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REVIEW ARTICLE

ANTI-INFLAMMATORY, ANALGESIC AND COGNITIVE ENHANCER PLANTS PRESENT IN BANGLADESH: A STUDY REVIEW

Sultan Sala Uddin¹, Md. Shahidul Islam*²

Department of Pharmacy, University of Science and Technology Chittagong (USTC), Chattogram, Bangladesh.

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*Address for Correspondence:

Dr. Md. Shahidul Islam, Department of Pharmacy, University of Science & Technology Chittagong (USTC), Bangladesh, Tel: +8801815-579040.
 E-mail: s_i_titon@yahoo.com

Abstract

In present scenario the exploit of conventional medicine is enlarging to newer prospects in addition to plants still stay as the original source of the structurally significant compounds that guide to the expansion of the innovative drugs. Recently Bangladesh has concerning forty five thousands plant variety among which therapeutic assets has been treated to the several thousands. The conventional Bangladeshi system of the medicine, Ayurveda reveals the exercise of the plants in treatment of the various diseases. The ethnobotanical investigation done in the most recent few decades have revealed cognitive, anti-inflammatory as well as analgesic actions of the plants mentioned in the conventional literature. Numerous herbal groundings are being stipulated as the anti-inflammatory, cognitive as well as analgesic in traditional literature. The research for innovative anti-inflammatory, cognitive and analgesic agents from enormous array of the medicinal plant sources is escalating. This reviews such type of the plant species in addition to their products which have demonstrated experimental and clinical anti-inflammatory and also analgesic, cognitive actions, the possible method of the action in addition to their therapeutic value. Several of the significant taxa which are originated efficient as cognitive, anti-inflammatory and analgesic agents such as *Callophyllum inophyllum* L, *Ananas comosus* (L.) Merr., *Calotropis gigantea* (L.) R.Br., *Camellia sinensis* (L.) Kuntz., *Calotropis procera* (Ak.) R.Br., *Cannabis sativa* L., etc. Here these plants species have shown contrasting degrees of cognitive, anti-inflammatory as well as analgesic activities.

Keywords: Anti-inflammatory, analgesic, cognitive activities, medicinal plant.

INTRODUCTION

Medicinal plants species are backbone of the all life in earth in addition to a crucial resource for the human well-being. Now the human competition started using the plants as the means of management of diseases in addition to injuries from early days of the civilization on the earth as well as in its very long journey from the ancient time to the modern age. Moreover the human has effectively used plants species and the plant products as efficient therapeutic instruments for the fighting against the diseases and a variety of additional health hazards¹. Plants species are the living organisms be in the right place to kingdom plantae and they acquire the majority of their energy from the sunlight through photosynthesis using the chlorophyll hold chloroplasts which provides them the green color. The plants species are significant for the human life in numerous ways. So without plants species animal life on the planet globe would be roughly impossible. The plants species have been utilized as the potent in

addition to powerful source of the medication throughout world as long². The plants species are almost certainly most significant to the people as a food. Plant species make up largest amount in human diet everything and eat comes directly as well as indirectly from the plant. During human history, roughly seven thousands dissimilar plant species have been utilized as food by the people. Occasionally human eat plants species themselves as when they take apples, peas and potatoes. But when they take meat and drink milk they are using as foods which come from the animal that take plants. So the seed of the plants species as corn, wheat and rice are chief source of the food in the most parts of world³. When human eat beets, sweet, carrots or potatoes, they are eating the roots of the plants. The Coffee, tea in addition to numerous soft drinks gets their taste from the plants. The plants provide people with numerous vital raw materials. The trees provide us lumber for the building homes in addition to making furniture as well as other goods.

Table 1: Plants having analgesic and anti-inflammatory activity available in Bangladesh.

Plant name/Family	Used parts	Chemical Constituents	Area	Traditional use	Pharmacology use
<i>Ananas comosus</i> (anarash)/ Bromeliaceae	Leaf extracts	high holocellulose, cellulose, hemicellulose, lignin	Tangail, Mymensingh, Gazipur, Sylhet, Moulvibazar, Chittagong	induce menstruation, induce abortion	Anti -inflammatory and analgesic effect ⁷
<i>Clotropis procera</i> (akanda)/ Asclepiadaceae	Latax	alkaloids, tannins	kurigram , Rajshahi, jessore	Diarrhoea, Stomatic, Skin disease	Analgesic effect ⁷
<i>Calotropis gigantea s</i> (Akanda)/ Apocynaceae	Leaves	Calotrop naphthalene, terpenes	bogura, natore	Fever, Nausea, Vomiting, Diarrhea, Elephantiasis	Anti-inflammatory ⁷
<i>Callophyllum inophyllum L</i> (Sultan chapa)/ Clusiaceae	Leaves extracts	alkaloid , triterpenoid, flavonoid, tannin, saponin	coastal areas and Sundarban	Wounds, ulcers and to treat phthisis, orchitis and lung affections	Anti -inflammatory and analgesic effect ⁸ .
<i>Camellia sinensis</i> (cha)/Theaceae	extract of dried tea	epigallocatechin gallate , gallic acid, gallo catechin gallate , Gallo catechin, catechin, epicatechin ,gallate, epicatechin and epigallocatechin	Chattogram, Brahmanbaria . Habiganj, Moulvibazar, Sylhet	Stimulant, Diuretic, astringent	Anti -inflammatory and analgesic effect ⁸ .
<i>Cannabis sativa L</i> (Ghaja)/ Cannabinaceae	leaves , flowers and fruits	α -Pinene, Myrcene, Linalool, Limonene, α -Terpinolene, Trans-caryophyllene, α -Humulene,.	Naogaon, Rajshahi, Jamalpur and Netrokona, Cox's Bazaar	Hallucinogenic Hypnotic, sedative, analgesic, anti-inflammatory	Analgesic as well as Anti- inflammatory effect ⁹ .
<i>Kalanchoe crenata</i> Andr. / Crassulaceae	bark extract	alkaloids, carbohydrate, phenol, phytosterols, resins, , tannins, flavonoids, amino acid and triterpene	Rangamati and Khagrachari	otitis, headache, inflammations, convulsions	Anti- inflammatory and analgesic effect ⁹ .
<i>Curcuma longa L</i> (Holud)/ Zingiberaceae	Rhizom , leaves and flowers	Zingiberen, terpinolene , β -sesquiphellandrene	sherpur, shatkchakra	anticancer, antimicrobial Anti-inflammatory	Analgesic and Anti-inflammatory effect ⁹ .
<i>Zingiber officinale Roscoe</i> (Ada) / Zingiberaceae	whole plant, leaves	Flavonols, Terpenoids, Alkaloids, Sterols , Tanins	Dinajpur, Rangpur, Tangail, Chittagong and Rangamati	stomach upset, nausea, vomiting	Analgesic and Anti-inflammatory effect ⁹ .
<i>Mangifera Indica L</i> (Aam)/ Anacardiaceae	leaf, root and seed oil	triterpenoids, quercetin and gallic acid, athujone, camphor and beta thujone	Rajshahi ,naogha ,chapainobab gonj	Dentifrices, antiseptic	Analgesic and Anti-inflammatory effect ⁹ .
<i>Sida cordifolia L</i> (Bon methi)/ Malvaceae	leaves and flowers	spilanthol, alkaloids ,carbohydrates, pungent amide tannins, steroids, carotenoids	-	Bronchial asthma cold and flu head ache nasal congestion	Analgesic and Anti-inflammatory effect ⁹ .
<i>Hibiscus rosa sinensis</i> (Joba)/Malvaceae	leaves	Flavons, alkaloids, beta-sitosterol, vitamin	Anywhere in BD	dysentery and diarrhea analgesic	Analgesic effect ¹⁰ .
<i>Spilanthes acmella Murr.</i> (Shormoni)/ Asteraceae	whole plant, leaves	Flavonols, Terpenoids, Alkaloids, Sterols , Tanins	-	antiseptic Antibacterial antifungal antimalarial	Anti -inflammatory and analgesic effect ¹⁰ .

<i>Scoparia dulcis</i> L (<i>Modhu maloti</i>)/ Scrophulariaceae	whole herb	Alkaloids, carbohydrates, glycosides & tannins	Narshingdi, bogura, kurigra, tangail, noakhali	fever, hypertension hemorrhoids diarrhea	Analgesic effect ¹⁰
<i>Manilkara zapota</i> (<i>sofeda</i>)/ Sapotaceae	Leaves	Alkaloids, flavonoids, steroids, phenolic compounds	Chattograam, Dhaka, tangail	coughs and colds antidiarrheal	Analgesic effect ¹⁰

Other vital sources of the fuel-coal, natural gas and oil also come from the plants. The all living things such as plants, animals, protists, fungi and prokaryotes are the linked by cycle of the nature. This natural procedure gives natives oxygen to breathe as well as food to eat in addition to heat to stay them warm⁴. The medicinal plants are also rich sources of the bioactive compounds and also thus provide as significant raw materials for the drug production. They may comprise a valuable natural benefit of the country and give a great treaty to its physical condition care systems. Medicinal plants as well as plant-derived medicines plays very significant role in economy of the tropical countries. Like Bangladesh, possessing such the rich flora of the medicinal plant and should make severe efforts to the derive maximum financial benefit from the plants by the using them as the raw materials for these native drug manufacturing factories and not by exporting to the other countries. This will severely reduce volume of the pharmaceutical raw materials in addition to processed medicine of the plant origin in country and also bring self-adequacy in the original drug industry

and saving huge quantity of the foreign exchange. Though there are no noticeable morphological properties in medicinal plants which make them divergent from the other plants producing with them and yet they acquire some extraordinary qualities and virtues that create them medicinally significant. This has been found that plant which in nature synthesis in addition to accumulate several secondary metabolites such as alkaloids, tannins, glycoside, volatile oils, contain minerals in addition to vitamins, acquire medicinal properties⁵.

The main purpose of this review work is

- To create a list of traditionally used Analgesic, Anti-inflammatory and Cognitive enhancer plants in Bangladesh.
- To review scientific papers reposting Analgesic, Anti-inflammatory and Cognitive enhancer plants in Bangladesh.
- To identify the plants which used in both Analgesic and Cognitive enhancer in Bangladesh.

Table 2: Plants having cognitive enhancer activity available in Bangladesh.

Plant name/ Family	Used parts	Chemical constituents	Area	Traditional uses	Pharmacological uses
<i>Ginkgo biloba</i> / Ginkgoaceae	Plant seed, leaf	alkaloid, tannins, steroid, terpenoid, volatile oil, glycoside, fixed oil.	-	nerve tonic Rejuvenate, Sedative, diuretic	Cognitive Enhancer ¹¹ .
<i>Cyperus rotundus</i> (<i>Badhali</i>)/ Cyperaceae	Rhizome	Pinene, Cineole, Terpenes, Isociprol	Noakhali	diarrhea Diabetes Pyresis Inflammation malaria	Cognitive Enhancer ¹¹ .
<i>Zizyphus jujube</i> (<i>Kul</i>)/Rhamnaceae	Fruit	Terpenoid, flavonoid and alkaloid, phenyl glycosides	rajshahi, Khulna , anywhere in BD	gastrointestinal problems stomach pain constipation	Cognitive Enhancer, anti – inflammatory ¹²
<i>Emblica Officinalis</i> (<i>Amalaki</i>)/ Phyllanthaceae	Fruit	gallic acid, tannins, flavonoids, pectin, and quercetin	Rangama ti	Antioxidant immune modulatory Antipyretic analgesic	Cognitive Enhancer ¹²
<i>Cocos nucifera</i> (<i>Narikel</i>)/ Arecaceae	Fruit	catechins, epicatechins, tannins, and flavonoids	Jessore, noakhali etc	diarrhea	Cognitive Enhancer ¹³
<i>Celastrus paniculatus</i> (<i>Jyotishmati</i>)/ Celastraceae	Plant seed, leaf	alkaloid, tannins, steroid, terpenoid, volatile oil, glycoside, fixed oil.	-	nerve tonic, Rejuvenant Sedative Diuretic	Cognitive Enhancer ¹³

Cont...

<i>Camellia sinensis</i> (Cha)/ Theaceae	Leaves	epigallocatechin gallate , gallicocatechin gallate , Gallocatechin, catechin, epicatechin, gallate, epicatechin and epigallocatechin	Chattogram, Brahmanbari , Sylhet rangamati	Diuretic astringent.	Cognitive Enhancer, Anti-inflammatory ¹⁴
<i>Bacopa monnieri</i> (Brahmi shakh)/ Plantaginaceae	Leaves and flowers	alkaloids brahmine, herpestine, nicotine, saponin, monierin, hersaponin, triterpene, and bacosine	coastal areas	improve memory	Cognitive Enhancer ¹⁴
<i>Rhodiola Rosea</i> / Crassulaceae	Roots	flavonoids, proanthocyanidines, tyrosol, cinnamyl alcohol, glycosides, organic acids.		fatigue Depression anemia	Cognitive Enhancer, anti-inflammatory ¹⁵

CONCLUSIONS

The current review highlighted the medicinal plants possessed analgesic and anti-inflammatory effects with special focus on their mode of action, as promising future drugs because of their safety and effectiveness. This review work makes an effort to provide scientific account of utilize of the valuable plant in Bangladesh as Analgesic, Cognitive and Anti-inflammatory enhancer source. So the future direction is to identify chemical constituents of the plants which is not has been discovered yet and evaluate its *in-vivo* data with animal models.

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AUTHOR'S CONTRIBUTION

Uddin SS: writing original draft, literature survey.
Islam MS: methodology, formal analysis. Both authors revised the article and approved the final version.

DATA AVAILABILITY

Data will be made available on reasonable request.

CONFLICTS OF INTEREST

The authors have no conflicts to report.

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