

## DPPH Scavenging Assay of Eighty Four Bangladeshi Medicinal Plants

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**Abstract:** This study was designed to screen out free radical scavenging potentiality of 84 medicinal plants. Stock solution of different plant extracts and standard were diluted to achieve suitable concentrations. A control was also prepared without plant extract solution. Then 0.004% DPPH solution was added. The mixtures were incubated in the room temperature for 30 minutes. Then the absorbance was measured at 517 nm against solvent in UV-spectrophotometer and then IC<sub>50</sub> was calculated. In this experiment two standard were used- ascorbic acid and BHT. Both showed a significant IC<sub>50</sub> value of 15.5µg/mL, and 46.54µg/mL respectively. Among 84 medicinal plants *Syzygium cumini*, *Casuarina littorea*, *Borassus flabellifer*, *Enhydra fluctuans*, and *Minusops elengi* exhibited highest radical scavenging potential with an IC<sub>50</sub> value of 12.816µg/mL, 14.467µg/mL, 15.755µg/mL, 15.653µg/mL, and 20.380µg/mL respectively. All these value are very close to the IC<sub>50</sub> value of ascorbic acid and better than IC<sub>50</sub> value of BHT (Butylated Hydroxy Toluene). *Syzygium cumini* is the most powerful scavenger among all tested medicinal plants and also most strong scavenger than ascorbic acid and BHT. Scavenging activity was found to increase in dose dependent manner. Another 30 medicinal plants exhibited good scavenging property and 14 medicinal plants showed moderate scavenging activity. The rest presented lower scavenging activity. This present study indicates that plants having good scavenging property may have various health beneficial effects and these plants can be considered as valuable source of bioactive components with high antioxidant properties.

**Keywords:** Antioxidant, Ascorbic acid, BHT, DPPH, Medicinal plants

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### I. Introduction

Oxygen, no doubt, the 3<sup>rd</sup> most elements in the universe after Hydrogen and Helium and the most abundant element by mass in earth crust. It plays a vital role in our breathing process. Living organism requires ample amount of oxygen for energy production and body metabolism process. All metabolic processes in our body depend on oxygen[1]. This indispensable element sometimes causes serious oxygen toxicity by formation of reactive oxygen species (ROS) which represents both free and non free radicals. Some common types of encountered free radicals are hydroxyl radical (HO•), superoxide radical (O<sub>2</sub>•-), nitric oxide radical (NO•), and lipid peroxy radical (LOO•) while non-free radical species principally being H<sub>2</sub>O<sub>2</sub>, singlet oxygen (1O<sub>2</sub>), and hypochlorous acid (HOCl)[2]. Free radical damage is closely related to oxidative damage. These types of species are involved in activation of many types of procarcinogens and promutagens. Free radicals react with biomolecules like DNA, RNA, lipid, and protein and result in gene mutation and cell structure damage and lead to development of cancer, cardiovascular disorder, neurodegenerative disease (Alzheimer's disease, Parkinson's disease), atherosclerosis, liver injury, diabetes mellitus[3, 4]. Reactive oxygen species (ROS) exerts oxidative stress towards the cells of human to face 10000 oxidative hit per second and when this type of hit breaks antioxidant defense mechanism, the free radicals then attack cell macromolecules and lead to a number of physiological disorders[4].

Bangladesh has rich plant and animal sources in particular reference to the antioxidant compounds from medicinal plants. So, well planned, careful, innovative, factual, and systemic research will be of great benefit to our poor people who are the helpless victims to various physiological diseases caused by free radicals. This study performed on medicinal plants support the proposal that plant constituents with antioxidant properties show good free radical and non free radical scavenging property in our biological system[5]. During our experiment we studied eighty four medicinal plants for evaluating DPPH (1, 1-diphenyl-2 picryl hydrazyl) scavenging assay. The assessment is interesting and useful task for finding out potential natural antioxidants.

### II. Materials and Methods

#### 2.1. Chemicals and drugs:

DPPH (1, 1-diphenyl-2 picryl hydrazyl) was obtained from Sigma chemical Co.USA. Ascorbic acid was obtained from SD Fine chem. Ltd. Biosar, India.

## 2.2. Preparation of plant materials:

All the plants were collected from different districts and villages of Bangladesh. Most of the samples were identified by experts in Bangladesh National Herbarium, Mirpur, Dhaka and the rest by Professor Dr. Abdul Ghani (Professor of Pharmacognosy, Stamford University Bangladesh)[6]. The specimen samples are kept in the Bangladesh National Herbarium. Suitable extraction procedures were used for these plants in different solvents.

## 2.3. DPPH free radical scavenging assay:

The free radical scavenging activity of the extracts, based on the scavenging activity of the stable 1, 1-diphenyl-2 picryl hydrazyl (DPPH) free radical was determined by the method described[7]. Solution of plant extracts of various concentrations were properly mixed with 0.004% methanol solution of DPPH. Absorbance at 517nm was determined after 30 min, and the percentage inhibition activity was calculated from the equation  $[(A_0 - A_1)/A_0] \times 100$  i.e., (1)

Where,  $A_0$  is the absorbance of the control, and  $A_1$  is the absorbance of the extract/ standard.

## 2.4. Statistical analysis:

The inhibition curves were prepared and IC<sub>50</sub> values were obtained with the help of Microsoft Excel 2007.

## III. Result

Unlike other free radicals such as hydroxide ion or superoxide anion DPPH has an advantage of being unaffected by certain side reaction such as enzyme inhibition and metal ion chelation process[7]. DPPH solution exhibits a deep purple color with absorption maximum at 517 nm. Generally, the color disappears when antioxidant compounds present in the medium. For this research prospect, 84 different types of plants were tested and screened for DPPH scavenging assay. Results of all plants are given below in a table. For each plant, eight types of information were provided including scientific name, family, local name, english name, traditional use, part used for assay, name of solvent used and IC<sub>50</sub> value. Most of the morphological information were collected from Ghani A 2003[6].

TABLE 1: IC<sub>50</sub> Value of 84 Medicinal Plants with their Traditional uses and Botanical Identity

Sl no	Scientific name	Family	Local name	English name	Traditional use	Part used	Solvent	IC <sub>50</sub> value (µg/mL)
01	<i>Pistia stratiotes</i> Linn.	Araceae	Topa pana, Toka pana	Water cabbage	Used in tuberculosis, ear disease	Root	Methanol	3103.75
							Pet ether	12700
						Leaf	Methanol	963.846
							Pet ether	4698.33
02	<i>Mikania scandens</i> (L.) Willd	Asteraceae	Asamlata	Heartleaf	Used to treat stomach ulcer, inflammation	Leaf	Hydro methanol	104.1010
03	<i>Punica granatum</i>	Punicaceae	Dalim, Anar	Pomegranate	Antidiarrhoeal, anthelmintic	Rind	Hydro methanol	35.558
04	<i>Xanthium indicum</i> Koenig	Asteraceae	Ghagra	Rough cocklebur	Used in urinary complaint, sore of lips and mouth	Leaf	Hydro methanol	70.684
05	<i>Tinospora crispa</i>	Menispermaceae	Gadancha gachh	Heavenly elixer	Jaundice, rheumatic fever, ulcer	Aerial part	Methanol	90.074
06	<i>Syzygium cumini</i> (Linn.)	Myrtaceae	Deshijam, Kalojam	Black plum	Used in diarrhea, diabetes: used as gargle, mouthwash	Leaf	Methanol	12.816
07	<i>Michelia champaca</i> (L.)	Magnoliaceae	Swarna champaca	Champaca	Expectorant, stimulant, anti-inflammatory	Leaf	Methanol	67.639
08	<i>Ipomoea quamoclit</i> (L.)	Convolvulaceae	Kunjolata	Star glory	Applied to carbuncles, and bleeding piles, treatment of ulcer and breast pain	Aerial Part	Hydro-Methanol	78.284
09	<i>Hopea odorata</i> Roxb	Dipterocarpaceae	Telsur	White thingan	Used in gingivitis, as an ointment for sores and wounds	Leaf	Hydro-Methanol	99.604
10	<i>Feronia lomialia</i> Linn.	Rutaceae	Kodbel	Wood apple	Remedy for venomous insect, and reptiles	Aerial part	Hydro-Methanol	53.073

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11	<i>Curcuma alismatifolia</i> Gangnep.	Zingiberaceae		Summer tulip	Applied to bruise, sprain, snake bite	Leaf	80% methanol	58.4513
12	<i>Commelina benghalensis</i> Linn.	Commelinaceae	Dholpata, Kanchira	Venus bath	Demulcent, emollient, laxative	Aerial part	Chloroform	28.9087
							Pet ether	43.7936
							n-butanol	106.285
							Hydromethanol	78.7301
13	<i>Cocos nucifera</i> Linn.	Arecaceae	Narikel, Daab	Coconut	Used in dysentery, hair nutrient alopecia	Kernel	80% methanol	41.2227
14	<i>Caesalpinia plucherrima</i> Linn.	Caesalpiniceae	Krisnachura	Peacock flower	Liver disorder, cough, bronchitis, asthma	Leaf	Hydromethanol	48.2490
15	<i>Butea monosperma</i> (Lam) Taub	Papilionaceae	Polash	Flame of forest	Used as anti ovulatory, anthelmintic, laxative	Leaf	Hydromethanol	78.284
16	<i>Baccurea ramiflora</i> Lour.	Phyllanthaceae	Lotkon	Burmese grape	Young leaves as vegetables, flavoring agent with curries	Fruit pericarp	Hydromethanol	94.6248
17	<i>Artocarpus lacucha</i> Buch. Ham	Moraceae	Daowa	Monkey jack	Applied to pimple, cracked skin and sores	Pulp	Methanol	24.9315
						Pericarp	Methanol	33.501
						Leaf	Methanol	50.5641
18	<i>Cyperus rotundus</i> Linn.	Cyperaceae	Motha, Mustak	Nut grass	Active against kapha and pitta suppressant, cure infection	Whole bush	Ethanol	35.9439
19	<i>Dillenia indica</i> Linn.	Dilleniaceae	Chalta	Elephant tree	Used in stomach disorder; anti microbial	Leaf	Methanol	32.622
20	<i>Brassica nigra</i>	Brassicaceae	Kalo sorisa	Black mustard	Seedlings used in salad; plant used in rheumatism	Whole plant	Ethanol	63.045
21	<i>Raphanus sativus</i> var. <i>sativus</i>	Brassicaceae	Mula	Raddish	Added in salad; have tonic and laxative effect	Celery with root	Ethanol	398.11
22	<i>Raphanus sativus</i> subsp. <i>longi pinnatus</i>	Brassicaceae	Sada mula	White raddish	White radish juice used to expel phlegm	Celery with root	Ethanol	398.107
23	<i>Ficus racemosa</i> (L.)	Moraceae	Dumur	Cluster tree	Latex alleviate edema; applied in skin	Fruit	Ethanol	8459.663
24	<i>Geodorum densiflorum</i> (Lam) Schltr	Orchidaceae	Shonkhomul, Kukumari		Diarrhea, regularize menstrual cycle	Whole plant	Methanol	177.089
							Ethyl acetate	609.2692
							Pet ether	103.479
25	<i>Scoparia dulcis</i> Linn.	Scrophulariaceae	Misridana, Chinighura	Sweet broom weed	Burn, infection, hypertension, insect bite, gastric disorder	Whole weed	95% ethanol	577.8608
26	<i>Terminalia bellerica</i> roxb	Combretaceae	Bohera, Bhaira	Belleric myrobalan	Useful in hemorrhage; dried fruit in the treatment of dysentery	Bark	Methanol	47.21
27	<i>Luffa cylindrica</i>	Cucurbitaceae	Dundul	Sponge gourd	Used in syphilis, rheumatism	Leaf	Methanol	38730.0825
28	<i>Momordica cochinchinensis</i>	Cucurbitaceae	Kakrol	Sweet gourd	Used in anemia; seed membrane aid in relief of dry eye	Leaf	Methanol	38731.4
29	<i>Centella asiatica</i> (L.)	Apiaceae	Thankuni	Indian penny worth	Leaf juice in cataract and eye trouble; whole plant is tonic	Whole plant	Methanol	162.18
30	<i>Coccinea cordifolia</i> Linn.	Cucurbitaceae	Telakucha	Ivy gourd	Treatment of diabetes; infusion used in anorexia, epilepsy, asthma	Whole herb	Methanol	251.18

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31	<i>Ipomoea aquatica</i> Forsk	Convolvulaceae	Kalmi sak	Water spinach	Plant is useful in leprosy and fever	Leaf and stem	Methanol	295.12
32	<i>Lannea coromandelica</i> (houtt)Merr.	Anacardiaceae	Jika, Jiga, Kamila	Wodier	Bark used in leprosy and obstinate ulcer; decoction in toothache	Bark	methanol	21.37
33	<i>Lawsonia inermis</i> (L.)	Lythraceae	Mehedi	Samphire	Leaf paste used in skin disease	Leaf	Methanol	83.37
34	<i>Nymphaea nouchalli</i> Burm.f.	Nymphaeaceae	Shapla, Shaluk gachh	Water lily	Powered form in piles and dysentery; show good activity in cough	Rhizome	Methanol	75.85
35	<i>Oxalis corniculata</i> Linn.	Oxalidaceae	Amrul	Wood sorrel	Leaf juice in dysentery; leaf juice with onion removes corns and warts	Leaf	Methanol	162.18
36	<i>Persicaria hydropiper</i> (L.) Spach	Polygonaceae	Pakarmul	Smart weed	Leaf : inflammation, stomachic, Seed: carminative, stimulant	Whole plant	Methanol	34.8623
37	<i>Phyllanthus fraternus</i> auct.Non linn.	Euphorbiaceae	Bhuin amla	Blackcatnip	Treatment of jaundice, leucorrhoea, stomachache, dyspepsia	Whole plant	Ethanol	21.387
38	<i>Triumfetta rhomboidae</i> N.Jacq	Tillaceae	Ban okra	Burbush, Burweed	Fruits and leaves as demulcent and astringent	Leaf	Ethanol	65.748
						Bark	Ethanol	22.851
						Root	Ethanol	45.5132
39	<i>Celastrus paniculatus</i> willd.	Celastraceae	Shonkhu	Black oil tree	In the treatment of epilepsy, gout, rheumatism; seed used as anti emetic	Seed	Methanol	35.9439
							Ethanol	33.8060
							Pet ether	35.9439
							Water	35.9439
40	<i>Casuarina littorea</i> (L.)	Casurinaceae	Jhau, Belati jhau	She-oak.	Bark is astringent and has traditional use in diarrhea	Bark	Ethanol	14.467
41	<i>Glinus oppositifolius</i> (L.)	Molluginaceae	Jima, Gima	Sweet juice	Used to abdominal pain, jaundice, inflammation	Whole plant	Methanol	489.77
42	<i>Cardiospermum halicacabum</i> (L.)	Sapindaceae	Kopal Futki	Heart pea	Traditional medicine for rheumatism, nervous disease, demulcent,malaria	Whole plant	Methanol	38.2241
43	<i>Calamus tenuis</i> Roxb	Arecaceae	Bet, Jail bet, Pati bet	Rattan	Useful in diarrhea; used as vegetables for edema, intrinsic hemorrhage	Fruit	Methanol	29.7941
							Pet ether	32.6258
							Ethyl acetate	67.5115
44	<i>Trema orientalis</i> (L.)	Ulmaceae	Jibon gachh	Indian nettle tree	Leaf and bark work against cough, sore	Leaf	Methanol	110.25
45	<i>Musa sapientum</i> L.subsp.sylvestris.	Musaceae	Ramkola	Apple banana	Used in diarrhea, dysentery, ulcerative colitis, diabetes, hypertension, gout	Peel	Methanol	5907.53
						Pulp	Methanol	95669.52
						Seed	Methanol	54.92
46	<i>Hedyotis corymbosa</i> (L.)	Rubiaceae	Pitpapra	Diamond flower	Applied in fever, depression, flatulence	Whole plant	Methanol	48.4076
							Pet ether	44.0618
47	<i>Andrographis paniculata</i>	Acanthaceae	Chirota	Green chirota	Exhibit anti fungal, anti malarial, anti inflammatory	Whole Plant	Methanol	414.245
48	<i>Spinacea oleracea</i> Linn.	Amaranthaceae	Palong shak	Garden spinach	Green plant eaten for urinary calculi and act as mild laxative	Whole plant	Methanol	58.2666
							Water	149.607
49	<i>Amaranthus blitum</i> (L.)	Amaranthaceae	Lalshak	Joseph's coat	Plant used as astringent in	Whole plant	Methanol	68.8376

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					ulcerated mouth and throat; mouthwash for ulcer and sores		Water	1780.216
50	<i>Daucus carota</i> (L.)	Apiaceae	Gazor	Carrot	Possess good activity against tumor, piles	Fruit	Methanol	69.373
							Water	146.3943
51	<i>Brassica olearacea</i> Var.capitata	Cruciferae	Badha kopi	Cabbage	Cabbage leaves are used to treat acute inflammation	Plant without root	Water	190.636
							Ethanol	47.472
52	<i>Polyalthia suberosa</i>	Amnonaceae	Kukuriam	Corky debber tree	Act against microbial infection, inflammation in eye	Leaf	Hydromethanol	161.365
						Bark	Hydromethanol	65.265
						Fruit	Hydromethanol	102.126
53	<i>Trichosanthes dioica</i> Roxb	Cucurbitaceae	Potal , Palval	Pointed gourd	Used in inflammation, jaundice; act as antipyretic, diuretic, laxative	Aerial Part	Water, Ethyl acetate, Pet ether, Methanol	Very low
54	<i>Aloe indica</i> (L.)	Amaryllidaceae	Ghrita kumari	Indian aloe	Juice of leaf act in stomachic; plant is useful in the treatment of piles and fissure, menstrual suppression	Plant material without leaf	Water	189.753
							Methanol	99.163
55	<i>Madhuca longifolia</i>	Sapotaceae	Mahwa, Mahua	Butter tree	Seed cake is good fertilizer; oil applied in skin, useful in constipation, hemorrhoid	Fruit	Methanol	217.3437
						Seed	Methanol	346.1518
							Pet ether	172.125
56	<i>Vitex negundo</i> (L)	Verbenaceae	Nishinda, Samalu	Negundo chaste tree	Used in headache; juice of fresh leaves removes worms from ulcer	Leaf	Ethanol	81.080
57	<i>Momordica charantea</i>	Cucurbitaceae	Corolla	Bitter gourd	Bitter melon is used as a folk medicine in to treat gastrointestinal disease and diabetes	Fruit	Methanol	1685.6(hot extraction n) 4185.6(cold extraction )
58	<i>Borassus flabellifer</i> (L.)	Arecaceae	Tal gachh	Palmyra palm tree	Root has anthelmintic property	Root	Ethanol	15.755
59	<i>Stephania japonica</i> (Thumb) Miers.	Menispermaceae	Akanadi, Nimuka	Snake vine, Tape vine	Leaves and roots are bitter and astringent and used in fever, diarrhea, dyspepsia	Whole plant	Ethanol	422.321
60	<i>Lablab purpureus</i> subsp.bengalensis is.	fabaceae	Sadiron sim	Bean, Indian butter bean	Anthelmintic; used to treat infection	Bin pod	Methanol	2511.85
61	<i>Smilax zeylanica</i> Linn.	Liliaceae	Kumarica, Kumarilata	Black creeper, Wild sarsaparilla	Roots used in the treatment of veneral disease; decoction is applied for rheumatism	Whole plant	Pet ether	11274.75
62	<i>Lablab purpureus</i>	Fabaceae	Beguni sim	Lablab bin	Leaf juice and root are used to treat infected area	Bin pod	Methanol	1298.263
63	<i>Nyctanthes arbor-tristis</i>	Oleaceae	Shefali, Sheuli	Night flowering jasmine	Paste of leaves is used specifically in treatment of ring worm	Leaf ethanol	Ethanol	133.116
64	<i>Psidium guaiava</i> (L.)	Myrtaceae	Peyara, Goam	Guava	Leaves used as astringent for	Leaf	Ethanol	48.906

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					bowels, wounds			
65	<i>Rumex maritimus</i>	Polygonaceae	Bon palong	Golden dock	Plant is useful in the treatment of cough, and pertussis; paste of leaf is applied to swelling	Whole plant	Ethyl acetate	1369.493
							Pet ether	1309.318
							Methanol	416.552
66	<i>Cocculus hirsutus</i> (L.) Diels	Menispermaceae	Jalajmoni	Broom creeper, Ink berry	Juice of leaf mixed with water used as cooling and soothing medicine for gonorrhoea	Leaf	Ethyl acetate	287.960
							Pet ether	1701.19
							Methanol	257.419
67	<i>Eclipta prostrata</i> (L.)	Compositae	Kalokeshi, Keshraj	False daisy	Plant is useful in liver and gall bladder ailment and act as anthelmintic	Leaf	Methanol	27.00
68	<i>Derris trifolia</i> Lour.	Fabaceae	Gila lata, Pan lata	Derris	Bark is stimulant, antispasmodic, and counter irritant	Whole plant	Methanol	287.611
69	<i>Thea sinensis</i>	Theaceae	Cha	White tea	Treating infection of digestive tract; leaves are CNS stimulant	Leaf	Water	23.333
							Ethanol	20
70	<i>Phyllanthus acidus</i> (L.)	Euphorbiaceae	Orbori, Horbori	Star goose berry	Fruit is tonic to liver and used in bronchitis piles; it is useful in vomiting	Fruit	Pet ether	1382.204
71	<i>Capsicum annum</i>	Solanaceae	Marich, Jhal morich	Chilies, Red pepper	Capsicum is used to treat arthritis and chilbans to colic	Fruit part	Ethanol	1849.076
72	<i>Boerhavia diffusa</i>	Nyctaginaceae	Purnalata	Pig-weed	Root are useful in jaundice, anemia, ascites, ophthalmia	Root	Methanol	902.901
73	<i>Acalypha indica</i> Linn.	Euphorbiaceae	Muktajhuri	Indian nettle	Plant is effective in bronchitis; fresh leaf juice is useful in arthritis and scabies	Whole plant	Ethanol	484.1279
74	<i>Cassia fistula</i> Linn.	Caesalpiniaceae	Badar lathi, Sonalu	Golden shower	Pulp of fruit is laxative and used in heart disease	Bark	Ethanol	233.1
75	<i>Saraca indica</i> Linn.	Caesalpiniaceae	Ashok	Asoka tree	Bark is used in menorrhagia, cures biliousness, dyspepsia	Bark	Ethanol	484.1279
76	<i>Caesalpinia ebonduca</i> (Linn.) Roxb	Caesalpiniaceae	Nata karanja	Molucca bean	Decoction of seeds useful against asthma, effective in blood dysentery	Seed	Ethanol	1561.323
77	<i>Alocasia decipiens</i>	Araceae	Bish kachu		This plant claimed to have analgesic and anti-inflammatory property	Trunk	Ethyl acetate	274.478
							Pet ether	696.276
							Methanol	499.518
						Root	Ethyl acetate	640.395
							Pet ether	665.888
Methanol	171.862							
78	<i>Bacopa monniera</i> (L.) pannel	Scrophulariaceae	Brhami sak	Herb of grace	Plant is used for neuralgia, epilepsy, and mental illness	Whole plant	Ethanol	401.0093
79	<i>Albizia lebbek</i> (Linn.) Benth.	Mimosaceae	Shirish, Koro	Flea tree, Parrot tree	Bark cures toothache and disease of gum	Bark	Ethanol	401.0093
80	<i>Coriandrum sativum</i> (L.)	umbelliferae	Dhonia, Dhoney	Coriander	Infusion of the herb is gentle remedy for flatulence, bloating, and cramp	Leaf	Water	591.812
							Pet. ether	758.046
							Rectified spirit	450.543



81	<i>Enhydra fluctuans</i> Lour.	Compositae	Hincha shak	Water cress	Plant is nutritious and used in ascites, dropsy	Leaf	Ethanol	15.653
82	<i>Cassia sophera</i> Linn.	Caesalpinaceae	Chhota, Jhigni	Senna sohpera	Leaves are used in cough, asthma, bronchitis	Leaf	Ethanol	1504.583
83	<i>Minusops elengi</i> (L.)	Sapotaceae	Bakul	Indian medaller	Bark and fruit are used in the treatment of diarrhea	Leaf	Methanol	20.380
84	<i>Opuntia dillenii</i> (Ker. Gawl) Haw.	Cactaceae	Phonimon osa	Pricly pear	Leaves are poultice to reduce inflammation, and ophthalmia	Leaf	Methanol (80%)	22.426

TABLE 2: IC<sub>50</sub> value of two standards used

Standard	IC50 value(µg/mL)
Ascorbic acid	15.5
BHT (Butylated Hydroxy Toluene)	46.54

#### IV. Discussion

In traditional society health and nutrition are interconnected and many medicinal plants are consumed both for food and medicinal purposes. This type of consumption played a great role in diet but there are very few ethnopharmacological phytopharmacological studies that dealt with potential health benefits of such diets.

In this study total 84 medicinal plants were evaluated. Free radicals exist in our body with one or more unpaired electrons. Propagation of free radicals can cause thousands of reactions in our body which could result in cell membrane disintegration, protein, and lipid damage, DNA mutation which can lead to propagation of many diseases like cancer, ulcer, diabetes, cardiovascular disorder etc.[8]. Antioxidants play beneficial role by scavenging free radicals.

For medicinal plants, to find out antioxidant potency, DPPH scavenging assay is the procedure[9, 10]. It is a direct test for free radical scavenging. DPPH (purple colored) is a stable free radical which is reduced to  $\alpha$ ,  $\alpha$ -diphenyl- $\beta$ -picryl hydrazine (yellow colored) by converting unpaired electron to paired one. Antioxidants act by converting unpaired electron to paired one. DPPH containing odd electron is responsible for the absorbance at 517 nm and also for a deep purple color and when it gets neutralized by accepting electron from an antioxidant compound it becomes decolorized which can be measured from the change in absorbance.

From this study we could conclude that, around 84 medicinal plants *Syzygim cumini*, *Commelina benghalensis*, *Lannea coromandelica*, *Phyllanthus fraternus*, *Triumfetta rhomboidae*, *Casuarina littorea*, *Calamus tenuis*, *Borassus flabellifer*, *Artocarpus lacucha*, *Eclipta prostrata*, *Enhydra fluctuans*, *Minusops eleng*, *Opuntia dilleni*, and *Thea sinensis* showed excellent DPPH scavenging property (90% or more). *Syzygim cumini*, *Casuarina littorea*, *Borassus flabellifer*, *Enhydra fluctuans*, and *Minusops elengi* exhibited highest radical scavenging potentiality with an IC<sub>50</sub> value of 12.816µg/mL, 14.467µg/mL, 15.755µg/mL, 15.653µg/mL, and 20.380µg/mL respectively. These results are presented in the diagram below;

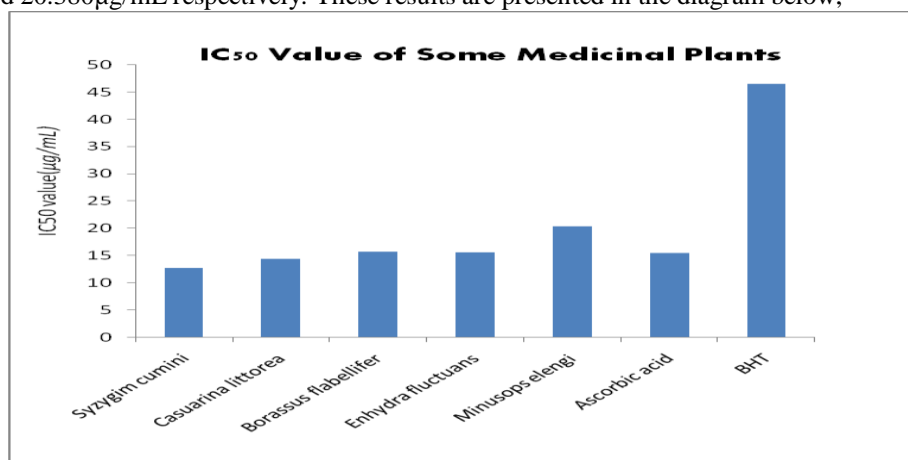


Fig.1: IC<sub>50</sub> value of some medicinal plants showing highest scavenging property

All these value are very close to the IC<sub>50</sub> value of 15.5 presented by ascorbic acid and better than IC<sub>50</sub> value of 46.537 presented by BHT (Butylated Hydroxy Toluene). *Syzygim cumini* is the most powerful and

excellent scavenger of DPPH free radical among all tested plants. 30 plants presented good scavenging property. Among them *Punica granatum* (35.558µg/mL), *Commelina benghalensis* (aerial part-pet ether fraction=43.7936 µg/mL), *Cocos nucifera* (41.2227µg/mL), *Artocarpus lacucha* (pericarp-methanol fraction=33.501µg/mL), *Cyperus rotundus* (35.9439µg/mL), *Dillenia indica* (32.622µg/mL), *Persicaria hydropiper* (34.8623µg/mL), *Triumfetta rhomboidae* (root-ethanol=45.5132µg/mL), *Celastrus paniculatus* (seed-methanol=35.9439µg/mL, seed- Ethanol=33.8060µg/mL, seed- Pet ether=35.9439µg/mL, seed- Water=35.9439µg/mL), *Cardiospermum halicacabum* (38.2241µg/mL), *Calamus tenuis* (fruit-pet ether=32.6258µg/mL), and *Hedyotis corymbosa* (whole part-pet ether=44.0618µg/mL) exhibited good scavenging property than standard reference BHT which presented IC<sub>50</sub> value of 46.537µg/mL. 14 plants showed moderate scavenging property between 80 to 150µg/mL, the rest showed low scavenging property. 3 out of 84 medicinal plants presented lowest and very poor scavenging potency. *Luffa cylindrical* and *Momordica cochinchinensis* have IC<sub>50</sub> value of 38730.0825µg/mL and 38731.4µg/mL respectively. Pulp (methanol) fraction of *Musa sapientum* showed the lowest potency among the 84 medicinal plants with an IC<sub>50</sub> value of 95669.52µg/mL.

It has been stated that radical scavenging property is due to phenolic compounds like flavonoid, polyphenol, and tannin[11]. Free radical neutralizing, quenching singlet or triplet oxygen is due to electron donating activity of phenolic compounds[12]. Oxidative damage is basic reason which leads to various disorders like inflammation, viral inflammation, autoimmune diseases and ulcer[13]. Reactive oxygen species are responsible for triggering carcinogenesis process starting with DNA damage and triggers irregular genetic events which lead to uncontrolled cell division. Finally carcinoma develops[13]. Hence free radical scavengers have potentiality to prevent, delay or stop these disorders. Evaluating the laboratory and epidemiological study of antioxidant potentiality of various plants in last 24 years, scientists experienced that whole edible plants or their active components like flavonoid, tannin, volatile oil, glycoside, alkaloids etc have substantial and protective effect on human carcinogenesis[13, 14, 15].

## V. Conclusion

From the above result and discussion tested plants have moderate to excellent free radical scavenging activity and selected medicinal plants which have very good antioxidant property can be used as a source of newer antioxidant preparation in future. So, further research project should be run to find out the active components present in these plants which are responsible for playing life saving role in human body.

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