

REVIEW ARTICLE

**A REVIEW ON ETHNIC  
PLANTS OF ASSAM (INDIA)  
AND THEIR  
ANTI-OXIDANT ACTIVITY.**

Kalita Pallab<sup>1\*</sup>, Deka Satyendra<sup>1</sup>, Sharma Rama Kanta<sup>2</sup>

1. Institute of Pharmacy, Assam down town University, Assam, India.
2. Department of RS & VK, Govt. Ayurvedic College, Assam, India.

**Correspondence**

Pallab kalita  
Institute of pharmacy, down  
town university, Guwahati  
Assam, India.  
kalitapallab@gmail.com

**Keywords**

Antioxidant, free-radical,  
reactive nitrogen species.

**Received**

01 November 2014

**Reviewed**

06 November 2014

**Accepted**

08 November 2014

**ABSTRACT**

Antioxidants are free-radical scavengers that provide protection to living organisms from damage caused by reactive oxygen species. Although almost all organisms possess antioxidant defence and repair systems but these systems are insufficient to cope over entire damage. So, dietary antioxidant supplementation is a promising mean to strengthen the antioxidant defence and repair systems. The aim of this study is to review some of plants of Assam having antioxidant activity. Assam is rich in medicinal plants and the pharmacological activity of various plants is not yet studied scientifically. Such type of study will give proper information about those plants and that will be beneficial to the society.

## INTRODUCTION

Now a day, medicinal plants are getting popularity and great demand to prevent and treat of the complex diseases like atherosclerosis, stroke, diabetes, Alzheimer's disease and cancer, antioxidant-based drugs are now tremendous demand in the market. So, different companies are making formulations with the herbs, which are showing the anti-oxidant activity (1). Medicinal plants are easily accessible, affordable and culturally appropriate sources of primary health care. Treatment of diseases like cancer, diabetes etc. is not easy for the poor family due to high coast of the treatment. Now a time, there is widespread interest to promote the traditional health care systems to meet primary health care needs. Coast of modern synthetic medicines is very high and governments find it increasingly difficult to meet the cost of pharmaceutical-based health care (2). As it is not possible to discuss all the plants which are used traditionally in Assam for Diabetic treatment. Only ten plants are chosen in this paper.

Antioxidant compounds in food play an important role as a health- protecting factor. Scientific research suggests that antioxidants reduce the risk for chronic diseases

including cancer, cardiovascular disease, neurodegenerative diseases and other disorders. Oxidative stress, pollution, smoking, easy life styles and many factors are working as a fuel in the generation of the diseases. Oxygen is needful to survive a life. But inhaled oxygen, after mixing with the blood, it generates the energy and free radical as a form of bi-products under cells. Reactive oxygen species (ROS) and reactive nitrogen species (RNS) are the by-products resulting from the cellular redox process. Reactive species exert beneficial effects on cellular redox signalling and immune function at low or moderate levels, but at high concentrations, they produce oxidative stress, a harmful process that can damage cell function and structures responsible for varieties of Major diseases (3). Anti oxidants are the substances, which reduce the oxidative stress to damaging the free radicals. Diseases are occurring due to the Oxidative stress. Primary sources of naturally occurring antioxidants are whole grains, fruits and vegetables. Plant sourced antioxidants have been recognized as having the potential to reduce disease risk. Most of the antioxidant compounds in a typical diet are derived from plant sources and belong to various classes of compounds with a wide variety of physical and chemical properties.

The main characteristic of an antioxidant is its ability to trap free radicals. From a wide variety of sources highly reactive free radicals and oxygen species are formed in to the biological systems. Oxidation occurs in nucleic acids, proteins, lipids or DNA by influence of free radical and can initiate degenerative disease (4). Antioxidant compounds like phenolic acids, polyphenols and flavonoids, scavenge free radicals such as peroxide, hydro peroxide or lipid peroxy and thus inhibit the oxidative mechanisms. The free radical scavenging activity of antioxidants in different herbs has been substantially investigated and reported by the researchers. Now a time, government give more attention to cultivate the ethnic plants of a region, which are traditionally used to recover from a disease. As it is not possible to discuss all the plants which are easily found in Assam for treatment of various diseases with antioxidant activity. Some plants are chosen in this paper.

#### **Antioxidant activity of traditionally used medicinal plants:**

##### **Mucuna pruriens -**

*Mucuna pruriens* (L). Dc is a plant of the Fabaceae family, commonly known as velvet bean, itchy bean, chiporro bean, mucuna, among others. *Mucuna pruriens*, is known as bandor kekoa in Assam. The

availability is more in rainy forest area of Assam. *This plant* typically found in tropical regions and used for various purposes in traditional medicine in several countries. In India and West Africa for example, it is used against snake bites. The main phytoconstituent of the mucuna is levodopa. Levodopa is a substance used as first-line treatment of Parkinson's disease (PD). Nicotine, physostigmine, serotonin, bufotenine, choline, N, N - dimethyl - tryptamine and some indole compounds are others components of mucunapruriens. It is also used as a uterine stimulant and aphrodisiac. Longhi et al. studied the antioxidant activity by using three different methods: the reduction of the phosphomolybdenum complex, the reduction of radical 1,1-diphenyl-2-picrylhydrazyl (DPPH•) and the formation of radical monocation ABTS•+, from the acid [2-2'-azinobis (3-ethylbenzothiazoline-6- sulfonate)](invitro). The plant showed the antioxidant activity (4).

##### **Urtica crenulata**

*Urtica crenulata* Roxburgh (Syn: *Laportea crenulata*, Gaud) locally known as Sorat, is an evergreen shrub that is widely distributed to Assam. Normally this plant is widely distributed to Bangladesh, India, Srilanka and Malay island .It is 3.7 m tall, branchless

spreading and semi woody with elliptic, oblong or obovate-lanceolate rarely rhombic leaf. In Assam, it is known as sorat. The different parts of the herbs having varieties of phytoconstituents as formic acid, mucilage, ammonia, carbonic acid, protein, calcium, phosphorus, iron, magnesium, and beta-carotene, along with vitamins A, C, D, and B complex. from the roots of *Urtica crenulata* recently a new triterpenoid 2 $\alpha$ , 3 $\beta$ , 21 $\beta$ , 23, 28-penta hydroxyl 12-oleanene and two known compounds, beta-sitosterol and beta-sitosterol 3- $\beta$ -D-glucopyranoside have been isolated. Gaud Antioxidative activity of *U. crenulata* stem extract was measured by different procedure. DPPH free radical scavenging method stem extract showed minimum significant amount of DPPH free radical scavenging effect compared to ascorbic acid. Percent (%) scavenging activity or % inhibition was plotted against log concentration and from the graph IC50 (Inhibition concentration 50) value was calculated by linear regression analysis. IC50 value of ascorbic acid and stem extract was found 14.72  $\mu$ g/ml and 1468.9  $\mu$ g/ml, respectively (6).

### **Mesua ferrea**

Various parts of the plant are used medicinally in India, Pakistan, Indo-China,

Malaysia and Thailand. In Assam the flower of *Mesua ferrea* is known as nahor phul. For the treatment of cough, dysentery, vomiting, sore throat and fever its barks are used. Their flowers are showing astringent and stomachic activity. Combination of leaves and flowers, are used for the treatment of snake bite and scorpion sting. In the treatment of rheumatism, the seed oil is used. The antioxidant activity of the essential oil of *M. ferrea* leaves was determined spectrophotometrically using the DPPH radicals scavenging assay. The essential oil showed antioxidant activity with the IC50 of 31.67 mg/mL (7).

### **Brassica juncea**

The botanical name of rajika is *Brassica juncea* and it belongs to family Brassicaceae. In Assam, the plant is called as lai sak. From the seeds of the *Brassica juncea*, mustard oil made is called brown mustard, which are used for medicinal purpose as well as food, since centuries. This plant produces tiny yellow colored flowers, which almost cover the plant. This plant having diuretic, emetic, rubefacient, and stimulant activities. Apart from the medicinal value this plant also used in allied field such as kitchen, phytomedicine, general medication for its medicinal value. It also contains brassica sterol, free

campesterol , sitosterol , esterified -5-avenasterol, and a trace of -7-stigmasterol. glucosinolate and the enzyme myrosin , sinapic acid; sinapine ,fixed oils consisting mainly of glycerides of erucic, eicosenoic, arachidic, nonadecanoic, behenic, oleic, and palmitic acids, among others; proteins and mucilage are the active constituents. The seeds extract of *brassica juncea* were evaluated for their hydroxyl radical scavenging by using DNA nicking assay (8).

### ***Ipomoea eriocarpa***

*Ipomoea eriocarpa* R.Br. (Family: Convolvulaceae) often called annual morningglories, are summer annual or perennial broad leaf plants. The plant is occasionally consumed as an edible leafy vegetable or mixed with other food in Assam and is commonly known as “Kolmow” by them. In the treatment of headache, rheumatism, leprosy, epilepsy, ulcers and fevers, the extract of *ipomoea eriocarpa* is used traditionally. The antioxidant activity of Petroleum Ether Extract of *Ipomoea eriocarpa* whole plant (PEIE) was evaluated. The plant extract was tested for DPPH radical scavenging, and reducing power assays (9, 10).

### ***Amaranthus spinosus***-

*Amaranthus spinosus* Linn. (Amaranthaceae) commonly known as

Spiny amaranth or Pig weed, is an annual or perennial herb found throughout India as a weed in cultivated as well as fallow lands . in assam this plant in known as khutura sak. Though whole plant is used as laxative, the root are regarded as highly specific for colic. Traditionally boiled leaves and roots of *Amaranthus spinosus* are given to children as laxative. the plant is having medicinal value as diuretic, antidiabetic, antipyretic, anti-snake venom, antileprotic, and anti-gonorrhoeal. *the plant* is used as an expectorant and to relieve breathing in acute bronchitis In Malaysia. The plant also showing the anti-inflammatory properties, immunomodulatory activity, anthelmintic properties. To induce abortion some tribes of india, are frequently used this plant. In vitro antioxidant activity was determined by DPPH, superoxide, hydroxyl radicals, hydrogen peroxide and nitric oxide scavenging methods. In the study it was found that the plant having the antioxidant activity (11).

### ***Antidesma ghaesembilla***

The plant *Anti-desma ghaesembilla* Gaertn (*Phyllanthaceae*), which has been reported to have various medicinal properties. The plant is used to treat disease like diabetes. The methanolic leaf extract of *Antidesma ghaesembilla* having antioxidant activity.

Antioxidant activity was determined by DPPH, superoxide, hydroxyl radicals, hydrogen peroxide and nitric oxide scavenging methods. In the study it was found that the plant having the antioxidant activity (12).

### **Mirabilis jalapa**

*Mirabilis jalapa* has been extensively used in almost all folklore remedies around the world for treating a variety of conditions. It has been reported that this plant is used for muscular pain, diarrhoea, dysentery, and abdominal colic. From the extract of *Mirabilis jalapa*, eleven compounds are isolated including ginglycolipid, 4'-hydroxy-2, 3-dihydroflavone, astragaloside VI etc. Moreover numerous components like  $\beta$ -sitosterol, stigmasterol, ursolic acid, oleanolic acid, brassicasterol, and *Mirabilis* antiviral protein, rotenoids. The aqueous extract of the leaves possess potential anti-inflammatory activity. *Mirabilis jalapa* has also been evaluated for its anti-histaminic activity and it has been found that in concordance with the folkloric use of the plant for allergy and asthma it has significant inhibitory action on the release of histamine and subsequent typical allergic responses. The methanolic extracts of the aerial parts of the plant having the potential antioxidant activity. The activity was studied

using conventional in vitro models like the reducing power assay, hydrogen peroxide scavenging assay (13).

### ***Trichosanthes dioica roxb***

*Trichosanthes*, a genus of family Cucurbitaceae is an annual or perennial herb distributed in tropical Asia, Polynesia, & Australia. Over 20 species are recorded in India of which two namely *T. anguina* & *T. dioica* are cultivated as vegetable. Pointed gourd (*Trichosanthes dioica*) is known by the name of parwal, palwal, parmal, patol, potala in different parts of India and Bangladesh and is one of the important vegetables of these regions. Earlier chemical study reveals that in addition to a number of tetra & pentacyclic triterpenes, the toxic bitter principles cucurbitacins (a group of often highly oxygenated tetracyclic compounds with a unique carbon skeleton & almost a carbonyl group in ring C) may be considered as a taxonomic character of Cucurbitaceae. Juice of leaves of *T. dioica* is used as tonic, febrifuge & in subacute cases of enlargement of liver & spleen. In Charaka Samhitha leaves & fruits used for treating alcoholism & jaundice. Leaves are used in odema and alopecia. It is also used as antipyretic, diuretic, cardi tonic & laxative. Several concentrations ranging from 10-250 Hg/ml of the aqueous and ethanolic extract

of *Trichosanthes dioica* Roxb. were tested for their antioxidant activity in different in vitro models.

## CONCLUSION

In this review we discussed about ethnic medicinal plants in the region of Assam. Mainly villagers of Assam, using varieties of herbs as a remedy without knowing their pharmacological activities. Due to easy availability and lower cost of the herbal medicines, traditionally these drugs having tremendous demands. But, proper investigations are needed to evaluate their action. In the present review an attempt has been made to investigate the antioxidant activity of medicinal plants and may be useful to the health professionals, scientists and scholars working in the field of pharmacology and therapeutics to develop drugs.

## REFERENCES

1. Nooman A, Khalaf Ashok K, Shakya K, Atif Al-Othman, Zaha El-Agbar, Husni Farah, 2008. Antioxidant Activity of Some Common Plants, *Turk J Biol*, 32, 51-55.
2. Kalita Pallab, Deka Satyendra, Bhargab Jyoti Saharia, Chakraborty Arpita, Basak Mrinmoy, Deka Manoj Kumar. 2014. An Overview And Future Scope On Traditionally Used Herbal Plants Of Assam

Having Antidiabetic Activity, *International Journal Of Advances In Pharmacy, Biology And Chemistry*, 3.

3. Sen S, Chakraborty R, 2011, In Oxidative Stress: Diagnostics, Prevention, And Therapy, *American Chemical Society*. 1-37.
4. Yun-Zhong Fang, Sheng Yang, Guoyao Wu, 2002. Free radicals, antioxidants, and nutrition, nutrition. 872-879.
5. Longhi JG, Elisa Perez, Jair José De Lima, Lys Mary, Bileski Cândido, 2011. In vitro evaluation of *Mucuna Pruriens* (L.) Dc. Anti-oxidant activity. *Brazilian Journal Of Pharmaceutical Sciences* .
6. Rahman M A, Rana M S, Zaman M M, Uddin S A, Akter R, 2010. Antioxidant, antibacterial and cytotoxic activity of the methanol extract of *Urtica Crenulata*, *J. Sci. Res.* 2, 169-177.
7. Sukanya Keawsa-Ard, Samart Kongta weelert, 2012. Antioxidant, antibacterial, anticancer activities and chemical constituents of the essential oil from *Mesua Ferrea* leaves, *Chiang Mai J. Sci.* 39, 455-463.
8. Bassan P, Sharma S, 2013. Antioxidant and in vitro anti-cancer activities of *Brassica Juncea* (L.) czern. seeds and sprouts, *International journal of pharma sciences*, 3, 343-349.

9. Thamizhvanan K, Kumuda P, Sateesh Babu JM, 2012. evaluation of antioxidant activity of whole plant of *Ipomoea Eriocarpa* extract, *International journal of innovative drug discovery*. 1-3.
10. Das M, Himaja M, 2014. Phytochemical Screening, Gc-MS analysis & biological activities of *Ipomoea Eriocarpa* leaf extracts, *International Journal of Pharmaceutical Science*. 592-594.
11. Kumar BS, K Lakshman, KN, Jayaveera, Khan Saleemulla, B. Manoj, VB Narayan Swamy, 2010. Evaluation of the antioxidant activity of *Amaranthus Spinosa* Linn. by non-enzymatic haemoglycosylation. 413-415.
12. Maryglen F, Gargantiel, Mafel C, Ysrael, 2014. Antioxidant activity and hypoglycemic potential of *Antidesma ghaesembilla* Gaertn (Phyllanthaceae), *International journal of scientific & technology research*. 422-431.
13. Zachariah SM, Viswanad V, Aleykutty NA, Jaykar B, Halima OA, 2012. Free radical scavenging and antibacterial activity of *Mirabilis jalapa* Linn using in vitro models. *Asian Journal of Pharmaceutical and Clinical Research*. 115-119.



Table.1- Some Ethnic Plant Of Assam

SR. no.	Local name	Biological Name	Family	Traditional Uses
1	Bandor kekoa	<i>Mucuna pruriens (L).</i>	Fabaceae	Snake bite
2	Sorat	<i>Urtica crenulata</i>	Urticaceae	Weakness, asthma, gout, mumps, whooping cough and chronic fever
3	Nahor	<i>Mesua ferrea</i>	<u>Calophyllaceae</u>	Cough, dysentery, vomiting, sore throat And fever
4	Lai sak	<i>Brassica juncea</i>	Brassicaceae	Anti microbial
5	Kolmow	<i>Ipomoea eriocarpa</i>	Convolvulaceae	Headache, rheumatism, leprosy, epilepsy, ulcers and fevers
6	Khutura sak	<i>Amaranthus spinosus</i>	Amaranthaceae	Diuretic, antidiabetic, antipyretic, anti-snake venom, antileprotic, and anti-gonorrhoeal
7	Helechi	<i>Antidesma ghaesembilla</i>	Phyllanthaceae	Hypertension and diabetes mellitus
8	Godhuli gopal	<i>Mirabilis jalapa</i>	Nyctaginaceae	Muscular pain, diarrhoea, dysentery, and abdominal colic
9	Pottle	<i>Trichosanthes dioica</i>	Cucurbitaceae	Liver infections and jaundice