tannins Proteins Amino acids	(Arun, Karthikeyan, Sagadevan, Umamaheswari, & Rex, 2014)

Sida cordifolia	Berela	Dysentery Neurological disorder Rheumatism	Analgesic Anti-inflammatory Anti-stress Adoptogenic Wound Healing Anti-pyretic Anti-ulcerogenic Anti-diarrheal Anti-arthritic	Alkaloids Carbohydrates Glycosides Saponins Phytosterols Proteins Flavonoids Lignin Fixed oil and fats	(Sivapalan, 2015)
Sida rhombifolia	Svetbarela	Anti-inflammatory To build immunity	Antibacterial Anti-inflammatory Antioxidant Immunomodulatory	Carbohydrates Alkaloids Saponins Fixed oils and fats Flavonoids Proteins Gums and mucilage Phenolic compounds Tannins Terpenoids Glycosides	(Sundaraganapathy et al., 2013)
Solanum sisymbriifolium	Swetrangani	Fever Respiratory tract infection Diarrhea	Antibacterial Antioxidant Anticonvulsant Analgesic Anti-diarrhoeal Neuropharmacological Antinociceptive	Carbohydrates Proteins Alkaloids Glycosides Phenols Terpenoids Steroids Saponins	(Bolleddu et al., 2018)

Solanum torvum Swartz	Tita bagoon	Leave in skin infection	Antimicrobial Antioxidant Analgesic Anti-inflammatory Antiviral Anti-platelet aggregation	Tannins Flavonoids Reducing sugars Saponin glycosides Alkaloids Phytosteroids Terpenoids	(Brobbey, Quartey, Otuo-Serebour, & Ayensu, 2016)
Sonneratia apetala	Keora	Fruits in diabetics	Antioxidant Anti-diabetic Antibacterial Analgesic Anti-diarrheal Antihelminthic	Alkaloids Cardiac glycosides Anthraquinone glycosides Tannins Steroids Flavonoids Gums and mucilages Carbohydrates Proteins Amino acid Terpenoids	(Patra, Das, & Thatoi, 2015)
Sonneratia caseolaris	Choilani	Anti-diabetic Astringent Antiseptic	Antihyperglycemic Antimicrobial Antioxidative Bactericidal	Alkaloids Carbohydrates Sterols Glycosides Saponins Phenolic compounds Flavanoids	(Varghese et al., 2010)

Spilanthes acmella	Vhadalika	Toothache	Antimicrobial Antinociceptive Diuretic Antifungal Antipyretic Anti-inflammatory Analgesic Local Anesthetic Antimalarial Immunostimulant Vasorelaxant Antioxidant	Alkaloids Carbohydrates Tannins Amino acids Steroids Sesquiterpenes Cartotenoids Fats and fixed oils	(Yadav, 2012)
Stephania japonica	Akanadi	Leaves and roots in fever, urinary diseases and diarrhea	Anti-inflammatory Antioxidant Anti-diarrheal Antihyperglycemic Anti-hyperlipidemic Antimicrobial Analgesic	Tannins Flavonoids Saponins Gums Alkaloids	(Uddin et al., 2014)
Sterculia villosa	Udal ful	To treat rheumatism	Anti-inflammatory Anti-diabetic Antihelminthic Diuretic Immunomodulatory Analgesic	Steroids Triterpenes Saponins Triterpinoidal Saponins Alkaloids Carbohydrates Flavonoids Tannins Glycosides Polyphenols	(Lakshmi & Pullaiah, 2015)

Streblus asper	Sehora	Bark juice in malaria and fever Stem in tooth problem	Antimitotic Antitumor Antihyperglycemic Antioxidant Anti-HBV Antidiabetic	Glycoside Sterol	(Alamgir, Rhaman, & Rahman, 2013)
Swertia chirata	Chireta	Roots in obesity and gastric problems	Anti viral Anti-Inflammatory Analgesic Antioxidant Antimicrobial Anti-diabetic Antitumor Gastroprotective Hepatoprotective Antihelminthic	Alkaloids Flavonoids Phenols Quinones Saponins Tannins Terpenoids	(Manoj Kumar, Dandapat, & Sinha, 2015)
Swietenia macrophylla	Mehgoni	Leaves and bark are used in diabetics	Antiviral Anti-inflammatory Antitumor Antimutagenic Anti-infective Anticancer Anti-diabetic Antioxidant Anti-nociceptive Antimicrobial Anti-diarrheal	Alkaloids Tannins Steroids Terpenoids Flavonoids Saponins Carbohydrates Amino acids Proteins Oil	(Durai, Balamuniappan, & Geetha, 2016)

Syzygium cumini	Kalojam	Bark in sore throat, bronchitis, asthma and dysentery	Hypoglycemic Hypolipidemic Anti-inflammatory Antibacterial Anticancer Antioxidant Anti-allergic Hepatoprotective Antipyretic	Alkaloids Flavonoids Saponins Tannins Glycosides Phenols Proteins Triterpenoid Steroids Fixed oils and fat	(Ramos & Bandiola, 2017)
Syzygium malaccense	Malaka Jamrul	Helminthiasis	Antioxidant Hypolipidaemic Antiglycemic	Flavonoids Tannins Phenolics Alkanoids Saponins	(Oyinlade, 2014)
Syzygium samarangense	Jamrul	Diabetics Leaf juice in cold and waist pain	Antihyperglycemic Analgesic Anti-inflammatory Antidepressant Antioxidant Hepatoprotective Antihelmintic Anti-diabetic	Alkaloids Carbohydrates Saponins Tannins Phenolics Amino acids Flavonoids Terpenoids Phenolic compounds	(Madhavi & Ram, 2015)
Tabernaemontana divaricata	Tagar	Leaf juice as antidote for poisoning Flower juice in eye disorder	Anti-diabetic Antioxidant Anti-diarrheal Antibacterial Analgesic Antinociceptive	Carbohydrates Tannins Alkaloids Glycosides Flavonoids Steroids Sterols Proteins	(Srivastava, Nagar, Srivastava, Ahirwar, & Chandel, 2016)

				Amino acids	
Tamarindus indica	Tatul	Abdominal pain Dysentery Parasitic infection	Antibacterial Antioxidant Anti-inflammatory Antinociceptive Antitumor Anti-diabetic Hepatoprotective Wound Healing Anticancer	Alkaloids Flavonoids Tannins Amino acids Carbohydrates Phenols Triterpenoids Proteins Saponins Resins Phytosterols	(Gomathinayagam, Tewari, & Rekha, 2017)
Tectona grandis	Saguna	Laxative Sedative To treat dysentery	Antibacterial Antifungal Anti-asthmatic Antioxidant Antihyperlipidaemic Anti-diabetic Analgesic Anti-inflammatory Hypoglycemic Wound Healing Anti-ulcer Antinociceptive	Steroids Tannins Saponins Anthocyanin Coumarin Emodins Alkaloids Protein Amino acid Carbohydrate Flavonoids Diterpenes Pheno Phlobatannin Leucoanthocyanin Anthraquinone Cardiac glycosides	(Godghate & Sawant, 2014)

				Chalcones	
Terminalia arjuna	Arjun	In heart diseases	Cardioprotective Anti-ischemic Antihypertensive Antioxidant Anticancer Antibacterial Antifungal Antiplatelet	Phytosterols Triterpenoids Saponins Alkaloids Carbohydrates Flavonoids Lactones Phenolic compounds Tannins Proteins Glycosides	(Mandal et al., 2013)
Terminaliabellerica	Horitoki	Stimulation of appetite Hair loss In treatment of intestinal worms	Antioxidant Antimicrobial Anti-diarrheal Anticancer Antihypertensive Antihelminthic Hepatoprotective Antipyretic	Alkaloids Flavonoids Steroid Glycosides Saponins Phenols Tannins	(Elizabeth, Bupesh, & Susshmitha, 2017)
Terminalia chebula	Bohera	Stimulation of appetite, Digestive aid and acidity	Anti-inflammatory Antibacterial Antimicrobial Anti-ulcer	Alkaloids Flavonoid Quinines Phenolic compounds Tannin Glycosides	(Baliah & Astalakshmi, 2014)

Thevetia peruviana	Kolkaphul	Acne Helminthiasis Flower juice in burning sensation of eye	Antihelminthic Anticancer Antifungal Antimicrobial Antispermatogenic Anti-inflammatory Wound Healing Antioxidant Anti-diarrheal	Alkaloids Carbohydrates Flavonoid Protein Saponins Tannins Phenolic compounds Cardiac glycosides Glycosides Coumarins Oil and fats	(Rahman, Mahmood, Rahman, & Haris, 2014)
Tragia involucrata	Bichuti	Root juice is applied on allergy	Analgesic Anti-inflammatory Antihelminthic Diuretic Antihistamine Antiepileptic Wound Healing	Terpenoid Alkaloid Reducing sugar Tannin Flavonoids Sapopnins	(Basri, Reddy, & Jayaveera, 2014)
Trema orientalis	Chikan	Leaf juice in dysentery and in tiredness due to heat	Anti-diabetic Analgesic Anti-diarrheal Anti-inflammatory Diuretic Antinociceptive Anti-plasmodial Anticonvulsant Antioxidant Antibacterial	Tannins Saponins Phenols Flavonoid Volatile oils Terpenoids Glycosides Steroids Alkaloids	(Akin-Osanaiyel, Gabriel, Omoniyi. A, & Ezeani, 2016)

Trichosanthes dioica	Potol	Leaves in acne and allergy	Antioxidant Anti-diabetic Antihyperglycemic Anti-hyperlipidemic Antitumor Anti-inflammatory Antipyretic Analgesic Anti-diarrheal Antinociceptive Chemopreventive Hepatoprotective Immunomodulatory Laxative Wound Healing	Alkaloids Glycosides Tannins Phenolic compounds Triterpenoides Proteins Amino acids Carbohydrates Fats and fixed oils	(Kumar, 2017)
Tridax procumbens	Phool-jori	Bronchitis To stop bleeding	Anti-diabetic Anticancerous Hepatoprotective Antimicrobial Wound Healing Immunomodulatory Anti-hemorrhagic Hypotensive Anti-inflammatory Antioxidant	Steroids Tannins Saponin Anthocyanin Alkaloids Amino acids Diterpenes Phenols Phlobatannin Flavonoids	(Rajaram & Ashvin, 2013)
Triticum aestivum	Gom	To treat diabetics	Antioxidant Analgesic Anti-inflammatory Anti-diabetic	Carbohydrates Proteins Alkaloids Flavonoids Tannins Phenols Saponins	(Suriyavathana, Roopavathi, & Vijayan, 2016)

				Glycosides Steroids Terpenoids	
Uraria lagopodies	Chakuley	Antimalarial	Anti-inflammatory Analgesic Antimotility Antioxidant Antimalarial Antimicrobial	Tannins Alkaloids Carbohydrates Flavonoids Steroids Saponins Glycosides	(Sanyal, Bala, & Mazumdar, 2017)
Urena lobata	Okhra	Urinary tract infection	Anti-inflammatory Analgesic Antimotility Anti-diarrheal Anti-diabetic Antioxidant Hepatoprotective	Alkaloids Glycosides Steroids Tannins Saponins Reducing sugars	(Islam et al., 2012a)
Vernonia anthelmintica	Tulsi	Cold Asthma Sore throat Anti-inflammatory	Antiproliferative Anti-inflammatory Analgesic Anti-arthritic Anti-bacterial Anti-fungal Anti-diabetic Antihyperlipidemic Larvicidal	Alkaloids Saponins Glycosides Flavonoids Tennins	(Pandey, Dash, Kela, Dwivedi, & Tiwari, 2014)

Vernonia cinerea	Joanbir	Fever	Analgesic Antipyretic Anti-inflammatory Antioxidant Antimicrobial Antitumor Anti-arthritis Anti-hyperglycemic	Alkaloids Phenols Saponins Steroids Glycosides Flavonoids Carbohydrates Phlobatannins Terpenoids	(Varsha, Prejeena, & Suresh, 2016)
Vernonia patula	Kukshim	Fever Skin disease	Anti-inflammatory Antioxidant	Reducing sugars Steroids Alkaloids Glycosides Tannins Gums	(Saha & Paul, 2012)
Vitex negundo	Nishinda	Leaf paste applied to rheumatic and joint pain	Antibacterial Antioxidant Anti-inflammatory Analgesic Antifungal Anti-rheumatic Antinociceptive CNS depressant Anti-allergic Hepatoprotective Laxative Immunomodulatory	Alkaloids Carbohydrate Cardiac glycosides Flavonoids Glycosides Phenols Protein Saponin Tannins Terpenoids	(Lakshmanan, Arumugam, & Mani, 2012)

Vitis vinifera	Angur	To treat tuberculosis	Thrombolytic Antibacterial Antioxidant Antiviral Antifungal Anticancer Anti-diabetic Hepatoprotective Anti-inflammatory Analgesic Antipyretic	Alkaloids Flavonoids Carbohydrates Saponins Tannins Proteins Amino acids Triterpenoids Phlobatannins Lipids Reducing sugar Steroids Resing Catechol	(Nirmala & Narendhirakanna n, 2011)
Xanthium indicum	Ghagra	Whole plant is applied on small pox, boils	Antinociceptive Antitumour Anticancer Antibacterial Antioxidant Antifungal Antihyperglycemic Neuropharmacological Analgesic Anti-inflammatory Antiplasmodial	Reducin sugar Glycosides Tannins Alkaloids Flavonoids	(Mishuk et al., 2017)
Xylocarpus granatum	Dhundul	Astringent Fever Diarrhea Anti-malarial	Analgesic Antimalarial Anti-diarrheal Anti-inflammatory Antimicrobial Antioxidant	Carbohydrates Saponins Tannins Flavonoids	(Shahid-Ud-Daula & Basher, 2009)

Zanthoxylum budrunga	Bajna	Bark and fruits as astringent, antiemetic and stimulant	Antioxidant Analgesic Antiemetic Anti-diarrheal Antinociceptive Antimicrobial	Flavonoids Alkaloids Glycosides Steroids Gums Reducing sugars Tannins	(Islam et al., 2018a)
Ziziphus mauritiana	Boroi	Leaf and bark are used in chicken pox, measles	Antiulcer Antioxidant Anti-inflammatory Antimicrobial Antibacterial Analgesic Hypoglycemic Immunomodulatory Anti-obesity	Flavonoids Glycosides Phenol Lignin Saponin Sterols Tannins	(Rathore, Bhatt, Dhyani, & Jain, 2012)

Chapter 4

Discussion

In this paper 183 plants distributed in 67 families screened for their pharmacological and preliminary phytochemical are piled up. From table 1 its reported Leguminosae family mostly contributes to the number of plants. Other plant families include Cannabaceae, Asteraceae, Poaceae, Malvaceae, Lamiaceae, Vitaceae, Meliaceae, Rhamnaceae, Apocynaceae, Myrtaceae, Gentianceae, Solanaceae, Lythraceae and excreta. From table 2 it's seen most the plants activities are consistent with their pharmacological activities. Anti-inflammatory activity was most commonly found activity in the plants. About 135 of the plant showed anti-inflammatory activity.

Anti-diabetic activity was found in 72 of the plants. Among the plants *Enhydra Fluctuans* Known as helencha in Bangladesh leaves is used to treat diabetics. Pharmacological activity screening exhibited activities like analgesic, anti-diarrheal, antimicrobial, anticancer, hepatoprotective, CNS depressant, Antihelminthic activities. However, there was no scientific validation of their anti-diabetic activity was found. Similarly, *Madhuca longifolia, Datura stramonium, Polyalthia suberosa* and *Sterculia villosa* are traditionally used in rheumatis. But there was no scientific to prove their anti-rheumatic acitivity.

Again, *Acrostichum aureum* locally known as lagolo is traditionally used to treat wound and peptic ulcer. Their wound healing activity is well established by pharmacological screening but pharmacological activity screening for peptic ulcer yet to be done. Secondary metabolites like alkaloids, flavonoids, and terpenoids shows anti-ulcer activity. The phytochemical screening of Acrostichum aureum shows the presence of flavonoids in ethanol acetate extract of whole plant

(Raja & Ravindranadh, 2014). So, *Acrostichum aureum* might show anti-ulcer activity in their pharmacological screening.

In addition, *Pouzolzia zeylanica* known as bishkathali is traditionally used as anti-ulcer and antihelminthic agent (Hossain et al., 2017). The leaf extract of *Pouzolzia zeylanica* is used in kabirajee for treatment of helminthiasis. To evaluate the antiulcer activity, the extract of Pouzolzia zeylanica was tested against skin ulcer induced rats. Their activity was evaluated by swelling volume, pathogenic morphology, thymus index and spleen index. *Pouzolzia zeylanica* significantly decrease the ulcer activity and promoted healing in rats (Yanfen et al., 2013). However, there is no scientific research conducted to prove their antihelmintihic activity.

Furthermore, *Costus specious* is known as khewa in Bangladesh. The stem extract of *Costus speciosus* mixed with *Thespesia lampas* is used in Rajshahi and Tangail district of Bangladesh to treat kidney stones (Haque et al., 2011). Phytochemical investigation of the plant showed the presence of carbohydrates, alkaloids, tannins, Saponins, steroids, flavonoids, anthroquinones, proteins (Khayyat1 & AL-Kattan, 2017). But there is no scientific evidence to validate the use of Costus speciosus in treatment of kidney stones. Similarly, *Dendrophthoe falcate, Aegiceras corniculatum, Barringtonia acutangula, Barringtonia racemosa* yet to introduced to pharmacological screening to validate their traditional use in asthma. Moreover, some of the studies were also found to be new additiona to their bioactivity. For example, patriscabratine, tetracosane from *Acrostichum aureum* are found to becytotoxic (Uddin, Grice, & Tiralongo, 2012). Patriscabratine showed moderate cytotoxicity against AGS, MDA-MB-231 and MCF-7 cells with IC(50) values ranging from 69.8 to 197.3 μm. Tetracosane showed some cytotoxic activity against AGS, MDA-MB-231, HT-29 and NIH 3T3 cells with IC(50) values ranging from 128.7 to >250 μm. Patriscabratine and tetracosane displayed an apoptotic effect (10%) (Uddin,

Grice, & Tiralongo, 2012). So *Acrostichum aureum*may provide new potential for anticancer drug. Thus, its clearely evident there are many plants whose traditional use yet to be scientifically validated. These plants may help in future discovery of new lead compound in drug discovery.

Chapter 5

Conclusion and Future Recommendation

In conclusion the medicinal plants of Bangladesh reported can be considered as potential source of drugs. The pharmacological and Phytochemicals studied of the plants of Bangladesh informsthe richness of the medicinal plants of Bangladesh. They also suggest medicinal plants of Bangladesh would be promising new source of drugs and useful source for pharmaceutical use. The studies also validate their use as traditional medicine of Bangladesh. Still there are many plants that need validation of their traditional use. Validation of these plants may also lead to discovery of new compounds for drug designing.

The Future research should focus on,

1. Antidiabetic activity of *Enhydra Fluctuans.*
2. Anti-rheumatic activity of *Madhuca longifolia, Datura stramonium, Polyalthia suberosa, Sterculia villosa.*
3. *Acrostichum aureum* for anti-ulcer activity.
4. *Dendrophthoe falcate, Aegiceras corniculatum, Barringtonia acutangula, Barringtonia racemosa* for Anti-asthmatic activity.

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