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ANTIOXIDANT ACTIVITY OF LEAVES SOLVENT EXTRACT OF *MIMUSOPS ELENGI* LINN.

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Keywords:

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ABSTRACT: The present study was to estimate the total phenolic content, flavonoids content and evaluate the in vitro antioxidant activity of alcoholic and aqueous extract of the leaves of plant *Mimusops elengi Linn.* Total phenolic content was determined calorimetrically using Folin ciocalteu reagent, and Total flavonoid content was determined by aluminum chloride method. The total phenolic content of methanol, ethyl acetate soluble fraction, and aqueous extract was found 23.22, 22.44, and 15.88%w/w respectively. In the case of total flavonoid content was found 33, 31, and 24%w/w respectively. Antioxidant activity was measured based on the DPPH radical scavenging assay, Nitric oxide scavenging assay, and reducing power assay. A methanol extract of the leaves of the plant showed potent free radical scavenging activity with an IC_{50} value of 65.00 µg/ml. However, standard ascorbic acid activity was significantly higher than that of all extracts. The IC_{50} value of the standard (Ascorbic acid) was 7.779µg/ml. In the case of nitric oxide scavenging assay, the methanolic & aqueous extract of the leaves of the plant *Mimusops elengi* showed a potential antioxidant effect. For reducing power assay, all extracts showed an increase in absorbance with an increase in concentration. Because the highest reducing power was observed with the methanol extract of the leaves. However, it may be due to the presence of the highest total antioxidant content of this extract that is mg of ascorbic acid equivalent per gram of plant extract, which is a potent reducing agent.

INTRODUCTION: Antioxidant means "against oxidation" and the work to protect lipid from per oxidation by radicals. The human body is an elaborate antioxidant defense system. The main characteristic of an antioxidant is its ability to trap free radicals.

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Highly reactive free radicals and oxygen species are present in biological systems from a wide variety of sources. These free radicals may oxidize nucleic acid, proteins, lipids or DNA and can initiate degenerative disease.

An antioxidant compound like phenolic acids, polyphenols, and flavonoids scavenge free radicals such as peroxide, hydroperoxide, or lipid peroxyl, thus inhibiting the oxidative mechanism that leads to degenerative diseases. Several clinical studies suggest that the antioxidant in fruits, vegetables, tea, and red wine are the main factors for the observed efficacy of these foods in reducing the

incidence of chronic diseases, including heart disease and some cancers [1].

Oxidative stress is an important risk factor in the pathogenesis of numerous chronic diseases. Free radicals and other reactive oxygen species are recognized as agents involved in the pathogenesis of sicknesses such as asthma, inflammatory arthropathies, diabetes, Parkinson's and Alzheimer's disease, cancers as well as atherosclerosis. Reactive oxygen species are also said to be responsible for human aging [2, 3]. An antioxidant can be broadly defined as any substance that delays or inhibits oxidative damage to a target molecule [4]. The main characteristic of an antioxidant is its ability to trap free radicals. Antioxidant compounds like phenolic acids, polyphenols, and flavonoids scavenge free radicals such as peroxide, hydroperoxide, or lipid peroxyl and thus inhibit the oxidative mechanisms that lead to degenerative diseases [5]. Herbal plants considered a good antioxidant since ancient times.

The genus *Mimusops elengi* belongs to the family Sapotaceae and comprises thirty species which are distributed in the tropical parts of hemispheres of these *Mimusops elengi*, commonly known as mulsari or bakul cultivated in gardens due to its scented lowers is indigenous to the subcontinent. The plant has been studied through many years phytochemically.

The seed Kernels from *Mimusops elengi* have been investigated previously by Boorsma in 1902 who found 21% fatty oil and 2% saponin [6, 7, 8, 9, 10]. The bark mainly contains saponin and tannins [11, 12, 13, 14, 15]. The leaves contain steroids. The pulp of the fruit contains mainly sugars and saponin. While the lowers, contain volatile oil. The parts of its mostly used in medicines [16, 17, 18, 19, 20, 21, 22, 23]. Bark is tonic and febrifuge. Unripe fruit is a useful masticator and therefore recommended to be chewed for fixing loose teeth. Pulp of ripe fruit is eaten as a diet in diarrhea and is used in snake bite. Fruits and lowers are used to prepare a lotion for wounds and ulcers. The bark and unripe fruit is used by dyers to ix colors. Bark increases fertility in women [24-28].

MATERIALS AND METHODS:

Plant Material: The leaves of *Mimusops elengi* was collected from the local area of Dhule district, Maharashtra, India, in July 2012, and authenticated by Dr. J. Jayanthi scientist 'C' H.O.D Deputy Director Botanical Survey of India, Koregaon Road Pune, by comparing morphological features and a sample voucher specimen of the plant was deposited for future reference (Voucher specimen number ANSMIE2). After authentication, the leaves are cleaned and dried at room temperature in the shade and away from direct sunlight. The dried aerial part was coarsely powdered in the grinder. The powdered material was sieved through 60-120 mesh to remove fine, and the powder was subjected for further study.

Preparation of Crude Plant Extract: The leaves of *Mimusops elengi* were collected and dried in the shade and then pulverized in a grinder. The powder material was passed through 60-120 meshes to remove fine powders, and the coarse powder was used for extraction. The extraction was carried out in a soxhlet extractor by using different solvents in increasing order of polarity, Petroleum ether (60-80), Chloroform, & then methanol.

Aqueous extraction was carried out by maceration. About 500 gm of fresh powder was subjected to cold maceration with chloroform: water (1.0 %) in a 2 liters round bottom flask for about 7 days at room temperature. The flask was securely plugged with absorbent cotton & was shaken periodically till complete maceration. After maceration, the marc was then pressed in a muslin cloth & the filtrate was concentrated to residue at low temp.

Quantitative Estimation of Total Phenolic and Flavonoid Content:

Total Phenolic Content: [29-30]

Chemicals: Folin ciocalteu reagent, gallic acid, sodium carbonate, distilled water,

Preparation of Reagents:

Folin Reagents: Dilute 15ml folin reagent in 15ml distilled water.

Sodium Carbonate: (2%w/v) Dissolve 2gm of Na_2CO_3 in 100ml distilled water.

Gallic Acid Solution: (mg/ml) Dissolve 50mg of gallic acid in 50ml distilled water (1000 µg/ml) from this solution; different concentration was prepared **Table 1**.

Preparation of Extract: (mg/ml) Dissolved 5mg extract in 5ml of distilled water (1000 µg/ml) from this solution final concentration were prepare.

Dilution for Gallic Acid: 50gm gallic acid + 50ml distilled water (1000 µg/ml).

TABLE 1: DILUTION OF STANDARD GALLIC ACID FOR TOTAL PHENOLIC CONTENT ESTIMATION

Gallic acid solution	Distilled water	Concentration µg/ml
0.5ml	50ml	10 µg/ml
1.0ml	50ml	20 µg/ml
1.5ml	50ml	30 µg/ml
2.0ml	50ml	40 µg/ml
2.5ml	50ml	50 µg/ml
3.0ml	50ml	60 µg/ml
3.5ml	50ml	70 µg/ml
4.0ml	50ml	80 µg/ml
4.5ml	50ml	90 µg/ml
5.0ml	50ml	100 µg/ml

Procedure: Total soluble phenolics in the extracts were determined with Folin ciocalteau reagent according to the method using gallic acid as a standard phenolic compound; 1.0 ml of extract solution containing 1.0 g extract in a volumetric flask was diluted with 46 ml of distilled water. 1.0 ml of Folin ciocalteau reagent was added and mixed thoroughly. Three minutes later, 3.0 ml of 2% sodium carbonate was added, and the mixture was allowed to stand for 3 hr with intermittent shaking. The absorbance of the blue color that developed was read at 760 nm **Table 5** and **6.** The concentration of total phenols was expressed as mg/g of dry extract. The concentration of total phenolic compounds in the extract was determined as µg of gallic acid equivalent using an equation obtained from the standard gallic acid **Fig. 1.**

Total Flavonoid Content: [31]

Chemicals: Quercetin, methanol, aluminum chloride, $NaNO_2$, NaOH, Distilled water.

Preparation of Solution:

Quercetin Solution: Add 30mg of Quercetin in 30ml of methanol. From this solution, different concentrations are prepared in **Table 2**.

10% Aq. $AlCl_3$: Dilute 10gm Aluminum chloride with 100ml of distilled water.

Extract Preparation: Prepared by dissolving 20mg in 20ml of methanol. From this solution, different concentration are prepared.

Dilution of Quercetin: First dilution of 30mg of quercetin in 30ml methanol (1000 µg/ml)

TABLE 2: DILUTION OF STANDARD QUERCETIN FOR TOTAL FLAVONOID CONTENT ESTIMATION

Quercetin solution	Distilled water	Concentration µg/ml
0.5ml	50ml	10 µg/ml
1.0ml	50ml	20 µg/ml
1.5ml	50ml	30 µg/ml
2.0ml	50ml	40 µg/ml
2.5ml	50ml	50 µg/ml
3.0ml	50ml	60 µg/ml
3.5ml	50ml	70 µg/ml
4.0ml	50ml	80 µg/ml
4.5ml	50ml	90 µg/ml
5.0ml	50ml	100 µg/ml

Procedure: A known volume of extract was placed in a 10 ml volumetric flask. Distilled water was added to make 5 ml, and 0.3 ml $NaNO_2$ (1:20) was added. 3 ml $AlCl_3$ (1:10) was added 5 min later. After 6 min, 2 ml 1 mol litre^{-1} NaOH was added, and the total was made up to 10 ml with distilled water. The solution was mixed well again and the absorbance was measured against a blank at 510 nm with a UV-VISIBLE spectrophotometer **Table 7** and **8**. Quercetin was used as the standard for a calibration curve. The flavonoid content was calculated using the following linear equation based on the calibration curve **Fig. 2**.

Test for Antioxidant Activity:

DPPH Scavenging Activity: [32, 35]

Chemicals: DPPH [1, 1-Diphenyl, 2-picryl-hydrazyl], Methanol, Distilled water.

DPPH Solution: (0.004%w/v) Dissolved 0.004gm of DPPH in 100ml of 95% methanol.

Standard Ascorbic Acid & Extract Solution: All extract *of Mimusops elengi* leaves was mixed with their particular solvent (Ascorbic acid mixed with distilled water) to prepare the stock solution (1000µg/ml).

TABLE 3: DILUTION OF STANDARD ASCORBIC ACID

Ascorbic acid solution	Distilled water	Solution µg/ml
0.2ml	10ml	2 µg/ml
0.4ml	10ml	4 µg/ml
0.6ml	10ml	6 µg/ml
0.8ml	10ml	8 µg/ml
0.10ml	10ml	10 µg/ml
0.12ml	10ml	12 µg/ml
0.14ml	10ml	14 µg/ml

From this solution pipette out 1ml solution & mixed with 10ml of particular solution (100 µg/ml). From this solution, different concentrations are prepared in **Tables 3** and **4**.

TABLE 4: DILUTION OF PET. ETHER, CHLOROFORM, METHANOLIC AND AQUEOUS EXTRACT

Extract solution (Pet ether, Chloroform, methanol, Aq. extract)	Particular solvent	Solution µg/ml
2.5ml	10ml	25 µg/ml
5.0ml	10ml	50 µg/ml
7.5ml	10ml	75 µg/ml
10.0ml	10ml	100 µg/ml
12.5.ml	10ml	125 µg/ml
15.0ml	10ml	150 µg/ml
17.5ml	10ml	175 µg/ml
20.0ml	10ml	200 µg/ml

Procedure: The free radical scavenging capacity of the extracts was determined using DPPH (Braca *et al.*, 2001). DPPH solution (0.004% w/v) was prepared in 95% methanol. Different extract of *Mimusops elengi* was mixed with their corresponding solvent to prepare the stock solution (1mg/ml). Freshly prepared DPPH solution (0.004% w/v) was taken in test tubes and *Mimusops elengi* extracts was added followed by serial dilutions (25µg to 200 µg) to every test tube so that the final volume was 3 ml and after 10 min, the absorbance was read at 515 nm using a spectrophotometer (Shimadzu UV-visible spectro-photometer). Ascorbic acid was used as a reference standard and dissolve in distilled water to make the stock solution with the same concentration (1mg/ml). A control sample was prepared to contain the same volume without any extract and reference ascorbic acid. The particular solvent was served as blank. % scavenging of the DPPH free radical was measured by using the following equation **Table 9** and **10**.

$$\% \text{ Inhibition} = A_{\text{blank}} - A_{\text{sample}} \times 100 / A_{\text{blank}}$$

The inhibition curve was plotted for duplicate experiments and represented as % of mean inhibition ± standard deviation. IC_{50} values were obtained by probit analysis. (Viturro *et al*., 1999) **Fig. 3** and **4.**

Nitric Oxide Scavenging Activity: [11] Sodium nitroprusside (5mM) in standard phosphate buffer solution was incubated with different concentration of extracts dissolved in standard phosphate buffer (pH 7.4) and the tubes were incubated at 25 ºC for 5 h. After 5 h, 0.5ml incubated solution was removed and diluted with 0.5ml of Griese reagent. The absorbance of chromospheres formed was read at 546 nm **Table 11, 12** and **Fig. 5, 6.**

% Inhibition = O.D. of standard - O. D. of test × 100 / O.D. of standard

Reducing Power Assay: [11] The reductive potential of plant extracts were determined according to the method of The reaction mixture containing varying concentrations of the plant extract (5-200 µg/ml) and standard Ascorbic acid (0.1-1.0 µg/ml) in 1 ml of distilled water, phosphate buffer (2.5 ml, 0.2 M, pH 6.6) and potassium ferricyanide [K3Fe (CN) 6] (2.5 ml, 1% w/v) was incubated at 50 °C for 20 min. A portion (2.5 ml) of trichloroacetic acid (10% w/v) was added to the mixture, which was then centrifuged for 10 min at 1000g. The upper layer of solution (2.5 ml) was mixed with distilled water (2.5 ml) and $FeCl_3$ (0.5 ml, 0.1% w/v), and the absorbance was measured at 700 nm in a spectrophotometer. Higher absorbance of the reaction mixture indicated greater reductive potential **Table 13, 14** and **Fig. 7, 8**.

RESULTS:

Total Phenolic Content: Equation Y=0.002X+0.007 was obtained from **Fig. 1**. From this equation concentration of the extract was determined. The total phenolic content of *Mimusops elengi*, of methanol, ethyl acetate, and aqueous extract was found to be 23.22, 22.44 & 15.88 w/w, respectively.

TABLE 5: ABSORBANCE OF STD GALLIC ACID AT DIFFERENT CONCENTRATION

S. no.	Concentration	Absorbance
1	10	0.035
2	20	0.073
3	30	0.098
4	40	0.123
5	50	0.158
6	60	0.188
7	70	0.213
8	80	0.244
9	90	0.268
10	100	0.298

TABLE 6: TOTAL PHENOLIC CONTENT OF ME EXT, ET. EXT AND AQ. EXT

S. no.	Sample	Abs.	Concentration % w/w
1	Methanolic extract	0.209	23.22
2	Ethyl acetate extract	0.202	22.44
3	Aqueous extract	0.143	15.88

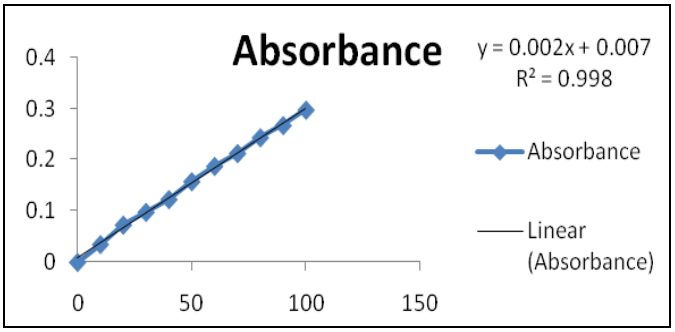

FIG. 1: CONC. RESPONSE CURVE FOR GALLIC ACID AT DIFFERENT CONC.

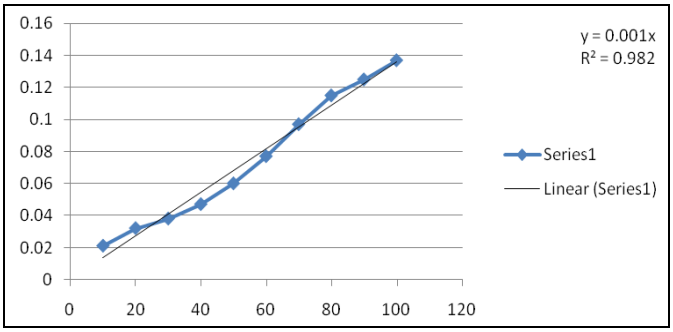

FIG. 2: CONC. RESPONSE CURVE FOR QUERCETIN AT DIFFERENT CONC.

Total Flavonoid Content: Equation Y=0.001X was obtained from **Fig. 2**. From this equation concentration of the extract was determined. The Total Flanoids content of *Mimusops elengi*, of Methanol, Ethyl acetate, and Aqueous extract was found to be 33, 31 & 24 w/w, respectively.

TABLE 7: ABSORBANCE OF STD QUERCETIN AT DIFFERENT CONC.

S. no.	Concentration	Absorbance
1	10	0.021
2	20	0.032
3	30	0.038
4	40	0.047
5	50	0.060
6	60	0.077
7	70	0.097
8	80	0.115
9	90	0.125
10	100	0.137

TABLE 8: RESULT OF TOTAL FLAVONOID CONTENT

S. no.	Sample	Abs.	Concentration
1	Methanolic extract	0.033	33
2	Ethyl acetate extract	0.031	31
3	Aqueous extract	0.024	24

DPPH Method: IC_{50} value of standard ascorbic acid was found to be 7.779 µg/ml, respectively. (Calculated by regression equation).

TABLE 9: DPPH RADICAL SCAVENGING ACTIVITY OF STANDARD ASCORBIC ACID

S. no.	Conc. (µg/ml)	Absorbance	% Inhibition
1	0	0.982	-
2	2	0.822	16.29
3	4	0.750	23.62
4	6	0.570	41.95
5	8	0.458	53.36
6	10	0.311	68.32
7	12	0.241	75.45
8	14	0.198	79.85

TABLE 10: DPPH RADICAL SCAVENGING ACTIVITY OF PET. ETHER, CHLOROFORM, METHANOLIC AND AQUEOUS EXTRACTS OF LEAVES OF *MIMUSOPS ELENGI*

S. no.	Conc. (µg/ml)	(% Inhibition)			
		Pet. Ether Extract	Chloroform Extract	Methanolic Extract	Aqueous Extract
1	25	3.76	12.42	21.58	17.51
2	50	7.84	18.53	37.88	26.37
3	75	12.42	27.08	57.43	42.76
4	100	20.57	31.77	80.65	63.34
5	125	29.73	39.71	86.76	69.04
6	150	40.52	50.50	90.83	75.76
7	175	49.28	62.52	93.89	81.87
8	200	60.48	71.69	98.98	91.85

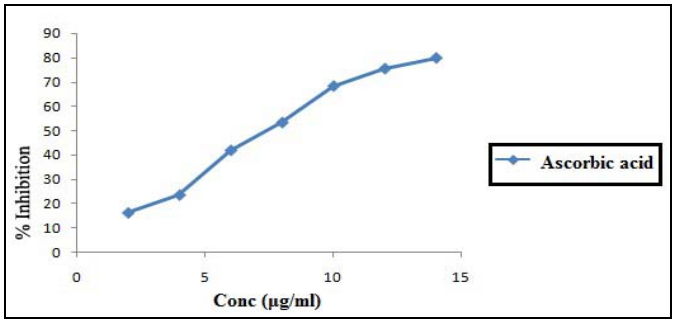

FIG. 3: DPPH SCAVENGING ACTIVITY OF STANDARD ASCORBIC ACID

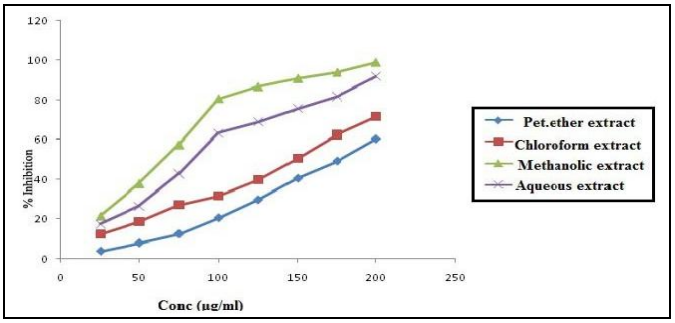

FIG. 4: DPPH SCAVENGING ACTIVITY OF PET. ETHER, CHLOROFORM, METHANOLIC AND AQUEOUS EXTRACTS OF LEAVES OF *MIMUSOPS ELENGI*

IC_{50} value of pet. ether, chloroform, methanolic & aqueous extract of leaves of *Mimusops elengi* was found to be 178.61, 144.31, 65, 92 µg/ml, respectively. (Calculated by regression equation).

Nitric Oxide Scavenging Activity: Nitric oxide scavenging activity of the different extract was carried out & methanolic extract shows higher activity than aqs, pet. Ether & chloroform extract.

TABLE 11: RESULTS OF NITRIC OXIDE SCAVENGING ACTIVITY OF STANDARD ASCORBIC ACID

S. no.	Conc. (µg/ml)	(% Inhibition)
1	2	12.61
2	4	26.56
3	6	39.69
4	8	53.23
5	10	68.20
6	12	73.74
7	14	80.61
8	16	90.15

TABLE 12: NITRIC OXIDE SCAVENGING ACTIVITY OF PET. ETHER, CHLOROFORM, METHANOLIC AND AQUEOUS EXTRACTS OF LEAVES OF *MIMUSOPS ELENGI*

S. no.	Conc. (µg/ml)	(% Inhibition)			
		Pet. Ether Extract	Chloroform Extract	Methanolic Extract	Aqueous Extract
1	25	5.89	11.66	27.30	16.96
2	50	11.17	16.28	37.45	27.63
3	75	17.84	29.43	44.20	32.96
4	100	23.77	36.23	54.00	41.42
5	125	28.14	43.50	59.07	47.07
6	150	33.22	49.20	66.85	54.97
7	175	39.83	59.17	77.68	62.54
8	200	53.04	65.20	85.31	70.97

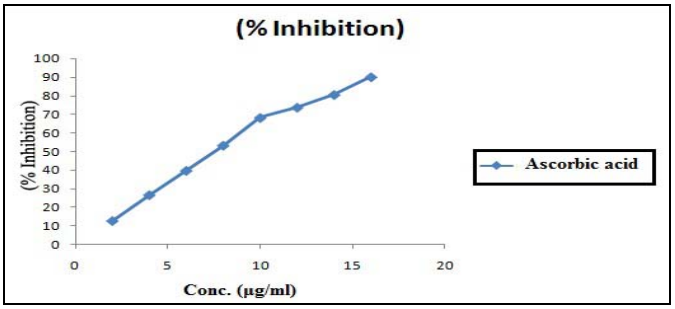

FIG. 5: NITRIC OXIDE SCAVENGING ACTIVITY FOR ASCORBIC ACID

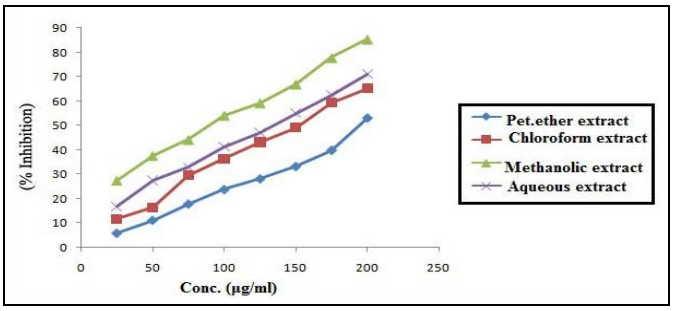

FIG. 6: NITRIC OXIDE SCAVENGING ACTIVITY FOR PET. ETHER, CHLOROFORM, METHANOLIC & AQUEOUS EXTRACT OF *MIMUSOPS ELENGI*

TABLE 13: OBSERVATION OF REDUCING POWER DETERMINATION OF STANDARD ASCORBIC ACID

S. no.	Concentration	Absorbance
1	2	0.028
2	4	0.045
3	6	0.069
4	8	0.095
5	10	0.128
6	12	0.156
7	14	0.183
8	16	0.207

Reducing Power Determination: Methanolic extract shows higher antioxidant activity by reducing the power determination method when compared with another extract.

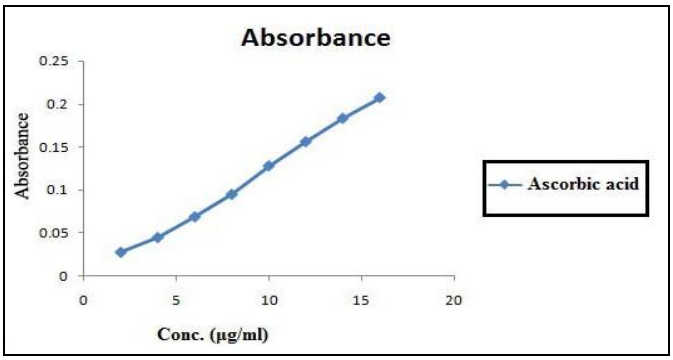

FIG. 7: CONCENTRATION RESPONSE CURVE OF REDUCING POWER DETERMINATION FOR ASCORBIC ACID

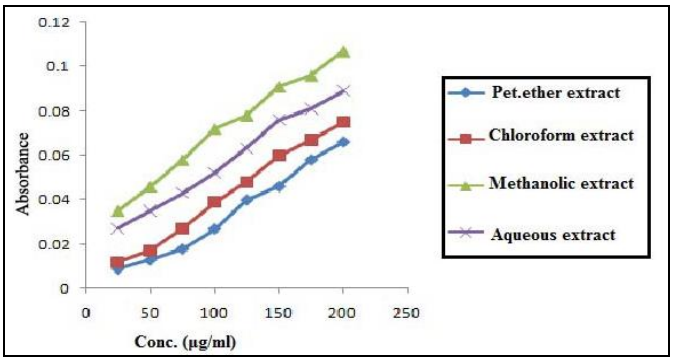

FIG. 8: CONCENTRATION RESPONSE CURVE OF REDUCING POWER DETERMINATION FOR PET. ETHER, CHLOROFORM, METHANOLIC & AQUEOUS EXTRACT OF *MIMUSOPS ELENGI*

TABLE 14: REDUCING POWER DETERMINATION OF PET. ETHER, CHLOROFORM METHANOLIC & AQUEOUS EXTRACT OF LEAVES OF *MIMUSOPS ELENGI*

S. no.	Conc. (µg/ml)	Absorbance			
		Pet. ether extract	Chloroform extract	Methanolic extract	Aqueous extract
1	25	0.009	0.012	0.035	0.027
2	50	0.013	0.017	0.046	0.035
3	75	0.018	0.027	0.058	0.043
4	100	0.027	0.039	0.072	0.052
5	125	0.040	0.048	0.078	0.063
6	150	0.046	0.060	0.091	0.076
7	175	0.058	0.067	0.096	0.081
8	200	0.066	0.075	0.107	0.089

DISCUSSION: Most of the free radical production within the body involves oxygen, and thus the free radicals are often referred to as reactive or reduced oxygen species. The presence of free radicals in the body may cause cell and tissue damage. This sort of damage is known as oxidative damage. Several mechanisms for the production of free radicals within the body have been proposed. The mitochondria and ischemia - injury have been areas of focus. Free radicals cause cellular damage by reacting with phospholipids bilayer of the cellular membrane. This reaction results in the production of measurable end products, primarily malondialdehyde. The most effective way to eliminate free radicals is with the help of antioxidant nutrients such as ascorbic acid (Vitamin c), alpha-tocopherol (Vitamin E), and beta carotene (Vitamin E).

In-plant material generally, phenolic compounds and flavonoids are present. Any of these phytoconstituents may be responsible for antioxidant activity of the crude extract. Antioxidant compounds like phenolic acids, polyphenol, and flavonoids scavenge free radicals such as peroxide, hydroperoxide, or lipid peroxyl and thus inhibit the oxidative mechanism that leads to degenerative diseases. Phenolic compounds and flavonoids have also been reported to be associated with antioxidant effects in biological systems, acting as scavengers of singlet oxygen and free radicals. The antioxidant property of phenolic compounds is mainly due to their redox properties, which can play an important role in absorbing and neutralizing free radicals, quenching singlet and triplet oxygen, or decomposing reactive oxygen Nitric oxide or reactive nitrogen species, formed during their reaction with oxygen or with super-oxides, such as NO_2, N_2O_4, N_3O_4, NO_3-, NO_2- are very reactive.

These compounds are responsible for altering the structural and functional behavior of many cellular components. Incubation of solutions of sodium nitroprusside in PBS (phosphate-buffered saline at 25 ºC for 2 h resulted in linear time-dependent nitrite production, which is reduced by the tested methanolic extract.

Earlier authors (Tanaka *et al.,* 1988) have observed a direct correlation between antioxidant activity and reducing the power of certain plant extracts. The reducing properties are generally associated with the presence of Reductones (Duh *et al.,* 1999), which have been shown to exert antioxidant action by breaking the free radical chain by donating a hydrogen atom (Gordon, 1990). Reductones are also reported to react with certain precursors of peroxide, thus preventing peroxide formation.

The DPPH scavenging ability of leaf extract of *M. elengi* in different solvents was done. The methanolic extract showed better activity than the other extract. However, standard ascorbic acid activity was significantly higher than that of all extracts; the value of ascorbic acid was 7.779 µg/ml. The IC_{50} value of methanolic extract was 65.0 µg/ml when compared to their corresponding aqueous petroleum ether and chloroform extract with Ic_{50} values of 92.0, 178.61, and 144.31 µg/ml, respectively. The percentage scavenging activity increased with increasing concentration of the extract. Lower the IC_{50} value better is the scavenging ability of the sample. The nitric oxide scavenging activity of methanol extract showed better activity than another extract; however, STD ascorbic acid activity was significantly higher than that of all extract. The reducing power of extract of *Mimusops elengi* was found remarkable, and the reducing power of the extract was observed to rise as the concentration of the extract gradually

increased. The above findings do not correlate the amount of phenolics with the reducing power of the extract. Because the highest reducing power was observed with the methanol extract of the leaves. However, it may be due to the presence of the highest total antioxidant content of this extract that is mg of ascorbic acid equivalent per gram of plant extract, which is a potent reducing agent.

CONCLUSION: The reducing power of extract of Mimusops elengi was found remarkable, and the reducing power of the extract was observed to rise as the concentration of the extract gradually increased. The above findings do not correlate the amount of phenolics with the reducing power of the extract. Because the highest reducing power was observed with the methanol extract of the leaves. However, it may be due to the presence of the highest total antioxidant content of this extract that is mg of ascorbic acid equivalent per gram of plant extract, which is a potent reducing agent.

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