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HERBAL REMEDIES OF ANTIOXIDANT ACTIVITY: A LITERARY REVIEW

Suchita Mittal[1] and Praveen K. Dixit*[1]

*[1]Department of Pharmacology, Jaipur College of Pharmacy, Jaipur, Rajasthan, India.

ABSTRACT

Herbs and berry crops have been shown to enclose sky-scraping levels of antioxidant compounds. Plants are a superior basis of biologically vigorous compounds known as phytochemicals. Oxidative stress occurs when the formation of free radicals increases. Antioxidants have been reported to avert oxidative injure caused by free radical. A lot of preceding narrative rumour indicated that natural antioxidants possess a wide range of biological activities, together with inhibition of reactive oxygen species (ROS) generation, direct or indirect scavenging of free radicals and alteration of intracellular redox reactions. Antioxidant systems decrease or thwart detrimental effects of the ROS. There is at this time enormous interest in natural antioxidants and their role in human health and nutrition.

KEYWORDS

Antioxidant activity, Herbal Plants and Free radicals.

Author of Correspondence:

Praveen K. Dixit,

Department of Pharmacology,

Jaipur College of Pharmacy,

ISI-15, RIICO Institutional Area, Sitapura,

Tonk Road, Jaipur, Rajasthan, India.

Email: pharmindia.praveen87@gmail.com

INTRODUCTION

Since ancient times, the medicinal properties of thereby improve the quality and nutritional value of plants have been investigated in the recent scientific food. While, flavonoids are a group of polyphenolic developments throughout the world, due to their potent compounds with known properties, which include free antioxidant activities[1]. Plants are a good source of biologically active compounds known as phytochemicals. The phytochemicals have been found to act as antioxidants by scavenging free radicals, and many have therapeutic potential for free radical associated disorders[2]. Oxidation process is one of the most important routs for producing free

radicals in food, drugs and even living systems[3]. Oxidation of biological molecules has been postulated to induce a variety of pathological events such as atherogenesis, carcinogenesis and ageing[4]. Consumption of natural oxidants as free radical scavengers may become necessary to improve the depleted immune system[5]. Antioxidants interfere with the production of free radicals and also play a key role to inactivate them[6]. Antioxidants, both exogenous and endogenous, whether synthetic or natural, can be effective in preventing free radical formation by scavenging them or promoting their decomposition and suppressing such disorders[7]. Major plant antioxidants are secondary metabolites of the shikimic acid pathway and phenyl-propanoid metabolism that includes phenolics, coumarins, tannins, chalcone, flavonoid, etc[8]. In recent years, the use of natural antioxidants present in food and other biological materials has attracted considerable interest due to their presumed safely, nutritional and therapeutic value[9]. The Indian subcontinent represents one of the greatest emporia of ethno biological wealth and Western Gnats represents the second hot spot in India[10]. Natural products in general and medicinal plants in particular, are believed to be an important source of new chemical substances with potential therapeutic efficacy[11]. As flora produce a lot of antioxidants as it have power over the oxidative stress cause by sunbeams also oxygen, they can correspond to a source of new compounds with antioxidant activity[12]. The new formulation gives a positive and consistent pharmacological strategy that can meet the valid changes of medical science[13].

DESCRIPTION OF SOME PLANTS HAVING ANTI-OXIDANT ACTIVITY

Aegle marmelos[16]

In vitro activity of Methanolic extract of *Aegle marmelos* showed that it has good antioxidant activity with that IC50 value 23±0.08 thus can be used as potential inhibitor of free radicals.

Agrimony[17]

Antioxidant activities of the ethyl acetate soluble fraction (ESF) and butanol soluble fraction (BSF) of agrimony acetone extract. The ESF and BSF were investigated for their antioxidant activities by means of the 2, 2-diphenhyl-1-picrylhydrazyl (DPPH), 2, 2-azino-bis 3-ethylbenzthiazoline-6-sulphonic acid (ABTS), β-carotene-linoleate and hydroxyl radical assay. The study showed that both ESF and BSF have more effective antioxidant than butylated hydroxytoluene (BHT). It was concluded that agrimony might be a potential source of antioxidants.

Azadirachta indica[18]

The antioxidant potential of ethanolic extract of *Azadirachta indica* with reference standard ascorbic acid was evaluated by in vitro methods. Ethanolic extract of *A. indica* and ascorbic acid was evaluated for DPPH (1, 1-diphenyl-2-picrylhydrazyl) and nitric oxide radical scavenging, iron chelating and reducing power activity. Studies demonstrated a dose dependent antioxidant activity of ethanolic extract of *A. indica* comparable with standard ascorbic acid. The present study revealed that ethanolic extract of *A. indica* leaves exhibit significant in vitro free radical scavenging properties.

***Andrographis paniculata* Nees**[19]

The leaf were extracted using various solvents such as Chloroform, Petroleum ether, Acetone, Ethyl alcohol, Isoamyl alcohol and Water (according to the non polar to high polar used for the extraction). The ethanolic extracts were screened for their in vitro antioxidant potential. Inhibition of oxygen derived free radicals, viz., assays for free radical scavenging by 2, 2- diphenyl -1 picryl hydrazyl (DPPH), reducing power ability and nitric oxide scavenging were performed. The antioxidant activity was compared with standard antioxidant such as D-ascorbic acid. The ethanolic extract elucidated agreeable antioxidant activity.

***Bergenia ciliata* (Haw.) Sternb**[21]

The study was to evaluate antioxidant activity of methanolic and aqueous extracts of *Bergenia ciliata* (Haw.) Sternb. rhizome. Free radical (DPPH and OH) scavenging potential of the extracts revealed that both extracts to be active radical scavengers. Reducing (Fe+3-Fe+2) power and lipid peroxidation inhibition efficiency (TBARS assay) of both extracts

were also evaluated and both extracts showed promising activity in preventing lipid peroxidation and might prevent oxidative damages to biomolecules.

Calotropis gigantea[23]

The different parts of *Calotropis gigantea* and *Vinca rosea* belonging to the families of Asclepiadaceae and Apocynaceae were studied for their antioxidant and antimicrobial activities against selected bacterial strains. From the results it was evident that the flower of *Vinca rosea* showed the highest antioxidant activity of 97.44% at 800 µg which was higher than the standard L-ascorbic acid (94%) and *Calotropis gigantea* showed the least.

***Cassia fistula* L**[24]

The antioxidant activities of *C. fistula* stem bark extract were evaluated with lipid peroxides test using ferric thiosyanat method (FTC) and 2.6-di-t-butyl-4-metilfenol (BHT) as standard equivalent antioxidant capacity. *C. fistula* stem bark maceration successively used solvent normal hexane (non polar), ethyl acetate (semi-polar) and methanol (polar). The ethyl acetate extract (Ea) shows higher antioxidant activity than the n-hexane extract (Hx) and methanol extract (MeOH). Therefore, the sequence of antioxidant activity is as follows ethyl acetate extract > methanol extract > n.hexane extract, with antioxidant activity consecutively at 5 hours: 65.98%, 58.19% and 32.66%.

Chromolaena odorata[26]

The evaluation of the antioxidant potential of the methanolic extract was also carried out. Tests for tannins, steroids, terpenoids, flavonoids and cardiac glycosides were positive in both methanolic and aqueous extracts. Alkaloids were detected only in the methanolic extract. The total phenolic content, reducing power and percent DPPH scavenging effect were 0.01 ± 0.00 mg/g GAE, 0.22 ± 0.01 and 28.85 ± 0.99%, respectively.

***Houttuynia cordata* Thunb**[32]

Antioxidant activities of extracts obtained from flower, leaf, stem, and root of two *H. cordata* accessions and their contents of phenolic compounds and flavonoids were evaluated. Results indicated that the total phenolic contents ranged from 1.90 to 10.26 mg gallic acid g-1 dw. The flavonoid contents were between 0.751 to 12.4 mg rutin g-1 dw. The total phenolic and flavonoid contents, as well as antioxidant activities, as observed in flower and leaf were generally higher than that in root and stem. The two *H. cordata* accessions tested showed no significant difference within antioxidant activities. The leaf and flower of *H. cordata* as potential natural antioxidant for food and medical products.

Momordica charantia[37]

The total antioxidant and free radical scavenging activities in methanolic and chloroformic were measured by ferric thiocyanate (FTC), thiobarbituric acid (TBA) and 1, 1-diphenyl-2-picryl-hydrazyl (DPPH) methods. The total antioxidant activity results indicated that, the inhibition percent of methanolic extract was significantly higher than the inhibition percent of chloroformic extract in the FTC and TBA methods. Methanolic extract contained more potent antioxidant and high polyphenol compounds when compared with chloroformic extract.

***Premna serratifolia* Linn**[40]

The antioxidant activity was evaluated by various antioxidant assays, including 1, 1-diphenyl-2-picrylhydrazyl (DPPH), 2, 2'-azino-bis (3-ethylbenzthiazoline-6-sulfonic acid) (ABTS), and hydrogen peroxide scavenging method. The antioxidant activities were compared to standard antioxidant ascorbic acid. *P. serratifolia* Linn wood extract showed a significant antioxidant activity in DPPH, ABTS and H2O2 scavenging methods. *P. serratifolia* Linn could be a potential source of natural antioxidant that could have greater importance as therapeutic agent in preventing or slowing oxidative stress related degenerative diseases.

Portulaca oleracea[42]

The anti-oxidant activity of the methanolic extract of *Portulaca oleracea* was evaluated by TLC and HPTLC fingerprint method. Anti-oxidant activity of methanolic extract was determined by DPPH free radical scavenging activity, reducing power by $FeCl_3$, nitric oxide free radical scavenging activity,

super oxide scavenging activity by alkaline DMSO method.

Teucrium ramosissimum[46]

The antioxidant activities of the tested extracts were evaluated through three chemical assays which are (1): The cupric reducing antioxidant capacity (CUPRAC), (2) The reducing power (RP) and (3) The ferric reducing antioxidant power (FRAP). Total oligomer flavonoids enriched extract (TOF) showed the best antioxidant activity evaluated by the CUPRAC and FRAP assays with trolox equivalent antioxidant capacity (TEAC) values of 12.85 and 0.525 μM, respectively compared to control.

Tylophora asthmatica[51]

The methanolic extract of *T. asthmatica* had a 2, 2 diphenyl 1-1-picryl hydiazyl (DPPH) scavenging activity of 84.6% at 250 μg/ml and a reductive potential of 0.77% at 100 μg/ml. These values were comparable with those of Gallic acid, 91.4% at 250 μg/ml and ascorbic acid, 0.79% at 60 μg/ml as standards for DPPH scavenging activity and reductive potential, respectively. The rich phytochemical content of *T. asthmatica* and its good antioxidant activity may be responsible for its popular and wide traditional use.

Table No.1: List of Herbal Sources having Anti-Oxidant Potential

S.No	Botanical Name	Family	Part Used	Extract used
1	*Albizzia lebbeck*[14]	Mimosaceae	Leaves	Aqueous
2	*Acorus calamus*[15]	Acoraceae	Leaves and rhizomes	Methanolic
3	*Aegle marmelos*[16]	Rutaceae	Leaves	Methanolic
4	*Agrimony*[17]	Rosaceae	Leaves	Acetone
5	*Azadirachta indica*[18]	Meliaceae	Leaves	Ethanolic
6	*Andrographis paniculata* Nees[19]	Acanthaceae	Leaves	Chloroform, Petroleum ether, Acetone, Ethyl alcohol, Isoamyl alcohol and Water
7	*Baccopa monnieri*[20]	Scrophulariaceae	Leaves	Methanolic
8	*Bergenia ciliata* (Haw.) Sternb[21]	Saxifragaceae	Rhizome	Methanolic and aqueous
9	*Catharanthus roseus* L[22].	Apocynacae	Leaves	Methanolic
10	*Calotropis gigantea*[23]	Asclepiadaceae	Root, stem, leaves, flower and seeds	Methanol

11	*Cassia fistula* L[24].	Leguminosae	Stem bark	Hexane, methanol ethylacetate,
12	*Cassia tora* Linn[25]	Fabaceae	Leaves	Ethanolic
13	*Chromolaena odorata*[26]	Asteraceae	Leaves	Aqueous and methanolic
14	*Costus afer* Ker-Gawl[27]	Costaceae	Stem	Aqueous and methanolic
15	*Daphne gnidium*[28]	Thymelaeaceae	Leaves	Petroleum ether, chloroform, ethyl acetate, methanol
16	*Doronicum hookeri* Hook f[29].	Asteraceae	Roots	Dichloromethane and methanol
17	*Flaveria trinervia*[30]	Asteraceae	Leaves	Petroleum ether, chloroform, methanol and ethanol
18	*Heliotropium strigosum*[31]	Boraginaceae	Whole plant	Methanol
19	*Houttuynia cordata* Thunb[32]	Saururaceae	Flower, Leaves, stem, roots	Aqueous ethanol
20	*Hypericum foliosum*[33]	Hypericaceae	Aerial parts, young leaves, old leaves, stem bark, stems, root and seed capsules	Methanolic
21	*Ipomoea leari*[34]	Convolculaceae	Roots	n-hexane, chloroform, ethyl acetate and hydromethanolic
22	*Leonotis leonurus*[35]	Lamiaceae	Leaves	Aqueous
23	*Mallotus tetracoccus* (Roxb.) Kurz[36]	Euphorbiaceae	Bark	Ethanolic
24	*Momordica charantia*[37]	Cucurbitaceae	Fruit	Methanolic and

				chloroformic
25	*Mimusops elengi* Linn[38]	Sapotaceae	Leaves, flowers, bark and fruits	Water, methanol, pet.ether
26	*Nilumbo nucifera*[39]	Proteaceae	Rhizome	Hexane, water choloform,ethanol,
27	*Premna serratifolia* Linn[40]	Verbenaceae	Wood	Ethanol
28	*Premna integrifolia* Linn. Mant[41]	Verbanaceae	Roots	Methanolic
29	*Portulaca oleracea*[42]	Portulacaceae	Herb	Methanolic
30	*Pulicaria undulata* (L.) C.A. Mey[43]	Compositae	Aerial part	Ethanolic
31	*Rosmarinus officinalis*[44]	Lamiaceae	Aerial part	Aqueous
32	*Selaginella willdenowii*[45]	Selaginellaceae	Aerial part	Aqueous
33	*Teucrium ramosissimum*[46]	Lamiaceae	Leaves	Pet. Ether, chloroform, methanol
34	*Tagetes erecta* L[47].	Asteraceae	Flower	Ethylacetate, ethanol
35	*Terminalia arjuna*[48]	Combretaceae	Bark	Acetone,methanol, chloroform, isopropylalcohol and water.
36	*Tinospora cordifolia*[49]	Menispermaceae	Leaves	Hexane, water chloroform, methanol,ethanol
37	*Torilis leptophylla*[50]	Apiaceae	Whole plant	Methanol
38	*Tylophora asthmatica*[51]	Asclepidaceae	Leaves	Methanolic
39	*Wedelia chinensis*[52]	Asteraceae	Leaves	Hydrodistillation
40	*Yucca aloifolia*[53]	Agavaceae	Leaves	Methanol

CONCLUSION

Antioxidant grades in this revision can be use to save from harm aligned with the damage induced by free radicals acting at an assortment of levels. It is probable to diminish the risks of chronic diseases and avert disease progression by either enhancing the body's natural antioxidant defences or by supplementing with confirmed dietary antioxidants. This article gives overview that some conventionally used medicinal plants are significant sources of potential antioxidants and may be resourceful as anticipatory agents in some diseases.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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