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A Review on Anti- Inflammatory and Anti-Oxidant Activity of Polyherbal Plant Extracts

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Abstract

A lot of medicinal plants, traditionally used for thousands of years, are present in a group of herbal preparations of the Indian traditional health care system named Rasayana proposed for their interesting antioxidant activities. Our country is a rich source of both biological and chemical diversity, which may be useful as a source of novel chemical structures. The timber value of Tectona grandis has been well known from decades. In The present study was meant to characterize pharmacological potential of different extracts from leaf, bark and stem of **(Curcuma longa L., Abutilan indica L., Momordica charantia L., *Solanum nigrum L., Tinospora cordifolia L., Abutilon indicum L.*,)** are viewed for their historical, etymological, morphological, Phytochemical and pharmacological aspects. The plants described contain antioxidant and anti-inflammatory principles. A comparative phytochemical analysis was carried to prove that the amount of phyto constituents varied with the fresh and dry stages of plants contributing to the activity of the extract. Total phenolic and saponnins content of both the extracts was estimated and was found to be more in the leaf, bark and stem giving positive results and the presence of steroids and Terpenoids also showed in leaf and stem. Antioxidant activity of extracts was carried out using ferulic acid and 2, 2-diphenyl-1- picrylhydrazyl (DPPH) assay and anti-inflammatory activity of the extract were also made. The anti-inflammatory activity was done by in-vivo model i.e. the carrageenan induced rat paw edema model, this extract reduced carrageenan induced rat paw edema in a dose dependent manner. This work stimulates the researchers for further research on the potential use of medicinal plant barks having anti-oxidant and anti-inflammatory property.

Key words: medicinal plant, anti-oxidant and anti-inflammatory activity, herbal extract

Contents

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1. Introduction

The tribal and rural population of India largely depends on medicinal plants for their health care as well as for their livestock. This attracted the attention of several botanists that lead to an array of reports on ethnomedicine.1The evaluation of these drugs is primarily based on Phytochemical, pharmacological and allied approaches including various instrumental techniques such as chromatography, microscopy and others. With the emerging worldwide interest in adopting and studying traditional systems and exploiting their potential based on different health care systems, the evaluation of the rich heritage of traditional medicine is essential. Drugs which are used presently for the management of pain and inflammatory conditions are either steroidal like corticosteroids or non steroidal like aspirin. All of these drugs possess more or less side and toxic effects like renal failure, allergic reactions, hearing loss or they may increase the risk of hemorrhages by affecting platelet function. On the contrary many medicines of plant origin had been used since ages without any adverse effects. It is therefore essential that efforts should be made to introduce new medicinal plants to develop more effective and cheaper drugs. Plants represent a large natural source of useful compounds that might serve as lead for the development of novel drugs. It is very important that profound research with ethno botanical plants possessing anti-inflammatory and analgesic properties can definitely open up new vistas in inflammatory disorders. Purified natural compounds from plants can serve as template for the synthesis of new generation anti-inflammatory drugs with low toxicity and higher therapeutic value. This article reviews such medicinal plants with anti-inflammatory and anti-oxidant properties which have been used by our ancestors to cure many of their ailments.

Table 1. Plants having Anti-oxidant and Anti-Inflammatory activity

S.No	Botanical Name	Family	Part used	Chemical Constituent	Activity	Ref
1	*Solanum nigrum*	Solanaceae	leave	Solanidine, solanine,beta 2- solamargine	Anti-Oxidant And Anti-Inflammatory	4
2	*Tinospora cordifolia*	Menispermaceae	Stem	Tinosporine, tinosporide, tinosporidine,	Anti-Oxidant And Anti-Inflammatory	5
3	*Abutilon indicum*	Malvaceae	leave	β-Sitosterol, quinque	Anti-Oxidant And Anti-Inflammatory	6
4	*Mitragyna parvifolia*	Rubiaceae	fruits	pyroligneous acid,methyl acetate, ketones and aldehydes	Anti-inflammatory, Analgesics	8
5	*Tectona grandis*	Vervenaceae	Leaves	quinones, steroids, glycosides, flavonoids, alkaloids, saponin	Anti-inflammatory	9
6	*Emblica officinalis* Gaertn.	Euphorbiaceae	Fruit	punigluconin (12%) and pedunculagin (14%	Anti-oxidant	11
7	*Momordica charantia* L.;	cucurbitacae	Fruit	Glycolipids,Phospolipids	Anti-oxidant	14

I. Inflammation and Non-steroidal anti-inflammatory drugs (NSAIDs)

The inflammatory process may be defined as a sequence of events that occurs in response to noxious stimuli, infection or trauma. The classic signs of inflammation are local redness, swelling, pain, heat and loss of function. The events of inflammation that underline these manifestations are induced and regulated by a large number of chemical mediators, including kinins, eicosanoids, complement proteins histamine and monokines. NSAIDs are among the most commonly used drugs worldwide. They are prescribed for orthopedics conditions such as osteoarthritis, soft-tissue injuries and fractures etc. NSAIDs are one of the best classes of drug to prevent and treat postoperative pain. The greatest disadvantage in presently available potent synthetic drugs lies in their toxicity and reappearance of symptoms after discontinuation. Therefore, the screening and development of drugs for their anti-inflammatory activity is the need of hour and there are many efforts for finding anti-inflammatory drugs from indigenous medicinal plants. The use of NSAIDs is associated with many side effects, but their unwanted effects on the gastrointestinal tract, the kidney and the cardiovascular system are considered as major issues with the use of these drugs. The mechanism of inflammation is attributed, to release of ROS from activated neutrophils and macrophages. ROS over production results tissue injury by damaging macromolecules and lipid per oxidation of membranes. In addition, it propagate inflammation by stimulating release of cytokines such as IL-1, TNF- α and interferon-γ which are responsible for the recruitment of additional neutrophils and macrophages. Thus free radicals are important mediators that provoke or sustain inflammatory responses and their neutralization by antioxidants and radical scavengers can reduce inflammation (Filomena Conforti, 2008).

2. Anti-Inflammatory Activity

Carrageenan-induced rat paw edema

Four group of six rat were taken. Group I (control) was treated with carboxymethylcellulose (10ml/kg) which is used as a vehicle. Group II (Standard) was treated with 10mg/kg of Indomethacin by oral route. Group III and Group IV (test) was treated with 200 mg/kg and 100mg/kg of Plant extract by oral route. After 30 mins of test drug administration, 0.1% of carrageenan (0.1ml) was administered into the sub plantar tissue of right hind paw (Raji Y,2002). After a duration of 30min, 1 hr, 2hr, 3hr and 4hr, the paw volume was measured by the digital plethylsmograph. The percentage of edema inhibition was calculated by the formula.

3. Anti-Oxidant Activity

As plants produce a lot of antioxidants to control the oxidative stress caused by sunbeams and oxygen, they can represent a source of new compounds with antioxidant activity. Ayurveda, the Indian traditional health care system (ayus- Life, veda-knowledge, meaning science of life), is the oldest medical system in the world and is being revived in its complete form under the name of Maharishi Ayurved (Glaser, 1988). These preparations contain a wide number of plants. Among the different plants, seven of them have been specifically investigated for their well-demonstrated antioxidant activity:

a. Emblica officinalis L.
b. Curcuma longa L.
c. Mangifera indica L.
d. Momordica charantia L.
e. Santalum album L.
f. Swertia chirata Buch-Ham
g. Withania somnifera L.
h. Abutilaan Indicum L.

Antioxidant Activity

DPPH Free Radical Scavenging Method

A stock solution of 100µg/ml was prepared of *Plant extracts* as well as of standard ascorbic acid. Different concentrations were made of 10, 20, 30, 40, 50 and 100 µg/ml from stock solutions using methanol and 0.1mM solution of DPPH in methanol was prepared in a volumetric flask which was completely kept away from light. Then 1ml of all concentration of test and standards were mixed with 1ml of DPPH solution. This solution was kept for 30 min in dark. Only methanol with DPPH was used as control. Absorbance of all the samples was taken on UV spectrophotometer.

(**% Inhibition** = [{Acont - Atest/std} / Acont] × 100)
Atest/std = Absorbance of test or standard
Acont = Absorbance of control

IC50 values were calculated from linear regression by plotting the graph between concentration and % inhibitions (Bandgar, B.P, 2009). IC50 resembles that it was that concentration of the sample which is required to scavenge 50% of DPPH free radicals.

4. Conclusion

Many studies have been performed to identify antioxidant and anti-inflammatory compounds with pharmacologically activity and a limited toxicity. In this context, ethnopharmacology represents the most important way possible of finding interesting and therapeutically helpful molecules. The Phytochemical analysis of extract has revealed a large number of compounds including tannic acid, flavonoids, terpenoids, carotenoids, glycosides, alkaloids, polyphenols, etc. which have been shown to have potent antioxidant properties. The herbal mixture preparations of Indian traditional medicine may have an antioxidant activity arising from their content of plants with antioxidant and anti-inflammatory activity principles, that act probably in a synergistic way.

5. References

1. Abraham, A., Constituents of Withania somnifera Dun-XIII: the withanolides of chemotype III. Tetrahedron, **1973**, 29: 1353–1364.
2. Agarwal, K., Dhir, H., Sharma, A., Talukder, G., The efficacy of two species of Phyllanthus in counteracting nickel clastogenicity. Fitoterapia , **1992**, 1 63 (1): 49–54.
3. Akthar, M.S., Athar, M.A., Yaqub, M., Effect of Momordica charantia on blood glucose level of normal and alloxan-diabetic rabbits. Planta Medica, **1981**, 42: 205–212.

4. Al-Hindawi, M.K., Al-Khafaji, S.H., Abdul-Nabi, M.H.,Anti-granuloma activity of Iraqui Withania somnifera.Journal of Ethnopharmacology, 1992,37: 113–116.
5. Ammon, H.P.T., Wahl, M.A., Pharmacology of Curcuma longa. Planta Medica, **1991**, 57: 17.
6. Aslam, M., Stockley, I.H.,. Interaction between curry ingredient (Karela) and drug (Chlorpropamide). The Lancet, **1979**, 17: 607.
7. Asmawi, M.Z., Kankaanranta, H., Moilanen, E., Vapaatalo, H., Anti-inflammatory activities of Emblica officinalis Gaertn leaf extracts. Journal Pharmacy and Pharmacology, **1993**, 45: 581–584.
8. Azuine, M.A., Kayal, J.J., Bhide, S.V., Protective role of aqueous turmeric extract agaist mutagenicity of direct-acting carcinogens as well as benzo(a)pyrene-induced genotoxicity and carcinogenicity. Journal of Cancer Reserch and Clinical Oncology, **1992**, 118: 447–452.
9. Ba¨hr, V., Ha¨nsel, R., Immunomodulating properties of 5,20a(R)dihydroxy-6a,7a-epoxy-1-oxo-(5a)-witha-2,24-dienolide and solasodine. Planta Medica, 1982, 44: 32–33.
10. Banerjee, S., Ecavade, A., Rao, A.R., Modulatory influence of sandalwood oil on mouse hepatic glutathione-Stransferase activity and acid soluble sulphydryl level. Cancer Letters, **1993**, 68: 105–109.
11. Barthakur, N., Arnold, N.P., Chemical analysis of the emblic (Phyllanthus emblica L.) and its potential as a food source. Scientific Horticulture, **1991**, 47 (1–2): 99–105.
12. Basa, S.C., Srinivasulu, C, Costituents of leaves of Phyllanthus emblica L. Chemical Abstract, **1988**, 108: 128-517.
13. Blasdell, K.S., Sharma, H.M., Tomlinson, P.F. Jr, Wallace, R.K., Subjective survey, blood chemistry and complete blood profile of subjects taking Maharishi Amrit Kalash (MAK). Faseb Journal, **1991**, 5: A1317.
14. Sakat SS, Juvekar AR And Gambhire MN, *Invitro*Antioxidant And Antiinflammatoryactivity Of Methanol Extract of *Oxalis Corniculata* Linn, International Journal of Pharmacy and Pharmaceutical Sciences, **2010,** 2(1): 146-155.
15. Nagore DH, Ghosh VK, Patil MJ, Wahile AM, In *Vitro* Antioxidant And *In Vivo* anti-inflammatory Activity of *Cassia sophera* Linn, International Journal Of Pharmacy And Pharmaceutical Sciences, 2(1), , 114-121.
16. Filomena Conforti , Silvio Sosa , Mariangela Marrelli.*et al*., *In vivo* anti-inflammatory and *in vitro* antioxidant activities of Mediterranean dietary plants. Journal of Ethnopharmacology, **2008**, 116: 144–151.
17. Urmilesh Jha, Prites J. Chhajed, Rajesh J. Oswal.*et al*.: Skeletal muscle relaxant activity of methanolic extract of Parthenium hysterophorus L. leaves in swiss albino mice. International Journal of Pharmacy and life science, **2011**, 2: 1211-1213
18. Raji Y , Udoh U.S, Oluwadara O. *et al* : Anti-inflammatory And Analgesic Properties Of The Rhizome Extract Of *Zingiber Officinale* African Journal of Biomedicine, **2002**, 5: 121 – 124
19. Aguilar AL, Rojas P, Marcelo A, Plaza A, Bauer R, Reininger E, Klaas CA, Merfort I. ‘‘Antiinflammatory activity of two different extracts of *Uncaria tomentosa* (Rubiaceae)’’. Journal of Ethnopharmacology, **2002**, 81: 271-276.