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STATUS OF INDIAN MEDICINAL PLANTS IN TERMS OF ANTIOXIDANT ACTIVITY (*IN VITRO*)

Jagriti Rana*, Jyoti Rana, Ved Prakash and Anand Sagar

Department of Biosciences, Himachal Pradesh University, Shimla-171005 (H.P), India

*E-mail: jagritiranag@gmail.com

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ABSTRACT

In this paper, literature regarding antioxidant activity (*in vitro*) of Indian medicinal plants was reviewed. Paper also gives an account of family, places of collection, part used, solvent, standards and methods used to define antioxidant potential of most of the Indian medicinal plants, which have been analyzed for free radical scavenging property.

Keywords:Indian medicinal Plants, Antioxidant activity

INTRODUCTION

Medicinal plants are those that are commonly used in treatment and preventing specific ailment and disease, and that are generally consider playing a beneficial role in health care (Srivastava *et al.*, 1996). With 2.4% of world's area, India covers 8% of global biodiversity and one fifth of all the plants found here are utilized for medicinal purposes (Sharma and Thokchom, 2014; Schippmann *et al.,* 1990). Due to the presence of numerous natural compounds like alkaloids, saponins, resins, oils etc. medicinal plants are now considered as chemical factory (Singh, 2005). Reactive oxygen species and free radicals produced endogenously as well as exogenously (Rajurkar and Hande, 2011) are simultaneously degraded by antioxidant defense mechanisms (Auddy *et al.,* 2003) but due to their overproduction or inadequate antioxidant defense mechanism, oxidative stress and oxidative injuries are induced which leads to damaging of various biomolecules and cause several chronic human diseases (Farber, 1994; Hogg, 1998). Researches have been shown that natural antioxidants obtained from the plants are found to have ability to suppress these free radicals and reactive oxygen species. In this paper review of literature regarding antioxidant properties of Indian medicinal plants was discussed chronologicaly from 1999.

Review of literature

Shylesh and Padikkala (1999) examined antioxidant activity of *Emilia sonchifolia* DC. by using Hydroxyl radical scavenging activity and Superoxide radical scavenging activity, and found that both juice and extract of the *E. sonchifolia* leaves inhibit hydroxyl and superoxide radical formation *in vitro.* Alcoholic extract of *Mucuna pruriens* Linn seeds was investigated for its antioxidant property by Tripathi and Upadhyay (2001). The effect of extract was observed by $FeSO_4$ induced lipid peroxidation, degree of nitroblue tetrazolium reduction and by hydroxylation of salicylate. The effect of ethanol rhizome extract of *Smilax china* Linn. was also studied on hydroxyl and superoxide radicals for estimating its antioxidant property (Tripathi *et al*., 2001). Plant rhizome extract shows, concentration dependent protection against $FeSO_4$ induced lipid peroxidation and also show scavenging activity on superoxide and hydroxyl radicals; however, it shows more efficiency towards superoxide than hydroxyl radicals.

Antioxidant property of twelve Indian medicinal plants was evaluated by using Free radical scavenging activity (DPPH) and Lipid peroxidation assay (Jadhav and Bhutani, 2002). Methanol extracts of *Terminalia arjuna* was found to be most active, followed by *Terminalia bellerica* in case of Free radical scavenging activity, while *Centella asiatica* and *Hypericum perforatum* in case of Lipid peroxidation assay. In the same year, Siddhuraju *et al*., (2002) reported the antioxidant property of *Cassia fistula* L. (stem bark, leaves, flowers and mature fruit pulp) by applying some methods like, total phenolic content, Thiocyanate method, Liposomes preparation, Reducing power assay, Superoxide radical scavenging method and DPPH scavenging assay. Among all the plant extracts, alcoholic stem bark extract showed highest antioxidant potential, which might be due to the presence of high phenolic content, and flower and pulp showed low activity might be because they contained anthraquinones, polyphenols and other prooxidants.

Sen *et al.,* (2002) studied the antioxidant activity of *Pluchea indica* Less both in *in vitro* and *in vivo.* They found that in case of glucose oxidase induced paw oedema, the methanol root extract of the plant produces significant anti-inflammatory activity. Extract also showed superoxide and hydroxyl radicals scavenging activity, and inhibited hydrogen peroxide induced lysis of erythrocytes, CCl_4 induced lipid peroxidation and dioxygenase activity. Antioxidant properties of *Punica*

granatun cv. Ganesha was published by Singh *et al*., (2002). By using β-carotene-linoleate and DPPH free radical scavenging activity method, they investigated methanol, ethyl acetate and aqueous extracts of peels and seeds of the plant and conclude that methanol extract of peels exhibited highest activity among all of the extracts.

Aqueous extracts from different parts of *Momardica charantia* Linn, *Glycyrrhiza glabra, Acacia catechu* and *Terminalia chebula* were examined for their antioxidant potential by Naik *et al.,* (2003) using different methods (γ-Radiolysis, Estimation of superoxide dismutase enzyme activity and estimation of antioxidant capacity of the extracts by cyclic voltammetry and pulse radiolysis) and concluded that the *Terminalia chebula* among four plants showed maximum inhibition of radiation induced lipid peroxidation, free radical scavenging activity and maximum value of ascorbate equivalents, and it also restore superoxide dismutase activity. Hence contained high antioxidant property. From different agroclimatic regions (India, Nicaragua and Niger) leaves of *Moringa oleifera* Lam. were collected to investigate its antioxidant properties by Siddhuraju and Becker (2003). Water, aqueous methanol and aqueous ethanol extracts of *M. oleifera* leaves were studied by β-carotene-linoleic acid system, reducing power, Superoxide radical scavenging, Linoleic acid, Liposomes preparation and DPPH radical scavenging methods, and among three different samples, methanol and ethanol extracts from India reported highest antioxidant activity. Negi *et al.,* (2003) examined the ethyl acetate, acetone, methanol and aqueous extracts of *Punica granatum* cv. Ganesha for their antioxidant potential by using Phosphomolybdenum method and found that the methanol extract presented highest antioxidant activity and water extract lowest activity compared to other extracts.

Fresh and dry stem extracts (ethyl acetate, methanol, water and n-hexane) of *Cissus quadrangularis* L. were evaluated by DPPH radical scavenging assay and β-carotene linoleic acid model method to find out their antioxidant property and it concluded that ethyl acetate extract of fresh stem exhibited highest activity followed by ethyl acetate dry stem extract among all the extracts of dry and fresh stem extracts of *C. quadrangularis* (Murthy *et al.,* 2003). In the same year antioxidant activity of *Desmodium gangeticum* (L.) DC., was also reported by Govindarajan *et al.,* (2003) by applying DPPH radical scavenging assay, Nitric oxide scavenging, assay of lipid peroxidation, Ferryl-bipyridyl assay and Hypochlorous acid scavenging method and concluded that *D. gangeticum* has a significant antioxidant potential. For the first time three medicinal plants i.e. *Sida cordifolia* Linn, *Cynodon dactylon* Linn and *Evolvulus alsinoides* Linn were evaluated for antioxidant potential by Auddy *et al.,* (2003). Evaluation was carried out by using ABTS radical cation decolorization assay which revealed high potency of *S. cordifolia* ethanol extract (IC_{50}=16.07 µg/mL) than other plants ethanol extract and water infusion of *E. alsinoides* (IC_{50}=172.25 µg/mL) than other plants infusion.

Certain Indian medicinal plants were selected for Nitric oxide scavenging activity and it is found that *Alstonia scholaris* was most potent, followed by *Cynodon dactylon* and *Morinda citrifolia* (Jagetia and Baliga, 2004). Tilak *et al.,* (2004) evaluated the antioxidant properties of *Plumbago zeylanica* aqueous and alcoholic extracts by using DPPH radical scavenging assay, ABTS radical scavenging assay and FRAP assay, and concluded that in case of DPPH and FRAP, ethanol extract showed more efficiency while in case of ABTS, aqueous extract recorded highest activity. Antioxidant activity of *Annona squmosa* Linn. was evaluated *in vitro* by antilipid peroxidation, ABTS radical scavenging assay, DPPH radical scavenging assay, scavenging of nitric oxide radical and scavenging of superoxide radical by Shirwaikar *et al.,* (2004) and found better activity in case of ABTS and DPPH, while moderate in remaining assays. By estimating SOD, Cyclic voltammetry, Xanthine-oxidase assay, DPPH assay antioxidant potential of *Terminalia chebula* was examined for antioxidant potential (Naik *et al.,* 2004) and results made *T. chebula* a potent antioxidant.

Aqueous and methanol extracts of *Cassia fistula* Linn. bark was investigated by Ilavarasan *et al.,* (2005) for antioxidant activity and in the results, it was found that both the extracts inhibited lipid peroxidation induced by CCl_4 and $FeSO_4$, and also had significant antioxidant activity in DPPH, Hydroxyl radical and Nitric oxide scavenging assays. Methanol seeds extract of *Mucuna pruriens* was investigated by Rajeshwar *et al.,* (2005) for antioxidant potential and by using Reducing power assay, and scavenging activities of DPPH radical, ydroxyl radical, nitric oxide radical, superoxide anion radical, H_2O_2 radical, they found that plant has significant antioxidant property. Methanol extract of *Bauhinia racemose* Lam. was evaluated for antioxidant property by Kumar *et al.,* (2005). In the evaluation, activity of the extracts increased in concentration dependent manner and it was also found that the extract inhibited the superoxide and hydroxyl radical generation.

Bajpai *et al.,* (2005) evaluated antioxidant property of some medicinal plants by using β-carotene and Linoleic acid assay and reported that *Terminalia arjuna, Terminalia bellerica, Terminalia chebula, Terminalia muelleri, Phyllanthus emblica* and *Syzygium cumini* showed high antioxidant activity among all the tested plants. Different extracts of *Hippophae rhamnoides* L. seeds were examined by Negi *et al.,* (2005) for antioxidant property by applying Liposome model system, determination of reducing power and scavenging of DPPH radical methods, and found that methanol extract exhibited highest antioxidant activity. *Syzygium cumini* (L.) fruit was evaluated for antioxidant potential and found to scavenged hydroxyl, superoxide and DPPH free radicle (Banerjee *et al.,* 2005).

Underground parts of *Sphaeranthus indicus* (Linn) was analyzed for antioxidant potential by Shirwaikar *et al.,* (2006) and they came up with the results that extract showed significant scavenging activity of ABTS, DPPH and nitric oxide radical while moderate in case of remaining

assays. Twelve traditionally used medicinal plants of India were tested by Aqil *et al.,* (2006), by availing FTC, TBA and DPPH free radical scavenging assay. Among twelve plants methanol crude extract of *Lawsonia inermis* L. was found most active. Aqueous extracts of *Coleus aromaticus* Benth. leaves were studied for antioxidant property by using various *in vitro* methods and results showed that the extract reported significant nitric oxide and superoxide scavenging property with reducing power and ferrous ion chelating ability, also showed concentration dependent DPPH radical scavenging activity (Kumaran and Karunakaran, 2006).

Emblica officinalis Gaertn. was also found to has antioxidant potential by employing DPPH and ABTS assays (Scartezzini *et al.,* 2006). Hydro alcoholic seed extract of *Nelumbo nucifera* Gaertn. presented low IC_{50} values for both DPPH and Nitric oxide assays, which were less than standard (rutin) used, thus indicating strong antioxidant potential (Rai *et al.,* 2006). Antioxidant activity of *Phyllanthus niruri* aqueous and methanol leaves extracts were examined by Harish and Shivanandappa *et al.,* (2006) and reported that both the extracts of leaves exhibited DPPH scavenging activity with reactive oxygen species inhibition and also inhibition of membrane lipid peroxidation.

Prakash *et al.,* (2007) analyzed twenty-five plants for total phenolic content test and the plants which showed promising phenolic contents, were screened for free radical scavenging activity and among selected plants with selected parts, barks of *Casuarina equisetifolia, Cinnamomum zeylanicum* and fruits of *Lawsonia inermis* showed significant results. *Bergia suffruticosa* (Delile) Fenzl was also examined for antioxidant potential by using DPPH free radical scavenging activity, assay for Superoxide radical scavenging activity and measurement of Reducing power (Anandjiwala *et al.,* 2007) and concluded that methanol whole plant extract exhibited very good free radical scavenging activity in dose dependent manner. Bark extracts of *Careya arborea* Roxb, prepared from six different solvents were evaluated for antioxidant activity by Senthilkumar *et al.,* (2007) and it was found that methanol extract showed lowest IC_{50} value in DPPH free radical, Hydrogen peroxide, Nitric oxide, Superoxide and Lipid peroxidation inhibition methods while aqueous extract showed lowest IC_{50} value in case of hydroxyl radical by deoxyribose method, aqua methanol also showed lowest IC_{50} value in case of ABTS radical scavenging method.

Nagulendran *et al.,* (2007) also published *in vitro* antioxidant property of *Cyperus rotundus* rhizome with the conclusion that extract showed activity in concentration dependent manner. Kumaran and Karunakaran, (2007) investigated five different species of *Phyllanthus* collected from Chennai for their antioxidant potential. *Phyllanthus debilis* was reported to have highest activity among five species. Thirteen Medicinal plants collected from India's Western Ghats were analyzed for antioxidant properties using different methods and in most of the methods, *Coleus aromaticus* Benth showed lowest IC_{50} value among all other plant extracts (Badami and Channabasavaraj, 2007).

By using DPPH and Superoxide scavenging activity, free radical scavenging property of *Achyranthes aspera* Linn was analyzed by Edwin *et al.,* (2008) and in the result activity of the aqueous leaves extract were found to be higher than ethanol extracts. Kumari and Kakkar (2008) examined bark extracts of five medicinal plants and reported their antioxidant property. Among all the plants *Crataeva nurvala* was found to have highest SOD mimetic activity, Lipid peroxidation inhibitory activity and ABTS scavenging activity while *Aegle marmelos* has highest nitric oxide quenching activity. Some selected medicinal plants of India were also investigated by Kumar *et al.,* (2008) for antioxidant potential by employing lipid peroxidation assay in which *Albizia amara* reported highest lipid peroxidation inhibition activity followed by *Cassia fistula* and *Cassia auriculata.*

Different extracts of different parts of *Costus speciosus* was evaluated by using DPPH, ABTS and Hydroxyl radical scavenging activity methods, for antioxidant potential (Vijayalakshmi and Sarada, 2008) and in the result methanol extracts was found to exhibited strongest free radical and hydroxyl scavenging activity. Gupta *et al.,* (2008) investigated *in vitro* antioxidant activity of different extracts of *Oroxylum indicum* (L.) Vent. leaves by using DPPH radical scavenging method and found that the ethyl acetate extract of leaves exhibited best scavenging effect than other solvents. *In vitro* antioxidant property of methanol extracts of five medicinal plants known as Shankhapushpi was studied by using DPPH radical scavenging activity, Superoxide radical scavenging activity, Metal chelating effect and determination of total antioxidant capacity, and out of these five medicinal plants, *Canscora decussata* expressed highest activity except in case of metal chelating effect, where *Evolvulus alsinoides* showed lowest IC_{50} value (Nag and De, 2008).

Baravalia *et al.,* (2009) examined the leaf extracts of *Diospyros ebenum* Roxb. for their antioxidant property using DPPH radical scavenging activity and found that plant showed 20 µg/ml, IC_{50} value. By using same method, twelve Northeast Indian medicinal plants were evaluated for antioxidant potential. Among tested plants *Oroxylum indicum* Vent. was found to have highest activity followed by *Ipomoea aquatic* Forsk. and *Moringa oleifera* Forsk. (Kumar *et al.,* 2009). In the same year antioxidant property of aqueous extract of four Indian medicinal plants was studied by Sharma *et al.,* (2009) by using Free radical absorbing power assay and found that *Emblica officinalis* exhibited highest antioxidant property than other plant extracts. Ethanol extract of *Caesalpinia bonducella* F. seeds was analyzed for antioxidant property by using four methods and plant extract showed increase in activity by a dose dependent manner in each method (Shukla *et al.,* 2009). Antioxidant potential of methanol extract of *Gmelina arborea* Roxb. stem bark was evaluated by using various *in vitro* methods, which concluded that plant extract possessed significant free radical

scavenging activity (Patil *et al.,* 2009). By using DPPH radical scavenging activity, Veeru *et al.,* (2009) examined methanol extracts of some Indian medicinal plants and concluded that among tested plants *Ocimum sanctum* L. methanol leaf extract showed lowest IC_{50} value.

Kalaivani and Mathew (2010) subjected different solvent extracts of *Acacia nilotica* (L.) Wild. Ex Delile leaf for antioxidant potential and concluded that ethanol extract exhibited promising ability to act as antioxidant agent. Aerial parts of *Hedyotis corymbosa* (L) Lam. was examined *in vitro* for antioxidant property by using different methods *viz.* DPPH radical scavenging activity, reducing power, ABTS radical scavenging assay, Nitric oxide radical scavenging activity and Hydroxyl radical scavenging activity, and found to have significant antioxidant activity (Sasikumar *et al.,* 2010). Antioxidant potential of methanol and aqueous stem extracts of *Achyranthes aspera* Linn. was screened by Priya *et al.,* (2010) by applying DPPH radical scavenging activity and found that methanol extract showed high antioxidant potential than aqueous extract. Antioxidant potential of some selected medicinal plants from Gujarat was investigated by Patel *et al.,* (2010) and by using DPPH radical scavenging assay they concluded that stem extract of *Kigellia pinnata* exhibited highest radical scavenging potential followed by leaf of *Hibiscus cannabinus.*

Carum copticum (L.) was also screened for antioxidant activity and methanol fruit extract was found to have better potential than different solvent extracts (Zahin *et al.,* 2010). By using various *in vitro* radical scavenging methods Raja and Pugalendi (2010) examined aqueous leaf extract of *Melothria maderaspatana* (Linn.) Cogn. for radical scavenging potential and concluded that extract showed effective fee radical scavenging property. Certain medicinal plants collected from Palakkad, Kerala, were subjected to antioxidant screening by following DPPH assay (Sini *et al.,* 2010). Results indicated that *Trianthema decandra* appeared with most active agent followed by *Plumbago zeylanica* and *Capparis zeylanica.*

Two Indian medicinal plants viz. *Adhatodam vasica* Nees and Sesbania *grandiflora* (L.) Pers (Padmaja *et al.,* 2011) and three viz. *Tinospora cordifolia*, *Piper longum* and *Bauhinia variegate* Linn. (Mishra, *et al.,* 2011) were examined for their antioxidant potential by using different antioxidant methods and in the result concluded that the tested plants exhibited significant antioxidant activity. Roy *et al.,* (2011) studied antioxidant potential of methanol and aqueous extracts of *Dalbergia sissoo* Roxb. stem bark by applying different methods and came up with the result showing stronger free radical scavenging property of aqueous extract than methanol extract. Narayanaswamy and Balakrishnan (2011) investigated the aqueous and ethanol extracts of thirteen medicinal plants by following DPPH radical scavenging assay and found that *Hyptis suaveolens* and *Ocimum basillicum* leaf extracts showed strongest antioxidant activity in case of aqueous and ethanol solvent, respectively. In case of *Piper cubeba* and *Piper nigrum,* ethanol extract of *P. cubeba* demonstrated highest percentage of antioxidant property than its aqueous and methanol extracts and all the three extracts of *P. nigrum* (Nahak and Sahu, 2011). Twelve genotypes of *Zizyphus mauritiana* Lamk. i.e. Indian jujube cultivated in India were tested for their antioxidant potential by using various *in vitro* methods and found to have significant antioxidant potential (Koley *et al.,* 2011).

Methanol leaf extract of *Indigofera cassioides* Rottl. Ex. DC. was evaluated by seven different *in vitro* assays, for their antioxidant activity and found to have concentration dependent antioxidant activity (Kumar *et al.,* 2012). Methanol and hexane extracts of fruit pulps and seeds of *Cassia fistula* Linn. were examined by Irshad *et al.,* (2012), for their antioxidant potential and came up with the result that methanol extracts of plant parts presented stronger activity than hexane extracts, as methanol pulp extract showed highest activity followed by methanol seed extract. Venkatachalam and Muthukrishnan (2012) analyzed antioxidant potential of ethanol leaf extract of *Desmodium gangeticum* L. by using eight different methods and concluded that plant exhibited ability of free radical scavenging.

Screening of ethanol extracts of four medicinal plants, individually and in herbal combination for their free radical scavenging potential by using DPPH radical scavenging assay and Reducing power assay was performed by Padmanabhan and Jangle (2012). Herbal combination extract was found to have strongest activity while in case of individual investigation *Zingiber officinalerhizom* was most active. *Habenaria edgeworthii* Hook. f. ex. Collett, rare Himalayan medicinal orchid was also investigated for their antioxidant potential by using various methods (Giri *et al.,* 2012). Chaudhuri *et al.,* (2012) tested *Withania somnifera* (L.) Dunal methanol root extract, commonly known as Ashwagandha for antioxidant ability by applying nine *in vitro* methods and found that plant may serve as antioxidant agent, since extract showed significant activity.

Sen *et al.,* (2013) performed experiments by following eight different methods to analyzed antioxidant potential of *Meyna spinosa* Roxb. ex Link leaves. Different extracts of leaves were prepared out of which methanol leaves extracts possessed highest potential than other solvents extracts. By using DPPH radical scavenging activity and Reducing power assay Soni and Sosa (2013) investigated methanol leaf extracts of five medicinal plants from Andhra Pradesh, India and concluded that among five plants extracts *Mentha spicata* showed highest potential for antioxidant activity. *Aerva lanata* (L.) Juss. Ex Schult. stem extract was examined for antioxidant potential and found to have high free radical scavenging ability, reducing power activity, Metal chelating activity and inhibition ability from DNA damaging, thus can be serve as source of antioxidant products (Kumar *et al.,* 2013). Antioxidant activity of root extracts of *Imperata cylindrical* was tested by using Nitric oxide scavenging method, reducing power assay and Hydrogen peroxide scavenging assay, and plant was found to be have significance antioxidant

activity (Padma *et al.,* 2013). Twenty-six medicinal plants from Himachal Pradesh were evaluated by DPPH radical scavenging activity and FRAP assay and among all the plants methanol leaf extract of *Taxus baccata* L. was found to have maximum free radical scavenging property followed by *Syzygium cumini* (L.) Skeels bark extract (Guleria *et al.,* 2013).

Methanol and aqueous extracts of gall induced leaves of *Syzygium cumini* were examined for antioxidant activity by Eshwarappa *et al.,* (2014). In the result they concluded that methanol extract showed higher activity than aqueous extract and even higher than standard Ascorbic acid. Flavonoids isolated from stem bark of *Albizzia lebbeck* Benth. was evaluated by DPPH radical scavenging activity and found to have strong free radical scavenging activity (Ahmed *et al.,* 2014). Alcoholic extracts of seven medicinal plants leaves were evaluated for antioxidant activity by Kaur and Mondal (2014). Among all the tested plants *Citrus aurantifolia,* demonstrated highest antioxidant activity followed by *Ocimum sanctum* and *Catharanthus roseus.* By using DPPH free radical scavenging activity Balakrishanan *et al.,* (2014) evaluated *Cymbopogon citratus* and Mathew and Subramanian (2014) examined twenty Ayurvedic medicinal plants for their free radical scavenging ability. Shaikh *et al.,* (2014) also investigated some medicinal plants for their antioxidant capacity by using DPPH radical scavenging activity, Hydroxyl radical scavenging activity and Superoxide radical scavenging activity.

Methanol leaf extract of *Carissa carandas* Linn. was analyzed for their antioxidant potential by using various *in vitro* methods and showed concentration dependent free radical scavenging property (Verma *et al.,* 2015). Organic and aqueous extracts of *Annona squamosal* Linn. leaves were also tested by different methods for antioxidant potential and the results came out in the favor of methanol extract which showed highest potential than other solvent extracts (Kalidindi *et al.,* 2015). Antioxidant property of methanol extracts of callus and stigma of *Crocus sativus* L. Kashmirianus c.v. was examined by Parray *et al.,* (2015) by using various *in vitro* methods and concluded that stigma extract exhibited better activity in terms of four methods while callus extract in terms of lipid peroxidation method.

Antioxidant activity of different extract of *Curcuma caesia* Roxb. rhizome was examined by using DPPH radical scavenging activity and Reducing power assay by Devi *et al.,* (2015). Result concluded that among all the extracts ethanol extract showed strongest potential as antioxidant agent. Bhattacharyya *et al.,* (2015) also investigated antioxidant property of different extracts of *Dendrobium thyrsiflorum* stem, leaf and root of mother as well as *in vitro* raised plants, by applying DPPH radical scavenging activity and FRAP assay. In the result they found that methanol extract of *in vitro* raised indirect shoot organogenesis was found most active than other *in vitro* plant and stem, leaf and root of mother plant, also the methanol leaf extract exhibited highest potential among all the extract of leaf, stem and root of mother plants. Antioxidant property of *Ocimum canum* Sims. leaves were also evaluated by Selvi *et al.,* (2015), using various methods. Dose dependent manner was observed in all the methods.

Screening of *Erythrina stricta* Roxb. stem bark for free radical scavenging activity was performed by following DPPH radical scavenging activity and FRAP assay Akter *et al.,* (2016). Methanol leaf extracts of some selected medicinal plants were analyzed for free radical scavenging activity by using DPPH radical scavenging activity, Reducing power assay and ABTS radical cation decoloration assay (Singh *et al.,* 2016). Kousalya and Bai (2016) also tested the antioxidant potential of *Canscora decussate* (Roxb.) Roem. & Schult. by using various *in vitro* methods. *Simarouba glauca, Syzygium cumini* and *Terminalia chebula* were evaluated for their antioxidant potential by Santhosh *et al.,* (2016), Singh *et al.,* (2016) and Saha and Verma, (2016), respectively. They used different radical scavenging methods for analysis and found that selected plants showed possibility of potential antioxidant agents.

Ghagane *et al.,* (2017) analyzed leaf extracts of *Leea indica* (Burm.f.) Merr prepared in different solvent for antioxidant activity. Nile *et al.,* (2017) also examined antioxidant activity of some Indian medicinal and aromatic plants by pursuing DPPH radical scavenging activity, Reducing power assay and β-Carotene-linoleci acid assay. Rana *et al.,* (2017) studied antioxidant potential of *Solanum indicum* Linn. by applying DPPH radical scavenging activity and Reducing power assay. In the same year Prakash *et al.,* (2017) also investigated antioxidant potential of *Prunus persica* (L.) BATSCH and *Vitex negundo* by using same methods.

Erigeron alpinus L., *Gentianella moorcroftiana* Wall. ex G. Don, *Trigonella foenum-graecum* Linn. and *Anethum graveolens* Linn. were analyzed for their free radical scavenging property by using DPPH radical scavenging activity (Sagar *et al.,* 2018). Two medicinal plants collected from BHU campus were also studied for their antioxidant property by using various radical scavenging methods (Keshari *et al.,* 2018). By following DPPH radical scavenging activity and Ferric reducing assay methods Dhanya Shree *et al.,* (2018) investigated antioxidant potential of *Smilax zeylanica* L.

Antioxidant property of different parts of *Arisaema jacquemontii* Blume, *Clematis grata* Wall. *Coriandrum sativum* L. and *Spilanthes acmella* L. was investigated by Bala *et al.,* (2019), Kumari *et al.,* (2019), Jeya *et al.,* 2019 and Thakur *et al.,* (2019), using DPPH free radical scavenging assay. Bhatt *et al.,* (2019) selected some plants from Junagadh, Gujarat for their antioxidant activity analysis and concluded that among all plants and different solvent extracts, aqueous extract of *Peltophorum pterocarpum* (DC.) K. Heyne and *Syzygium cumini* (L.) Skeels leaves presented highest DPPH radical scavenging ability while all the extracts of *Bauhinia variegate* L.

Table 1: List of some medicinal plants tested in vitro for antioxidant activity

Plant Name/ Family	Place	Part	Solvent	Standard	Method	References
Acanthaceae						
Adhatodam vasica Nees	Andhra university Campus, Visakhapatnam	L	Aq	Ascorbic acid (1,2,3,5), Vitamin E (6), BHT (1,2,3), EDTA (4)	1. DPPH radical scavenging assay 2. Hydroxyl radical scavenging activity 3. Lipid peroxidation assay 4. Metal chelating activity 5. Total antioxidant activity 6. Reducing power assay	Padmaja *et al.,* 2011
Andrographis paniculata	India	AP	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Justica glauca	Attapady area, Palakkad, Kerala	L, S	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Aizoaceae						
Trianthema decandra	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Alliaceae						
Allium sativum L.	India	Bu	98% Met	BHT(1,2,3), α-to-copherol(1,2,3)	1. FTC method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Aloaceae						
Aloe vera (L.) Burm. f.	HGHRI, Joginder Nagar, Mandi	FL	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Aloe vera L. Burm f.	Loni and adjoining areas, Maharashtra	L	Et (80%)	BHT (1,2), Vitamin C (1,2)	1. DPPH radical scavenging activity 2. Reducing power assay	Padmanabhan and Jangle, 2012
Amaranthaceae						
Achyranthes aspera	Kodaikanal (South India)	-	-	BHT	Inhibition of lipid peroxidation	Kumar *et al.,* 2008
Achyranthes aspera L.	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Achyranthes aspera Linn	Mandsaur, MP	L	Et, Aq	Ascorbic acid (1,2)	1. DPPH scavenging activity 2. Superoxide scavenging activity	Edwin *et al.,* 2008
Achyranthes aspera Linn	SFA, Chittoor, AP	S	Met, Aq	Gallic acid	DPPH radical scavenging activity	Priya *et al.,* 2010
Achyranthes aspera Linn.	Sonitpur, Assam	WP	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Achyranthus aspera Linn.	Marathwada, Maharashtra	R	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017

continued...

Aerva lanata (L.) Juss. Ex Schult.	SFA, Chittoor, AP	S	Aq	-	1. DPPH radical scavenging activity 2. Metal chelating activity 3. Reducing power assay 4. DNA damage inhibition efficiency	Kumar *et al.,* 2013
Amaranthus caudatus L.	ARC, NBRI, Lucknow	L	Met	-	DPPH radical scavenging activity	Veeru *et al.,* 2009
Spinacia oleracea	Local market, Gujarat	L	Met	Ascorbic acid (1), BHT (2)	1. DPPH radical scavenging activity 2. Reducing power assay	Soni and Sosa, 2013
Anacardiaceae						
Buchanania lanzan Spreng.	Lucknow	SB	50% Et	Catechin(1,2,3,4)	1. SOD mimetic activity 2. LPO inhibitory potential 3. NO quenching capacity 4. ABTS assay	Kumari and Kakkar, 2008
Mangifera indica L.	India	L	98% Met	BHT(1,2,3), α-to-copherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Annonaceae						
Annona squamosa L.	Junagadh, Gujarat	L	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Annona squamosa Linn.	Dharwad, Karnataka	L	Aq, Chlo, Met	Ascorbic acid (1-4)	1. DPPH radical scavenging activity 2. Hydrogen peroxide scavenging activity 3. Nitric oxide radical scavenging activity 4. Reducing power assay	Kalidindi *et al.,* 2015
Annona squmosa Linn.	Painkulam, Kanyakumari, TN	L	95% Et	-	1. *In vitro* antilipid peroxidation 2. ABTS radical scavenging assay 3. DPPH radical scavenging assay 4. Scavenging of nitric oxide radical 5. Scavenging of superoxide radical	Shirwaikar *et al.,* 2004
Polyalthia longifolia	Jalandhar, Punjab	L	Aq:Et (80%)	Ascorbic acid (2)	1. Beta carotene bleaching method 2. DPPH radical scavenging activity	Kaur and Mondal, 2014
Apiaceae						
Anethum graveolens Linn.	Joginder Nagar, Mandi, HP	S, Se	Met, Act	Ascorbic acid	DPPH radical scavenging activity	Sagar *et al.,* 2018
Carum copticum (L.)	Aligarh	F	Et, Met, Act, Bnz, EtyAt, PetEth	L-Ascorbic acid, BHT	1. DPPH radical scavenging assay 2. Total antioxidant capacity by phosphomolyb-denum method	Zahin *et al.,* 2010
Centella asiatica	India	AP	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Centella asiatica L.	Sonitpur, Assam	WP, L	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Centella asiatica (L.) Urban	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sul-phate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013

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Centella asiatica Linn.	NIPER, Punjab	WP	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Centella asiatica Linn.	Kerala	WP	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Coriandrum sativum L.	HGHRI, Joginder Nagar, Mandi	F	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Coriandrum sativum L.	Uzhavvar sandhai market, TN	Se	Aq	Ascorbic acid	DPPH radical scavenging activity	Jeya *et al.,* 2019
Coriandrum sativum Linn.	Kerala	L	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Apocynaceae						
Alstonia scholaris	Udupi, Karnataka	B	85% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Alstonia scholaris R. Br.	Sonitpur, Assam	SB, L, MJ	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Calotropis procera	Vallabh Vidyanagar, Gujarat	S, L	Met	BHT	DPPH radical scavenging assay	Patel *et al.,* 2010
Carissa carandas Linn.	Jaitpura, Jaipur, Rajasthan	L	Met (10%)	Ascorbic acid (1-4)	1. DPPH radical scavenging activity 2. Total antioxidant activity 3. Scavenging of Hydrogen peroxide 4. Reducing power assay	Verma *et al.,* 2015
Catharanthus roseus	Jalandhar, Punjab	L	Aq:Et (80%)	Ascorbic acid (2)	1. Beta carotene bleaching method 2. DPPH radical scavenging activity	Kaur and Mondal, 2014
Catharanthus roseus	Botanical Garden of BHU, Varanasi	L	Aq	Ascorbic acid (1,2,3,4,5)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity assay 3. Superoxide radical scavenging activity assay 4. Hydrogen peroxide scavenging activity assay 5. Reducing power	Keshari *et al.,* 2018
Chonemorpha fragrans (Moon) Alst	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Rauvolfia serpentina Linn.	Kerala	R	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Rauwolfia serpentina Benth. ex Kurz	Marathwada, Maharashtra	R	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Araceae						
Acorus calamus	India	Rh, L	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Acorus calamus	BGMCC, Bangalore	L	Aq, Et		DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011

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Acorus calamus L.	HGHRI, Joginder Nagar, Mandi	R	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Acorus calamus Linn.	Kerala	Rh	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Arisaema jacquemontii Blume	Solang vally, Manali, HP	DF, T, L	Aq, Act, Met, Chlo	Ascorbic acid	DPPH radical scavenging activity	Bala *et al.,* 2019
Aristolochiaceae						
Aristolochia indica Linn.	Marathwada, Maharashtra	R	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Asclepiadaceae						
Gymnema sylvestre	India	L	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Pergularia daemia	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Secamone emetica	Attapady area, Palakkad, Kerala	F, L	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Tylophora indica	Udupi, Karnataka	-	50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Asparagaceae						
Asparagus adscendens Roxb.	HGHRI, Joginder Nagar, Mandi	R	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Asparagus racemosus	Jalandhar, Punjab	L	Aq:Et (80%)	Ascorbic acid (2)	1. Beta carotene bleaching method 2. DPPH radical scavenging activity	Kaur and Mondal, 2014
Asparagus racemosus Willd.	HGHRI, Joginder Nagar, Mandi	R	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Chlorophytum tuberosum	India	Tu	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Asteraceae						
Cichorium intybus Linn.	Marathwada, Maharashtra	WP	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Cichorium intybus L.	India	R	98% Met	BHT(1,2,3), α-tocopherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Eclipta alba Hassk.	Sonitpur, Assam	L	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Eclipta alba L.	ARC, NBRI, Lucknow	L	Met	-	DPPH radical scavenging activity	Veeru *et al.,* 2009

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Emilia sonchifolia DC.	Kerela	L	70% Met	Curcumin	1. Hydroxyl radical scavenging activity 2. Superoxide radical scavenging activity	Shylesh and Padikkala, 1999
Erigeron alpinus L.	Beeling, Lahaul-Spiti, HP	WP	Met, Act	Ascorbic acid	DPPH radical scavenging activity	Sagar *et al.,* 2018
Gynura conyza Cass.	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Matricaria chamomilla	India	L, R	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Parthenium hystrophorous	Vallabh Vidyanagar, Gujarat	S, L	Met	BHT	DPPH radical scavenging assay	Patel *et al.,* 2010
Pluchea indica Less	India	R	Met	Phenidone (2,3,4), vitamin E (1)	1. Hydroxyl free radical scavenging activity 2. Super oxide anion radical scavenging 3. Dioxygenase activity of lipoxygenase 4. Hydrogen peroxide stimulated 5-lipoxygenase activity	Sen *et al.,* 2002
Saussurea lappa C.B. Clarke.	Kerala	R	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Sphaeranthus indicus (Linn)	Manipal, Karnataka	UdP	95% Et	Ascorbic acid (1,2,3,4,5)	1. ABTS radical cation decolorization assay 2. DPPH radical scavenging activity 3. Scavenging of superoxide radical 4. Scavenging of nitric oxide radical 5. Iron chelating activity	Shirwaikar *et al.,* 2006
Spilanthes acmella L.	Balyana, Mandi, HP	L, F, S	Act, Met, Aq	Ascorbic acid	DPPH radical scavenging activity	Thakur *et al.,* 2019
Spilanthes calva DC	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Barringtoniaceae						
Careya arborea Roxb	Western Ghats, Haridravati, Shimoga, Karnataka	SB	PetEth, EtyAt, Chlo, Aq, 50% Met	Ascorbic acid(1,2,35), Rutin(1,2,3,4,5), BHA(3,5,6,7), α-Tocopherol(6)	1. DPPH Free radical method 2. ABTS Free radical method 3. Hydrogen peroxide 4. nitric oxide 5. Superoxide 6. Lipid peroxidation inhibition method 7. Deoxyribose	Senthilkumar *et al.,* 2007

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Berberidaceae						
Berberis aristata DC.	HGHRI, Joginder Nagar, Mandi	R	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Bignoniaceae						
Kigellia pinnata	Vallabh Vidyanagar, Gujarat	S, L	Met	BHT	DPPH radical scavenging assay	Patel *et al.,* 2010
Oroxylum indicum (L.) Vent.	Dhameta, HP	L	EtyAt, Met, Aq	L-Ascorbic acid	DPPH radical scavenging	Gupta *et al.,*2008
Oroxylum indicum Vent.	Sonitpur, Assam	SB, RB, Se	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Bombacaceae						
Adansonia digitate L.	Junagadh, Gujarat	F	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Cactaceae						
Opuntia dillenii Haw	Shimoga, Karnataka	F, L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Caesalpinaceae						
Bauhinia racemose Lam.	Kolli Hills	SB	Met	α-tocopherol(1), BHT(2,5), BHA(3), Curcumin(4), Quercetin(5), Catechin(6)	1.Thiocyanate 2. Reducing power 3. DPPH radical scavenging 4. Nitric oxide radical scavenging 5. Super oxide anion radical scavenging 6. Hydroxyl radical scavenging	Kumar *et al.,* 2005.
Bauhinia variegate L.	Junagadh, Gujarat	B	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Caesalpinia bonducella F.	Sagar, MP	Se	Et	Ascorbic acid	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. Nitric oxide radical scavenging activity 4. Superoxide radical scavenging activity	Shukla *et al.,* 2009
Cassia auriculata	Kodaikanal (South India)	-	-	BHT	Inhibition of lipid peroxidation	Kumar *et al.,* 2008

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Cassia fistula	India	Fl, F	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Cassia fistula	Jalandhar, Punjab	L	Aq:Et (80%)	Ascorbic acid (2)	1. Beta carotene bleaching method 2. DPPH radical scavenging activity	Kaur and Mondal, 2014
Cassia fistula	Kodaikanal (South India)	-	-	BHT	Inhibition of lipid peroxidation	Kumar *et al.,* 2008
Cassia fistula L.	Coimbatore, TN	B, L, Fl, Fp	Met(Bark, flowers, fruit pulp), Et (leaves)	BHA (2), Trolox (3), BHT (6)	1. Total phenolic content 2. Thiocyanate method 3. Liposomes preparation 4. Reducing power assay 5. Superoxide radical scavenging method 6. DPPH scavenging assay	Siddhuraju *et al.*, 2002
Cassia fistula Linn.	Ariyalur, TN	B	Aq, Met	Ascorbic acid	1. Scavenging of DPPH radicals 2. Scavenging of nitric oxide 3. Hydroxyl radical scavenging activity 4. CCl_4 induced lipid peroxidation 5. Ferrous sulphate induced lipid peroxidation scavenging	Ilavarasan *et al.,* 2005
Cassia fistula Linn.	DIPSAR, New Delhi	Fp, Se	Met, Hex	Ascorbic acid (1,3,4)	1. DPPH radical scavenging activity 2. FRAP assay 3. Hydroxyl radical scavenging assay 4. Reducing power assay	Irshad *et al.,* 2012
Cassia occidentalis	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Cassia tora L.	Junagadh, Gujarat	L	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Peltophorum pterocarpum (DC.) K. Heyne	Junagadh, Gujarat	L, B	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Capparidaceae						
Capparis grandiflora	Attapady area, Palakkad, Kerala	L, R	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Capparis spinosa Linn.	NIPER, Punjab	R	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Capparis zeylanica	Attapady area, Palakkad, Kerala	L, R	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Crataeva nurvala Buch.-Ham.	Lucknow	SB	50% Et	Catechin(1,2,3,4)	1. SOD mimetic activity 2. LPO inhibitory potential 3. NO quenching capacity 4. ABTS assay	Kumari and Kakkar, 2008

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Casuarinaceae						
Casuarina equisetifolia	India	SB, L	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Celastraceae						
Celastrus paniculatus Willd.	HGHRI, Joginder Nagar, Mandi	Se	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Celastrus paniculatus Willd.	Kerala	Se	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Crocus sativus L. Kashmirianus c.v.	Pampore, JK	St	Met	BHT	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. FTC method 4. Thiobarbituric acid assay 5. Lipid peroxidation method	Parray *et al.,* 2015
Combretaceae						
Terminalia arjuna	India	F, L, B	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Terminalia arjuna Wight	NIPER, Punjab	B	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Terminalia bellerica	India	F, L, B	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Terminalia bellerica Roxb.	NIPER, Punjab	B	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Terminalia bellerica Roxb.	India	F	98% Met	BHT(1,2,3), α-tocopherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Terminalia chebula	India	-	Aq	Ascorbic acid	1. γ-Radiolysis 2. Estimation of superoxide dismutase enzyme activity 3. Estimation of antioxidant capacity of the extracts by cyclic voltammetry and pulse radiolysis	Naik *et al.,* 2003
Terminalia chebula	India	F	Aq	Ascorbic acid, gallic acid, ellagic acid	1. Estimation of SOD 2. Cyclic voltammetry 3. Xanthine-oxidase assay 4. DPPH assay	Naik *et al.,* 2004
Terminalia chebula	India	F, L, B	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005

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Terminalia chebula Retz.	India	F	98% Met	BHT(1,2,3), α-to-copherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Terminalia chebula Retz.	Kerala	WF	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Terminalia chebula Retzius	Local market, Ahmedabad	F	Met (70%)	Ascorbic acid (2,3,4,5)	1. Reducing power assay 2. Total antioxidant capacity 3. DPPH radical scavenging activity 4. Nitric oxide radical scavenging assay 5. Hydroen peroxide scavenging assay	Saha and Verma, 2016
Terminalia muelleri	India	F, L, B	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Convolvulaceae						
Convolvulus pluricaulis Choisy.	Kerala	WP	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Evolvulus alsinoides	Kolkata	LS	Met	-	1. DPPH radical scavenging activity 2. Superoxide radical scavenging activity 3. Metal chelating effect 4. Determination of total antioxidant capacity	Nag and De, 2008
Evolvulus alsinoides	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Evolvulus alsinoides Linn	India	WP	90% Et, Aq	Trolox	ABTS radical cation decolorization assay	Auddy *et al.,* 2003
Evolvulus alsinoides Linn.	Kerala	WP	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Evolvulus nummularius	Kolkata	LS	Met	-	1. DPPH radical scavenging activity 2. Superoxide radical scavenging activity 3. Metal chelating effect 4. Determination of total antioxidant capacity	Nag and De, 2008
Ipomoea aquatic Forsk.	Sonitpur, Assam	YSL	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Ipomoea digitata	Udupi, Karnataka	-	50% Met	-	Assay of nitric production	Jagetia and Baliga, 2004
Costaceae						
Costus speciosus	Bangalore, Karnataka	L, P, PS, R	50% Met, Chlo, EtyAt	Ascorbic acid(1), Gallic acid(2)	1. DPPH method 2. ABTS method 3. Hydroxyl radical scavenging activity	Vijayalakshmi and Sarada, 2008
Costus speciosus Koen ex. Retz	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Crassulaceae						

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Bryophyllum calycinum Salisb	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Cucurbitaceae						
Cucumis trigonus Roxb	Shimoga, Karnataka	F	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Melothria maderaspatana (Linn.) Cogn.	Chidambaram, TN	L	Aq	α-tocopherol (1,2,6), Ascorbic acid (3), BHT (4,5),	1. Hydroxyl radical scavenging activity 2. Hydrogen peroxide scavenging 3. Superoxide anion radical scavenging activity 4. DPPH radical scavenging assay 5. ABTS radical scavenging assay 6. Reducing power	Raja and Pugalendi, 2010
Momardica charantia Linn	India	-	Aq	Ascorbic acid	1. γ-Radiolysis 2. Estimation of superoxide dismutase enzyme activity 3. Estimation of antioxidant capacity of the extracts by cyclic voltammetry and pulse radiolysis	Naik *et al.,* 2003
Momordica charantia	Udupi, Karnataka	-	50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Momordica charantia	India	F, L, S, Se	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Momordica charantia	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016

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Trichosanthes dioica	Allahabad, UP	L	Aq	Ascorbic acid, Quercitin	Free radical absorbing power assay	Sharma *et al.,* 2009
Cyperaceae						
Cyperus rotundus	Thiruvaiyaru, Thanjavur, TN	Rh	70% Et	-	1. Superoxide anion scavenging activity assay 2. Hydroxyl radical scavenging activity assay 3. Nitric oxide scavenging activity assay 4. Hydrogen peroxide scavenging activity assay 5. Metal chelating activity assay 6. Reducing power assay	Nagulendran *et al.,* 2007
Dillaniaceae						
Dillenia indica (L.)	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Ebenaceae						
Diospyros ebenum Roxb.	Rajkot, Gujarat	L	PetEth, EtyAt, Met, Aq	Ascorbic acid	DPPH radical scavenging activity	Baravalia *et al.,* 2009
Elaeagnaceae						
Hippophae rhamnoides L.	Lahaul and Spiti, HP	Se	Chlo, EtyAt, Act, Met	-	1. Liposome model system 2. Determination of reducing power 3. Scavenging of DPPH radical	Negi *et al.,* 2005
Elatinaceae						
Bergia suffruticosa (Delile) Fenzl	Ahmedabad	WP	Met	Pyrogallol(1), Ascorbic acid(2), Gallic acid(3), Tannic acid(3)	1. DPPH free radical scavenging activity 2. Assay for superoxide radical scavenging activity 3. Measurement of reducing power	Anandjiwala *et al.,* 2007
Euphorbiaceae						
Acalypha indica L.	Shimoga, Karnataka	L, S, R	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Emblica officinalis	Allahabad, UP	Se	Aq	Ascorbic acid, Quercitin	Free radical absorbing power assay	Sharma *et al.,* 2009

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Emblica officinalis Gaertn.	India	F	Aq	Ascorbic acid(1,2)	1. Scavenging activity on the DPPH radical 2. ABTS radical cation decolourization assay	Scartezzini *et al.,* 2006
Emblica officinalis Gaertn.	Kerala	WF	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Jatropa curcas	BGMCC, Bangalore	F	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Jatropa gossipifolia	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Jatropa multifida	BGMCC, Bangalore	Fl	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Phyllanthus amarus	Chennai	-	Met	BHT(1,3,6), Ascorbic acid(1,2,3,4,5,)	1. DPPH radical scavenging activity 2. Assay of superoxide radical scavenging activity 3. Scavenging of hydrogen peroxide 4. Assay of nitric oxide scavenging activity 5. Reducing power 6. Metal chelating activity	Kumaran and Karunakaran, 2007
Phyllanthus debilis	Chennai	-	Met	BHT(1,3,6), Ascorbic acid(1,2,3,4,5,)	1. DPPH radical scavenging activity 2. Assay of superoxide radical scavenging activity 3. Scavenging of hydrogen peroxide 4. Assay of nitric oxide scavenging activity 5. Reducing power 6. Metal chelating activity	Kumaran and Karunakaran, 2007
Sauropus androgynous	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Sauropus androgynus L. Merr.	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Trewia nudiflora	India	L, F	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007

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Fabaceae						
Acacia catechu	India	-	Aq	Ascorbic acid	1. γ-Radiolysis 2. Estimation of superoxide dismutase enzyme activity 3. Estimation of antioxidant capacity of the extracts by cyclic voltammetry and pulse radiolysis	Naik *et al.,* 2003
Acacia catechu	Attapady area, Palakkad, Kerala	B	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Acacia nilotica	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Acacia nilotica (L.) Wild. Ex Delile	Vellore	L	Et, Aq, Bnz, Chlo, PetEth, DCM	Ascorbic acid (1,2), Catechin (3), Mannitol (4)	1. Reducing power assay 2. DPPH Radical scavenging assay 3. Lipid peroxidation 4. Hydroxyl radical scavenging effect	Kalaivani and Mathew, 2010
Albizia amara	Kodaikanal (South India)	-	-	BHT	Inhibition of lipid peroxidation	Kumar *et al.,* 2008
Albizia chinensis (Osbeck)	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Albizia lebbeck (L.) Benth.	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Albizzia lebbeck Benth.	Allahabad, UP	B	Met, EtyAt, DCM	Trolox	DPPH radical scavenging activity	Ahmed *et al.,* 2014
Bauhinia variegate Linn.	Local market, Allahabad	L	Aq, Bnz, Chf, PetEth, EtyAt, EtyAl, Act	BHA(1), BHT(1), Quercetin (1), Ascorbic acid (1), Propyl gallate (2)	1. DPPH radical scavenging assay 2. Phosphomolybdate method	Mishra, *et al.,* 2011
Clitorea ternatea	Kolkata	R	Met	-	1. DPPH radical scavenging activity 2. Superoxide radical scavenging activity 3. Metal chelating effect 4. Determination of total antioxidant capacity	Nag and De, 2008
Clitoria ternatea	Attapady area, Palakkad, Kerala	R,S,Fl	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Dalbergia sissoo Roxb.	Local area Santiniketan, WB	SB	Aq, Met	Gallic acid (1,2), EDTA (3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. Ferrous ion chelating activity	Roy *et al.,* 2011
Dalbergia sissoo Roxb. ex DC.	Lucknow	SB	50% Et	Catechin(1,2,3,4)	1. SOD mimetic activity 2. LPO inhibitory potential 3. NO quenching capacity 4. ABTS assay	Kumari and Kakkar, 2008

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Delonix regia Gamble.	India	Fl	98% Met	BHT(1,2,3), α-to-copherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Derris indica (Lam.) Bennet	Junagadh, Gujarat	Se	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Desmodium gangeticum L.	ARC, NBRI, Lucknow	L	Met	-	DPPH radical scavenging activity	Veeru *et al.,* 2009
Desmodium gangeticum L.	Kolli Hill, Namakkal, TN	L	Et	Ascorbic acid (1,2,3), BHT (6), Mannitol (7), EDTA (8)	1. DPPH radical scavenging activity 2. Superoxide anion radical scavenging activity 3. Reducing power assay 4. Nitric oxide radical activity 5. FRAP 6. ABTS radical scavenging activity 7. Hydroxyl radical activity 8. Iron chelating activity	Venkatachalam and Muthukrishnan, 2012
Desmodium gangeticum (L.) DC.	Chitrakoot, MP	AP	50% Alc	Ascorbic acid (1,2,3), Tocopher-ol(4), Lipoic acid(6)	1. DPPH radical scavenging assay 2. Total antioxidant capacity 3. Nitric oxide scavenging 4. Assay of lipid peroxidation 5. Ferryl-bipyridyl assay 6. Hypochlorous acid scavenging	Govindarajan *et al.,* 2003
Dichrostachys cinerea	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Erythrina stricta Roxb.	Nagaland	SB	n-Hex, DCM, EtyAt Met, Aq,	Ascorbic acid (1), Trolox (2)	1. DPPH radical scavenging activity 2. FRAP assay	Akter *et al.,* 2016
Glycyrrhiza glabra	India	-	Aq	Ascorbic acid	1. γ-Radiolysis 2. Estimation of superoxide dismutase enzyme activity 3. Estimation of antioxidant capacity of the ex-tracts by cyclic voltammetry and pulse radiolysis	Naik *et al.,* 2003
Glycyrrhiza glabra Linn.	Kerala	R	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subra-manian, 2014
Indigofera cassioides Rottl. Ex. DC.	Yercaud Hill, India	L	Met	Ascorbic acid (1-7), Rutin (1-7)	1. ABTS radical scavenging activity 2. DPPH radical scavenging activity 3. Nitric oxide radical inhibition assay 4. Superoxide radical scavenging activity 5. Hydrogen peroxide radical scavenging method 6. Hydrogen radical scavenging activity 7. Total iron reducing power assay	Kumar *et al.,* 2012

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Indigofera tinctoria	India	F	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Mucuna pruriens	Kolkata	Se	Met	BHT(1), L-Ascorbic acid(1,2,5), Quercetin(4,5,6), Tocopherol(4,5,6)	1. DPPH radical scavenging activity 2. Determination of reducing power 3. Determination of hydroxyl radical scavenging activity 4. Determination of nitric oxide radical scavenging activity 5. Determination of superoxide anion radical scavenging activity 6. Determination of H_2O_2 radical scavenging activity	Rajeshwar *et al.,* 2005
Mucuna pruriens Linn.	India	S	Alc	-	1. $FeSO_4$ induced lipid peroxidation 2. Superoxide anion scavenging 3. Hydroxyl radical scavenging	Tripathi and Upadhyay, 2001
Pterocarpus marsupium	India	HW, L	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Sesbania grandiflora (L.) Pers	Andhra university Campus, Visakhapatnam	L	Aq	Ascorbic acid (1,2,3,5), Vitamin E (6), BHT (1,2,3), EDTA (4)	1. DPPH radical scavenging assay 2. Hydroxyl radical scavenging activity 3. Lipid peroxidation assay 4. Metal chelating activity 5. Total antioxidant activity 6. Reducing power assay	Padmaja *et al.,* 2011
Trigonella foenum graceum Linn.	Kerala	Se	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Trigonella foenum-graecum	Local market, Gujarat	L	Met	Ascorbic acid (1), BHT (2)	1. DPPH radical scavenging activity 2. Reducing power assay	Soni and Sosa, 2013
Trigonella foenum-graecum L.	India	L	98% Met	BHT(1,2,3), α-tocopherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Trigonella foenum-graecum Linn.	Joginder Nagar, Mandi, HP	L, Se	Met, Act	Ascorbic acid	DPPH radical scavenging activity	Sagar *et al.,* 2018
Gentianaceae						
Canscora decussata	Kolkata	LS	Met	-	1. DPPH radical scavenging activity 2. Superoxide radical scavenging activity 3. Metal chelating effect 4. Determination of total antioxidant capacity	Nag and De, 2008

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Canscora decussate (Roxb.) Roem. & Schult.	Kerala	Se	Met	Trolox (2), Ascorbic acid (4)	1. DPPH radical scavenging activity 2. ABTS assay 3. FRAP assay 4. Phosphomolybdenum method	Kousalya and Bai, 2016
Canscora diffusa	Kolkata	LS	Met	-	1. DPPH radical scavenging activity 2. Superoxide radical scavenging activity 3. Metal chelating effect 4. Determination of total antioxidant capacity	Nag and De, 2008
Gentianella moorcroftiana Wall. ex G. Don	Beeling, Lahaul-Spiti, HP	F, S	Met, Act	Ascorbic acid	DPPH radical scavenging activity	Sagar *et al.,* 2018
Geraniaceae						
Geranium nepalense Sweet.	Summer Hill, Shimla, HP	L, R	Act, Met	Ascorbic acid	DPPH radical scavenging assay	Chauhan *et al.,* 2020
Ginkgoaceae						
Gingko biloba	Udupi, Karnataka		95% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Ginkgo biloba Linn.	NIPER, Punjab	WP	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Hypericaceae						
Hypericum patulum	NIPER, Punjab	WP	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Hypericum perforatum Thunb.	NIPER, Punjab	WP	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Lamiaceae						
Anisomeles malabarica	Attapady area, Palakkad, Kerala	L	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Clerodendrum colebrookianum Walp.	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Coleus ambonicus	Udupi, Karnataka	-	MCh:Met	-	Assay of nitric production	Jagetia and Baliga, 2004

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Coleus aromaticus Benth	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Coleus aromaticus Benth.	Chennai	L	Aq	BHT(1,5), Gallic acid(2), Ascorbic acid(3), Curcumin(4), EDTA(6)	1. β-carotene-linoleate model system 2. DPPH radical scavenging activity 3. Superoxide radical scavenging activity 4. Nitric oxide scavenging activity 5. Reducing power assay 6. Metal chelating activity	Kumaran and Karunakaran, 2006
Hyptis suaveolens	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Hyssopus officinalis Linn.	Marathwada, Maharashtra	AP	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Lavandula bipinnata (L.) O. Ktze.	Nanded, Maharashtra		Aq, Et, Hex	Ascorbic acid (1-3)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. Superoxide radical scavenging activity	Shaikh *et al.,* 2014
Mentha spicata	Local market, Gujarat	L	Met	Ascorbic acid (1), BHT (2)	1. DPPH radical scavenging activity 2. Reducing power assay	Soni and Sosa, 2013
Ocimum basilicum L.	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Ocimum basillicum	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Ocimum canum Sims.	Coimbatore, TN	L	Aq	Ascorbic acid (1-4), BHT (1-4)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. Metal chelating activity 4. Prevention of deoxyribose degradation	Selvi *et al.,* 2015
Ocimum kilimandscharicum Guerke.	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Ocimum killimandscharicum G	NIPER, Punjab	AP	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Ocimum sanctum	Udupi, Karnataka	L	50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004

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Ocimum sanctum	Local market, Gujarat	L	Met	Ascorbic acid (1), BHT (2)	1. DPPH radical scavenging activity 2. Reducing power assay	Soni and Sosa, 2013
Ocimum sanctum	Jalandhar, Punjab	L	Aq:Et (80%)	Ascorbic acid (2)	1. Beta carotene bleaching method 2. DPPH radical scavenging activity	Kaur and Mondal, 2014
Ocimum sanctum L.	India	L	98% Met	BHT(1,2,3), α-to-copherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Ocimum sanctum L.	ARC, NBRI, Lucknow	L	Met	-	DPPH radical scavenging activity	Veeru *et al.,* 2009
Ocimum sanctum L. (Black strain)	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Ocimum sanctum L. (White strain)	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Origanum vulgare Linn.	Marathwada, Maharashtra	AP	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Orthosiphon thymiflorus	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Tectona grandis	Udupi, Karnataka	-	Aq	-	Assay of nitric production	Jagetia and Baliga, 2004
Lauraceae						
Cassytha filiformis L.	Sonitpur, Assam	WP	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Cinnamomum camphora (L.) T. Nees & C. H. Eberm.	HGHRI, Joginder Nagar, Mandi	L	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Cinnamomum tamala	India	L	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Cinnamomum zeylanicum	India	SB	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Leeaceae						
Leea indica (Burm.f.) Merr	Dandeli, WG	L	Chlo, EtyAt, Met, Et, Aq	Ascorbic acid (1,2,3)	1. FRAP assay 2. Phosphomolybdenum assay 3. DPPH radical scavenging activity	Ghagane *et al.,* 2017
Loranthaceae						
Dendrophthoe falcate Etting.	NIPER, Punjab	L, R	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Lythraceae						

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Lawsonia inermis	India	L, F	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Lawsonia inermis L.	India	L	98% Met	BHT(1,2,3), α-to-copherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Punica granatum cv. Ganesha	Bangalore	Pe, Se	Met, Ethyl acetate, Aq	BHA	1. β-carotene-linoleate antioxidant assay 2. DPPH free radical scavenging activity	Singh *et al*., 2002
Punica granatum cv. Ganesha	India	Pe	Ethyl acetate, Aceton, Met, Aq	Ascorbic acid	Phosphomolybdenum method	Negi *et al.,* 2003
Malvaceae						
Abroma augusta (Linn.)	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Bombax ceiba (Linn.)	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Hibiscus cannabinus	Vallabh Vidyanagar, Gujarat	F, S, L	Met	BHT	DPPH radical scavenging assay	Patel *et al.,* 2010
Hibiscus sabdarifa Linn.	Sonitpur, Assam	F, L, Fl	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Hibiscus sabdariffa (Linn.)	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Malva sylvestris Linn.	Marathwada, Maharashtra	WP	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Pavonia procumbens Boiss	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007

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Sida acuta Burm.	Sonitpur, Assam	R, WP	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Sida cordifolia Linn.	India	WP	90% Et, Aq	Trolox	ABTS radical cation decolorization assay	Auddy *et al.,* 2003
Meliaceae						
Azadirachta indica	India	SB	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Cedrela toona Roxb.	Lucknow	SB	50% Et	Catechin(1,2,3,4)	1. SOD mimetic activity 2. LPO inhibitory potential 3. NO quenching capacity 4. ABTS assay	Kumari and Kakkar, 2008
Cedrus deodera (Roxb.) G. Don	Kerala	SB	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Soymida fembrifuga (Roxb.) A. Juss.	Nanded, Maharashtra	-	Aq, Et, Hex	Ascorbic acid (1-3)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. Superoxide radical scavenging activity	Shaikh *et al.,* 2014
Menispermaceae						
Tinospora cordifolia	Udupi, Karnataka	S	Aq, MCh:Met, Met, Hex	-	Assay of nitric production	Jagetia and Baliga, 2004
Tinospora cordifolia	Botanical garden of the University of Allahabad	S	Aq, Bnz, Chf, PetEth, EtyAt, EtyAl, Act	BHA(1), BHT(1), Quercetin (1), Ascorbic acid (1), Propyl gallate (2)	1. DPPH radical scavenging assay 2. Phosphomolybdate method	Mishra, *et al.,* 2011
Tinospora cordifolia (Thunb.) Miers	Kerala	S	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Tinospora cordifolia (Willd.) Hook. f. & Thomson	HGHRI, Joginder Nagar, Mandi	S	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Tinospora cordifolia (Willd.) Miers.	Nanded, Maharashtra		Aq, Et, Hex	Ascorbic acid (1-3)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. Superoxide radical scavenging activity	Shaikh *et al.,* 2014
Moraceae						
Ficus bengalensis	Allahabad, UP	AR	Aq	Ascorbic acid, Quercitin	Free radical absorbing power assay	Sharma *et al.,* 2009

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Morus alba L.	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Strebilis aspera	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Moringaceae						
Moringa oleifera	India	L	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Moringa oleifera	Allahabad, UP	F	Aq	Ascorbic acid, Quercitin	Free radical absorbing power assay	Sharma *et al.,* 2009
Moringa oleifera	Loni and adjoining areas, Maharashtra	L	Et (80%)	BHT (1,2), Vitamin C (1,2)	1. DPPH radical scavenging activity 2. Reducing power assay	Padmanabhan and Jangle, 2012
Moringa oleifera Forsk.	Sonitpur, Assam	R,F,L,B	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Moringa oleifera Lam.	India	L	Aq, 80% Met, 70% Et	Ascorbic acid(1,2,4), α-tocopherol(5), BHA(1,4), BHT(4), rutin (1), quercetin(6), kaempferol(6)	1. β-carotene-linoleic acid system 2. Reducing power 3. Superoxide radical scavenging 4. Linoleic acid 5. Liposomes preparation 6. DPPH radical scavenging method	Siddhuraju and Becker, 2003
Myrtaceae						
Eucalyptus globulus	India	L, B	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Eugenia jambolana	Udupi, Karnataka	L(1), Se(2)	1. MCh:Met, 2. 50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Syzygium cumini	India	Se	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Syzygium cumini	Bangalore	LG	Met, Aq	Ascorbic acid (1-4)	1. DPPH radical scavenging activity 2. FRAP assay 3. Hydroxyl radical scavenging activity 4. Nitric oxide radical scavenging	Eshwarappa *et al.,* 2014

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Syzygium cumini	Local market, Amritsar	Fp	Et	Gallic acid(1-3), Caffeic acid(1-3), Sinapic acid(1-3), Quercetin(1-3), Delphinidin chloride (1-3)	1. DPPH radical scavenging activity 2. ABTS radical scavenging assay 3. FRAP assay	Singh *et al.,* 2016
Syzygium cumini (L.)	Kolkata	Fs	Aq	Ascorbic acid(5), gallic acid(5)	1. Hydroxyl radical scavenging assay 2. Superoxide radical scavenging assay 3. DPPH radical scavenging activity 4. lipid peroxidation 5. Determination of total antioxidant capacity	Banerjee *et al.,* 2005
Syzygium cumini (L.) Skeels	HGHRI, Joginder Nagar, Mandi	B	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Syzygium cumini (L.) Skeels	Junagadh, Gujarat	L	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Nelumbonaceae						
Nelumbo nucifera Gaertn.	Kerala	Fl	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Nyctaginaceae						
Boerhaavia diffusa	Udupi, Karnataka	-	50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Boerhaavia diffusa	India	R	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Boerhavia diffusa L.	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Nymphaeaceae						
Nelumbo nucifera Gaertn.	India	S	50% hydro alcoholic	Rutin(1,2), Vitamin E(3,4,5)	1. DPPH method 2. Nitric oxide radical inhibition assay 3 Estimation of catalase activity 4. Estimation of superoxide dismutase 5. Measurement of lipid peroxidation	Rai *et al.,* 2006
Orchidaceae						
Dendrobium thyrsiflorum	Cherrapunjee, Meghalaya	S, L, R	Met, Act, Chlo	-	1. DPPH radical scavenging activity 2. FRAP assay	Bhattacharyya *et al.,* 2015
Habenaria edgeworthii Hook. f. ex. Collett	Surkunda, Tehri Garhwal, Uttarakhand	Se, Tu	Met (80%)	Ascorbic acid (1,2,3)	1. ABTS radical scavenging activity 2. DPPH radical scavenging activity 3. FRAP assay	Giri *et al.,* 2012
Oxalidaceae						

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Averrhoa carambola	India	L	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Papaveraceae						
Fumaria parviflora Lam.	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Papilionaceae						
Cicer arietinum L.	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Clitorria ternate	BGMCC, Bangalore	L, Fl	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Sophora japonica Linn.	NIPER, Punjab	S	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Passifloraceae						
Passiflora edulis	BGMCC, Bangalore	F	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Phyllanthaceae						
Phyllanthus emblica	India	L, F	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Phyllanthus maderaspatensis	Chennai		Met	BHT(1,3,6), Ascorbic acid(1,2,3,4,5,)	1. DPPH radical scavenging activity 2. Assay of superoxide radical scavenging activity 3. Scavenging of hydrogen peroxide 4. Assay of nitric oxide scavenging activity 5. Reducing power 6. Metal chelating activity	Kumaran and Karunakaran, 2007
Phyllanthus niruri	Udupi, Karnataka	Sh	50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004

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Phyllanthus niruri	Mysore, Karnataka	L, F	Aq, Met	-	1. Microsomal membrane lipid peroxidation 2. DPPH radical scavenging 3. Superoxide anion scavenging activity	Harish and Shivanandappa *et al.,* 2006
Phyllanthus urinaria	Chennai	-	Met	BHT(1,3,6), Ascorbic acid(1,2,3,4,5,)	1. DPPH radical scavenging activity 2. Assay of superoxide radical scavenging activity 3. Scavenging of hydrogen peroxide 4. Assay of nitric oxide scavenging activity 5. Reducing power 6. Metal chelating activity	Kumaran and Karunakaran, 2007
Phyllanthus virgatus	Chennai	-	Met	BHT(1,3,6), Ascorbic acid(1,2,3,4,5,)	1. DPPH radical scavenging activity 2. Assay of superoxide radical scavenging activity 3. Scavenging of hydrogen peroxide 4. Assay of nitric oxide scavenging activity 5. Reducing power 6. Metal chelating activity	Kumaran and Karunakaran, 2007
Piperaceae						
Piper betel	Jalandhar, Punjab	L	Aq:Et (80%)	Ascorbic acid (2)	1. Beta carotene bleaching method 2. DPPH radical scavenging activity	Kaur and Mondal, 2014
Piper cubeba	Koraput, Mayurbhanj, Odisha	F	Aq, Met, Et		DPPH radical scavenging assay	Nahak and Sahu, 2011
Piper cubeba L.	India	Se	98% Met	BHT(1,2,3), α-tocopherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Piper longum	India	F, L	50% Met, Met, Aq	-	B-carotene and linoleic acid	Bajpai *et al.,* 2005
Piper longum	Botanical garden of the University of Allahabad	F	Aq, Bnz, Chf, PetEth, EtyAt, EtyAl, Act	BHA(1), BHT(1), Quercetin (1), Ascorbic acid (1), Propyl gallate (2)	1. DPPH radical scavenging assay 2. Phosphomolybdate method	Mishra, *et al.,* 2011
Piper longum L.	ARC, NBRI, Lucknow	F	Met	-	DPPH radical scavenging activity	Veeru *et al.,* 2009
Piper longum L.	HGHRI, Joginder Nagar, Mandi	R	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Piper nigrum	Koraput, Mayurbhanj, Odisha	F	Aq, Met, Et	-	DPPH radical scavenging assay	Nahak and Sahu, 2011
Plumbaginaceae						
Plumbago zeylanica	TN	R	Aq, Et	L-ascorbic acid, Trolox	1. DPPH radical scavenging assay 2. ABTS radical scavenging assay 3. FRAP assay	Tilak *et al.,* 2004

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Plumbago zeylanica	Attapady area, Palakkad, Kerala	R, B, S	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Poaceae						
Cymbopogon citratus	Madurai, TN	L	Chlo, Met, Aq	-	DPPH radical scavenging activity	Balakrishanan *et al.,* 2014
Cymbopogon citratus	Botanical Garden of BHU, Varanasi	L	Aq	Ascorbic acid (1,2,3,4,5)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity assay 3. Superoxide radical scavenging activity assay 4. Hydrogen peroxide scavenging activity assay 5. Reducing power	Keshari *et al.,* 2018
Cynodon dactylon	Udupi, Karnataka	-	50% Met	-	Assay of nitric production	Jagetia and Baliga, 2004
Cynodon dactylon Linn	India	WP	90% Et, Aq	Trolox	ABTS radical cation decolorization assay	Auddy *et al.,* 2003
Imperata cylindrical	Ernakulam	R	Chlo, DCM, Met, Act, Aq	Ascorbic acid (1,2,3)	1. Nitric oxide scavenging method 2. Reducing power assay 3. Hydrogen peroxide scavenging assay	Padma *et al.,* 2013
Vertivera zizanoides L. Nash.	Shimoga, Karnataka	Rh	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Portulacaceae						
Portulaca oleracea Linn.	Marathwada, Maharashtra	WP	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Punicaceae						
Punica granatum L.	India	Ri	98% Met	BHT(1,2,3), α-tocopherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Punica granatum L.	Junagadh, Gujarat	Ec	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Punica granatum Linn.	Kerala	WF	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014

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Ramnaceae						
Zizuphus oenoplia L.	Shimoga, Karnataka	F	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Ranunculaceae						
Caltha palustris L.	Kharidhar, Kullu, HP	L, R	Act, Met	Ascorbic acid	DPPH radical scavenging assay	Singh *et al.,* 2020
Clematis grata Wall.	Kandraur, Bilaspur, HP	L, S, R	Act, Met, Aq	Ascorbic acid	DPPH radical scavenging activity	Kumari *et al.,* 2019
Rhamanceae						
Zizyphus mauritiana Lamk. (Twelve)	CIAH, Bikaner, Rajasthan	F	Et (80%)	Trolox (2,34)	1. FRAP 2. Cupric reducing antioxidant power 3. Free radical scavenging activity using DPPH 4. Free radical scavenging activity using ABTS	Koley *et al.,* 2011
Rhizophoraceae						
Rhizophora annamalayana	Paranagipettai, TN	L	Aq	BHT (1,2,4), Ascorbic acid (3)	1. Total antioxidant activity 2. DPPH radical scavenging activity 3. Total reducing power 4. Nitric oxide radical scavenging activity	Arulkumar *et al.,* 2020
Rhizophora apiculate	Paranagipettai, TN	L	Aq	BHT (1,2,4), Ascorbic acid (3)	1. Total antioxidant activity 2. DPPH radical scavenging activity 3. Total reducing power 4. Nitric oxide radical scavenging activity	Arulkumar *et al.,* 2020
Rhizophora mucronata	Paranagipettai, TN	L	Aq	BHT (1,2,4), Ascorbic acid (3)	1. Total antioxidant activity 2. DPPH radical scavenging activity 3. Total reducing power 4. Nitric oxide radical scavenging activity	Arulkumar *et al.,* 2020
Rosaceae						
Prunus cerasoides D. Don	HGHRI, Joginder Nagar, Mandi	B	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Prunus persica (L.) BATSCH	Sirmaur HP	L	Met, Act, Aq	Ascorbic acid	1. DPPH radical scavenging activity 2. Reducing power assay	Prakash *et al.,* 2017

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Rubiaceae						
Hedyotis corymbosa (L) Lam.	Coimbatore, TN	AP	Met	BHT	1. DPPH radical scavenging activity 2. Reducing power 3. ABTS radical scavenging assay 4. Nitric Oxide radical scavenging activity 5. Hydroxyl radical scavenging activity	Sasikumar *et al.,* 2010
Meyna spinosa Roxb. ex Link	Khowai, Tripura	L	Met, EtyAt, PetEth	BHA (2), Quercetin (3), Ascorbic acid (1,4,6), Gallic acid (5), α-tocopherol (8)	1. DPPH radical scavenging activity 2. Superoxide anion radical scavenging activity 3. Hydroxyl radical scavenging activity 4. Nitric oxide radical scavenging assay 5. Hydrogen peroxide scavenging assay 6. Reducing power assay 7. Metal chelating ability 8. Ferric thiocyanate method	Sen *et al.,* 2013
Morinda citrifolia	Udupi, Karnataka	B	50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Paederia foetida L.	Sonitpur, Assam	L, T	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Rubia cordifolia Linn.	Marathwada, Maharashtra	R	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Spermacoce latiflolia	Attapady area, Palakkad, Kerala	L	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Rutaceae						
Aegle marmelos	Udupi, Karnataka	L(1), F(2)	1. Aq 2. 50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Aegle marmelos (L.) Correa ex Roxb.	HGHRI, Joginder Nagar, Mandi	L	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Aegle marmelos Corr.	Lucknow	SB	50% Et	Catechin(1,2,3,4)	1. SOD mimetic activity 2. LPO inhibitory potential 3. NO quenching capacity 4. ABTS assay	Kumari and Kakkar, 2008
Citrus aurantifolia	Jalandhar, Punjab	L	Aq:Et (80%)	Ascorbic acid (2)	1. Beta carotene bleaching method 2. DPPH radical scavenging activity	Kaur and Mondal, 2014
Santalaceae						
Santalum album	Udupi, Karnataka	-	50% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Sapindaceae						
Dodonaea viscosa	Attapady area, Palakkad, Kerala	WP	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010

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Saururaceae						
Houttuynia cordata Thunb.	Sonitpur, Assam	L	Met	Ascorbic acid	DPPH radical scavenging activity	Kumar *et al.,* 2009
Scrophulariaceae						
Bacopa monniera (Linn.) Pennell	Kerala	WP	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Bacopa monniera Linn	Loni and adjoining areas, Maharashtra	L	Et (80%)	BHT (1,2), Vitamin C (1,2)	1. DPPH radical scavenging activity 2. Reducing power assay	Padmanabhan and Jangle, 2012
Bacopa monnieri (L.) Pennell	HGHRI, Joginder Nagar, Mandi	WP	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Bacopa monnierii Linn.	NIPER, Punjab	WP	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Picrorhiza kurroa Royle ex benth.	HGHRI, Joginder Nagar, Mandi	RS	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Picrorrhiza kurroa	Udupi, Karnataka	-	95% Et	-	Assay of nitric production	Jagetia and Baliga, 2004
Verbascum thapsus	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Simaroubaceae						
Simarouba glauca	Thrissur, Kerala		PetEth, EtyAt	Ascorbic acid (1-3)	1. Total antioxidant capacity assay 2.Hydroxyl radical scavenging activity 3. DPPH radical scavenging activity	Santhosh *et al.,* 2016
Smilacaceae						
Smilax china Linn.	India	Rh	Et	-	1. Effect on $FeSO_4$ induced lipid peroxidation 2. Effect on aerial oxidation of the reduced glutathione 3. Effect on superoxide and hydroxyl radicals	Tripathi *et al*., 2001
Smilax zeylanica L.	Haniya, Hosanagarataluk, Shivamogga, Karnataka	L,F	Met	Ascorbic acid	1. DPPH radical scavenging activity 2. Ferric reducing assay	Dhanya Shree *et al.,* 2018
Solanaceae						
Cestrum nocturnum	Botanical Garden of BHU, Varanasi	L	Aq	Ascorbic acid (1,2,3,4,5)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity assay 3. Superoxide radical scavenging activity assay 4. Hydrogen peroxide scavenging activity assay 5. Reducing power	Keshari *et al.,* 2018
Datura metel	Attapady area, Palakkad, Kerala	L	Met	Ascorbic acid	DPPH radical scavenging assay	Sini *et al.,* 2010
Datura stramonium	Kodaikanal (South India)	-	-	BHT	Inhibition of lipid peroxidation	Kumar *et al.,* 2008

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Solanum indicum	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Solanum indicum Linn.	Kaloha, Kangra, HP	L	Met, Act, Aq	Ascorbic acid	1. DPPH radical scavenging activity 2. Reducing power assay	Rana *et al.,* 2017
Solanum nigrum L.	ARC, NBRI, Lucknow	F	Met		DPPH radical scavenging activity	Veeru *et al.,* 2009
Solanum xanthocarpum Schrad. & H. Wendl.	Junagadh, Gujarat	Ap	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Withania coagulans	Botanical Garden of BHU, Varanasi	F	Aq	Ascorbic acid (1,2,3,4,5)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity assay 3. Superoxide radical scavenging activity assay 4. Hydrogen peroxide scavenging activity assay 5. Reducing power	Keshari *et al.,* 2018
Withania somnifera (L.) Dunal	Local vendor of Kolkata, WB	R	Met:Aq (7:3)	Ascorbic acid (1,8,9), Mannitol (2), Quercetin (3), Curcumin (4), Gallic acid (5), Sodium pyruvate (6), Lipoic acid (7)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. Superoxide radical scavenging activity 4. Nitric oxide radical scavenging activity 5. Peroxynitrile anion scavenging 6. Hydrogen peroxide scavenging assay 7. Singlet oxygen scavenging 8. Hypochlorous acid scavenging 9. Reducing power	Chaudhuri *et al.,* 2012
Withania somnifera (L.) Dunal	HGHRI, Joginder Nagar, Mandi	R	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Withania somnifera (Linn.) Dunal.	Kerala	R	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Sterculiaceae						
Helicteres isora L.	Nanded, Maharashtra		Aq, Et, Hex	Ascorbic acid (1-3)	1. DPPH radical scavenging activity 2. Hydroxyl radical scavenging activity 3. Superoxide radical scavenging activity	Shaikh *et al.,* 2014
Symplocaceae						
Symplocos racemosa Roxb.	Marathwada, Maharashtra	S	Et	Trolox (1-3)	1. DPPH radical scavenging activity 2. Reducing power assay 3. β-Carotene-linoleci acid assay	Nile *et al.,* 2017
Taxaceae						
Taxus baccata L.	HGHRI, Joginder Nagar, Mandi	L	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Theaceae						

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Camellia sinensis L.	India	L	98% Met	BHT(1,2,3), α-to-copherol(1,2,3)	1. FTC Method 2. TBA method 3. DPPH free radical scavenging assay	Aqil *et al.,* 2006
Trichopodaceae						
Trichopus zeylanicus Gaertn.	NIPER, Punjab	AP	Met	Vitamin C (1), Vitamin E (2)	1. Free radical scavenging activity (DPPH) 2. Lipid peroxidation assay	Jadhav and Bhutani, 2002
Valerianaceae						
Nardostachys jatamansi DC.	Kerala	Rh	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Valeriana wallichii DC.	Kerala	R	Met	Gallic acid, Ascorbic acid	DPPH radical scavenging activity	Mathew and Subramanian, 2014
Verbenaceae						
Callicarpa arborea Roxb.	Dampa TRF, Mizoram	L	Met	Ascorbic acid (1,2,3)	1. ABTS radical cation decoloration assay 2. DPPH radical scavenging activity 3. Reducing power assay	Singh *et al.,* 2016
Gmelina arborea	Vallabh Vidyanagar, Gujarat	S, L	Met	BHT	DPPH radical scavenging assay	Patel *et al.,* 2010
Gmelina arborea	VNSGU	L	Met	Ascorbic acid (1), BHT (2)	1. DPPH radical scavenging activity 2. Reducing power assay	Soni and Sosa, 2013
Gmelina arborea Roxb.	Western Ghats, Maharashtra	SB	Met	Ascorbic acid	1. DPPH radical scavenging activity 2. Reducing power assay 3. Hydrogen peroxide scavenging assay 4. Nitric oxide radical scavenging activity 5. Hydroxyl radical scavenging activity	Patil *et al.,* 2009
Vitex negundo	Udupi, Karnataka	L	95% Et, MCh:Met, Aq	-	Assay of nitric production	Jagetia and Baliga, 2004
Vitex negundo Linn.	Devthana-Nandri, Sirmaur HP	L	Met, Act, Aq	Ascorbic acid	1. DPPH radical scavenging activity 2. Reducing power assay	Prakash *et al.,* 2017
Vitaceae						

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Cissus quadrangularis (L.)	TN	AP	Et, Met	Quercetin (1-6)	1. DPPH radical scavenging 2. Hydroxyl radical scavenging activity assay 3. ABTS radical scavenging property 4. Nitric oxide radical scavenging activity 5. Superoxide radical scavenging activity assay 6. Reducing power assay	Dhanasekaran, 2020
Cissus quadrangularis L.	Mysore	S	Ethyl acetate, Met, Aq, n-Hex	BHA(1,2)	1. DPPH radical scavenging assay 2. β-carotene linoleic acid model	Murthy *et al.,* 2003
Cissus quadrangularis L.	Shimoga, Karnataka	L	Met	Ascorbic acid(1,2,4,5), Rutin(1,2,4,5,7), BHA(4,6)	1. Scavenging of ABTS radical cation 2. DPPH radical scavenging method 3. Scavenging of hydroxyl radical by deoxyribose method 4. Scavenging of hydroxyl radical by p-NDA method 5. Scavenging of hydrogen peroxide 6. Lipid peroxidation inhibitory activity 7. Nitric oxide radical inhibition assay 8. Scavenging of superoxide radical by alkaline DMSO method	Badami and Channabasavaraj, 2007
Zingiberaceae						
Alpina calcarata	BGMCC, Bangalore	L	Aq, Et	-	DPPH radical scavenging assay	Narayanaswamy and Balakrishnan, 2011
Alpinia galanga (L.) Willd.	NBU and Calicut university	Rh	Et	Quercetin	DNA protection assay	Nag *et al.,* 2019
Alpinia galangal	India	L	50% Met	Quercetin (2,3), Ascorbic acid(2,3)	1. Auto-oxidation of β-carotene and linoleic acid assay 2. DPPH free radical scavenging activity 3. Reducing power	Prakash *et al.,* 2007
Alpinia zerumbet (Pers.) B.L. Burtt	NBU and Calicut university	Rh	Et	Quercetin	DNA protection assay	Nag *et al.,* 2019
Curcuma amada Roxb.	Junagadh, Gujarat	Rh	Chlo, Met, Aq	Ascorbic acid (1,2)	1. DPPH radical scavenging activity 2.Nitric oxide scavenging activity	Bhatt *et al.,* 2019
Curcuma caesia Roxb.	Nambol, Bishnupur, Manipur	Rh	PetEth, EtyAt, Et, Met, Aq	Ascorbic acid (2)	1. DPPH radical scavenging activity 2. Reducing power assay	Devi *et al.,* 2015
Curcuma caesia Roxb.	NBU and Calicut university	Rh	Et	Quercetin	DNA protection assay	Nag *et al.,* 2019
Curcuma longa L.	HGHRI, Joginder Nagar, Mandi	Rh	Met	BHT (1), Iron sulphate	1. DPPH radical scavenging activity 2. FRAP assay	Guleria *et al.,* 2013
Zingiber officinale	Loni and adjoining areas, Maharashtra	Rh	Et (80%)	BHT (1,2), Vitamin C (1,2)	1. DPPH radical scavenging activity 2. Reducing power assay	Padmanabhan and Jangle, 2012
Zingiber officinale Rosc.	NBU and Calicut university	Rh	Et	Quercetin	DNA protection assay	Nag *et al.,* 2019
Zingiber zerumbet (L.) Smith	NBU and Calicut university	Rh	Et	Quercetin	DNA protection assay	Nag *et al.,* 2019

Places:

AP=Andhra Pradesh, TN=Tamil Nadu, HP=Himachal Pradesh, MP=Madhya Pradesh, UP=Uttar Pradesh, WB=West Bengal, JK=Jammu and Kashmir, WG=Western Ghats, NIPER=National Institute of Pharmaceutical Education and research, ARC=Auraon Research Center, NBRI=National Botanical Research Institute, SFA= Seshachalam Forest Area, PMF=Pichavaram Mangrove Forest, BNIC=Bhupal Nobles Institute Campus, HGHRI=Herbal Garden and Herbarium Research Institute, AUC= Andhra University Campus, BGMCC=Botanical Gardens of Mount Carmel College, Bangalore, CIAH=Central Institute for Arid Horticulture, DIPSAR=Delhi Institute of Pharmaceutical Science and Research , VNSGU=Veer Narmad South Gujarat University, TRF=Tiger reserve forest, AHG=Amity Herbal Garden, BHU=Banaras Hindu University, NBU=North Bengal University

Methods:

DPPH=1,1-diphenyl-2-picryl hydrazyl, ABTS=2,2'-azinobis (3-ethylbenzothiazoline-6-sulphonic acid), BHA=Butylated hydroxyamsole, BHT=Butylated hydroxytoluene, LPO=Lipid peroxidation, LDL=Low density lipoprotein, MDA= Malondialdehyde, NBT=Nitroblue Tetrazolium, GSH=Glutathione, SOD=Superoxide dismutase, FRAP=Ferric reducing antioxidant power, FTC=Ferric thiocyanate, TBA=Thiobarbituric acid, TBARS=Thiobarbituric acid reactive substances, **Solvents:** Met=Methanol, Aq=Aqueous, Alc=Alcohol, Et=ethanol, EtyAl=Ethyl Alcohol, EtyAt=Ethyl acetate, Act=Acetone, n-Hex= n-hexane, MCh:Met=Methylene Chloride:methanol, Hex=Hexane, , Bnz=Benzene, Met-HCl=Methanol-HCl, PetEth=Petrolium ether, Chlo=Chloroform, DCM=Dichloro methane, FTC=Ferric Thiocyanate, TBA=Thiobarbituric acid, AST=Aspartate aminotransferase, ALT=Alanine aminotransferase, GPX=Glutathione peroxidase,

Plant parts:

L=Leaves, F=Fruits, Fl=Flowers, S=Stem, SB=Stem Bark, R=Roots, Rh=Rhizome, Bu=Bulb, WP= Whole plant, Se= Seeds, LS=Leafy Shoot, Sh=Shoot, MJ=Milky Juice, YSL=Young Shoot Leaves, B=Bark, RB=Root Bark, T=Twigs, AR= Aerial Root, AP=Aerial part, UdP=Underground Part, P=Pods, Tu=Tubers, RS= Root stolen, FL=Fleshy leaf, LG=Leaf gall, WF=Whole Fruit, St=Stigma, Fp=Fruit pulp, Fruit skin=Fs, Ec=Epicarp, HW=Heart wood, Pe=Peel, Ri=Rind

bark and *P. pterocarpum* leaf showed higher nitric oxide inhibition. Some plants of Zingiberaceae family were studied by Nag *et al.,* (2019), using DNA protection assay for their antioxidant potential.

By using DPPH free radical scavenging assay, Chauhan *et al.,* (2020) and Singh *et al.,* (2020) examined free radical scavenging activity of *Geranium nepalense* Sweet. and *Caltha palustris* L., respectively. Arulkumar *et al.,* (2020) tested the antioxidant potential of the leaves of three Indian mangroves by using various radical scavenging methods and found that all the plants showed increase in antioxidant property in dose dependent manner. Same pattern was shown by *Cissus quadrangularis* (L.) aerial part extracts when analyzed for antioxidant activity by various radical scavenging methods (Dhanasekaran, 2020).

CONCLUSION

According to the table, more than eighty families of plants have been analyzed for antioxidant potential and among all the families, medicinal plants belong to family Fabaceae are most studied for antioxidant activity followed by Lamiaceae, Asteraceae, Solanaceae, Zingiberaceae. Table also suggests that the *Ocimum sanctum, Terminalia chebula, Cassia fistula, Achyranthes aspera, Syzygium cumini, Tinospora cordifolia*, *Moringa oleifera* and *Centella asiatica* are the medicinal plants which are highly investigated by different researchs at different periods of time. About the solvent, table expressed that methanol was highly used for extraction followed by aqueous solvent. DPPH free radical scavenging method was found to be most common method for testing free radical scavenging activity and Ascorbic acid followed by BHT was considered as standered in most of the cases as per the table listing medicinal plants, tested for antioxidant activity.

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