CODEN (USA): IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

Available online at: http://www.iajps.com *Research Article*

EXTRACTION OF BACCHARIS CORDIFOLIA PLANT PARTS AND ITS EVALUATION FOR ANTI OXIDANT ACTIVITY

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Abstract:

The present study is to evaluate the antioxidant activity of Baccharis cordifolia against azathioprine induced oxidative stress in rats Baccharis cordifolia posses considerable pharmacological actions such as antimicrobial, anticancer, anti-inflammator, analgesic, antiarthritic, antibacterial, anti-HIV, and antihelminthic activities. From these results, ideas for future molecular modifications leading to compounds with greater favorable pharmacological properties maybe derived. Baccharis cordifolia has antioxidant activity against Azathioprine induced oxidative stress in rats by decreasing the oxidative stress biomarkers serum creatinine, serum urea in kidneys. high scavenging activity against DPPH free radical generating system. nephropretective effect against Azathioprine induced toxicity in kidneys by observing the histopathological changes in rat kidney tissues.many pharmacological activities like anticancer, antimicrobial, anti-inflammatory, analgesic, antiarthritic, antibacterial, anti-HIV, and antihelmntic activities.

Key words : *Baccharis cordifolia, anti-oxidant, azathioprine.*

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Please cite this article in press as G. Vijaya Kumar et al, ***Extraction of Baccharis Cordifolia Plant Parts and Its Evaluation for Anti Oxidant Activity****, Indo Am. J. P. Sci, 2016; 3(12).*

INTRODUCTION:

Free radicals in Health and Disease:-A free radical is defined as any molecular species that contains an unpaired electron in the atomic orbital (Halliwell and Gutteridge, 1999). Radicals are highly reactive that either donate an electron to or extract an electron from other molecules, and therefore, behave as oxidants or reductants. As a result of their high reactivity, most radicals have a very short half life (10-6 seconds or less) in biological systems (Halliwell and Gutteridge, 1999). The most important free radicals produced in the body are oxygen derivatives, particularly superoxide and the hydroxyl radical. Examples of free radicals and reactive oxygen species include: superoxide anion radical, hydroxyl radical, nitric oxide, thiyl radical, trichloromethyl radical, hypochlorite radical, hypochlorous acid, and also some potentially dangerous non-radicals such as hydrogen peroxide, singlet oxygen, hypochlorous acid and ozone. Radical production in the body occurs by both endogenous and environmental factors

Antioxidants

An antioxidant is defined as: "any substance that, when present in low concentrations compared to that of an oxidisable substrate, significantly delays or inhibits the oxidation of that substrate" (Halliwell, 1995). The physiological role of antioxidants is to prevent damage to cellular constituents arising as a consequence of chemical reactions involving free radicals.

An ideal antioxidant: An ideal antioxidant should have the following attributes –

• No harmful physiological effects.
•Effective in low concentration. Fat-soluble.
• Carry-through effect.
• Not contribute an objectionable flavour, odour or colour to the food.
• No destruction during processing.
• Readily-available.
•Economical

Nephrotoxicity

Pathogenic mechanism of drug induced nephrotoxicity Most drugs found to cause nephrotoxicity by one or more common pathogenic mechanisms. These include altered intraglomerular hemodynamics, tubular cell toxicity, inflammation, crystal nephropathy, rhabdomyolysis, and thrombotic microangiopathy.

Mechanisms of drug induced renal damage:

a) Free radical production
b) Disturbance of renal tubule cell energy metabolism
c) Disrupted cell calcium homeostasis
d) Alteration of membrane phospholipid metabolism
e) Disruption of cellular monovalent cation volume and pH dependant degradation
f) Disruption of cytoskeleton
g) Abnormalities of cell proteases
h) Abnormalities of protein and nucleic acid synthesis
i) Distruption of lysosomal function

Aims and Objectives:-

The present study has been designed to achieve the following aims and objectives.

- To evaluate the antioxidant activity of *Baccharis cordifolia* against azathioprine induced oxidative stress in rats.
- To estimate various oxidatative stress biomarkers like Urea, and Creatinine in plasma to assess the antioxidant activity of test compound.
- To assess the antioxidant capacity of test compound by estimating superoxide dismutase in kidney tissue homogenate.
- To evaluate the antioxidant activity of test compound by examining the histopathological protection against azathioprine induces oxidative stress to kidney.

Materials

The following are the chemicals or kits used in the present investigation.

Drugs and chemicals

Azathioprine ,Ascorbic acid, DPPH ,Formaldehyde, Normal saline, Sodium citrate.,Dipotassium hydrogen phosphate, Potassium dihydrogen phosphate ,Diethyl ether , Chloroform , O-dianisidine , Ethanol , Methanol Riboflavin .

Kits used :

Urea, creatinin

Equipments:

Shimadzu Electronic Balance , U.V spectrophotometer, Ultra homogenizer, Centrifuge RM-12C, Rotary Evaporator

METHODOLOGY:

Collection and Authentification of Plant Material
Extraction of Plant Material
Cold Extraction (Methanol Extraction)
Evaporation of Solvent
% Yield value of Methanol Extract from Aerial Parts of *Baccharis cordifolia* Plant
In Vitro Method:
DPPH scavenging activity procedure
In Vivo Method:
Experimental animals
Acute toxicity study of *Baccharis cordifolia* formulation (As per OECD guide Lines number: 423):
Induction procedure:-
Induction of oxidative stress:-

Experimental design:-
Collection of blood samples and organs:
Estimation of biochemical parameters
Estimation of Superoxide Dismutase (SOD)
Estimation of serum Creatinine levels
Estimation of serum urea levels
Statistical analysis:

RESULTS AND DISCUSSION:

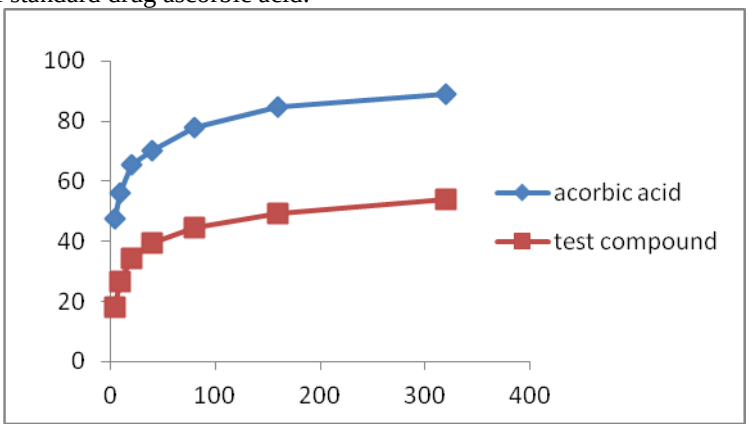
Invitro Evaluation Of Antioxidant Activity Of *Baccharis Cordifolia* Dpph Radical Scavenging Activity:

Concentrations of test compound and ascorbic acid (µg/ml)	Percentage inhibition of DPPH radical (IC_{50})	
	Baccharis cordifolia (BC)	Ascorbic acid
5	17.3±0.71	47.6±0.48
10	25.2±0.31	56.15±0.65
20	31.3±1.0	65.6±0.48
40	38.4±0.7	70±1.33
80	40.7±0.35	77.8±0.82
160	47.6±0.7	84.9±1.1
320	57.7±0.5	89.1±0.51

Concentration dependent percentage inhibition of DPPH radical by various concentrations of test compound and ascorbic acid

The test compounds have been reported to show high scavenging activity against the DPPH free radical generating system. The antiradical activity of test compound and ascorbic acid against DPPH was shown in Table and the IC_{50} values were found to be as 17.3±0.71, to57.7±0.5 increased with respectively concentrations with that of reference standard, ascorbic acid (47.6±0.48 to 89.1±0.51).

The results clearly indicate the free radical scavenging activity of test compound in vitro and this activity comparable with that of standard drug ascorbic acid.



In vitro concentration dependent percentage inhibition of DPPH radical by BC and ascorbic acid

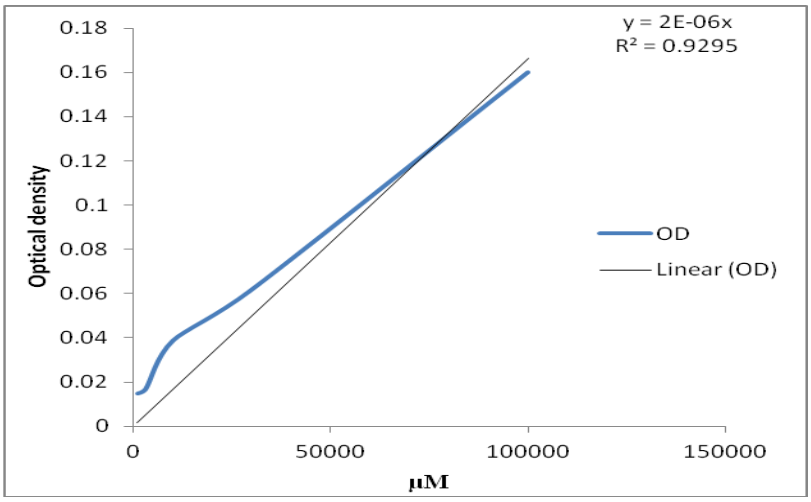
In Vivo Studies

Evaluation of Antioxidant Activity Using Azathioprine Induced Oxidative Stress in Rats

SUPEROXIDE DISMUTASE:

Table 1:Standard graph values of superoxide dismutase

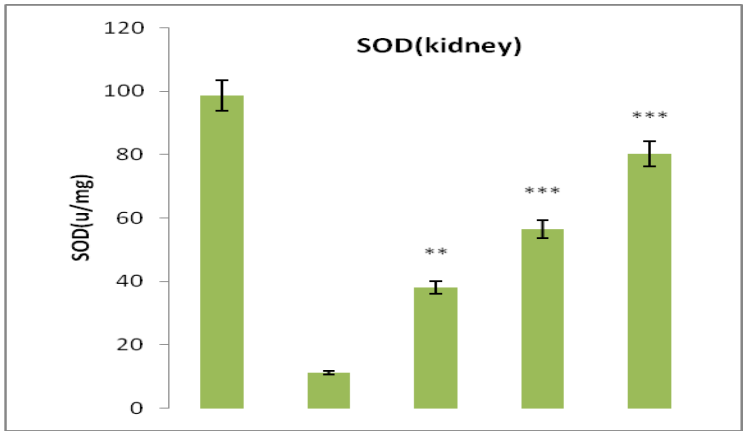
SOD(µU)	Absorbance
1000	0.015
3000	0.017
10000	0.039
30000	0.062
100000	0.16



Superoxide dismutase levels in kidney tissue homogenate

Table 2:Effect of BC on superoxide dismutase levels in kidney tissue homogenate in rats treated with AZP.

Group	SOD(U/mg) in kidney
Normal group	98.6±0.95
Toxic control (20mg/kg)	13.2±0.22
BC low dose(100mg/kg)	39.7±0.6**
BC high dose (30mg/kg)	57.6±1.1***
Standard ascorbic acid(10mg/kg)	80.2±0.84***



Serum Creatinine:

Table 3:Effects of BC on serum creatinine levels in rats treated with azathioprine

Groups name	Creatinine (mg/dl)
Normal group	3.5± 0.32
Toxic control (20mg/kg)	24.2± 0.4
BC low dose(100mg/kg)	6.1± 0.7***
BC high dose (200mg/kg)	4.8± 0.3***
Standard ascorbic acid(10mg/kg)	4.3± 0.1***

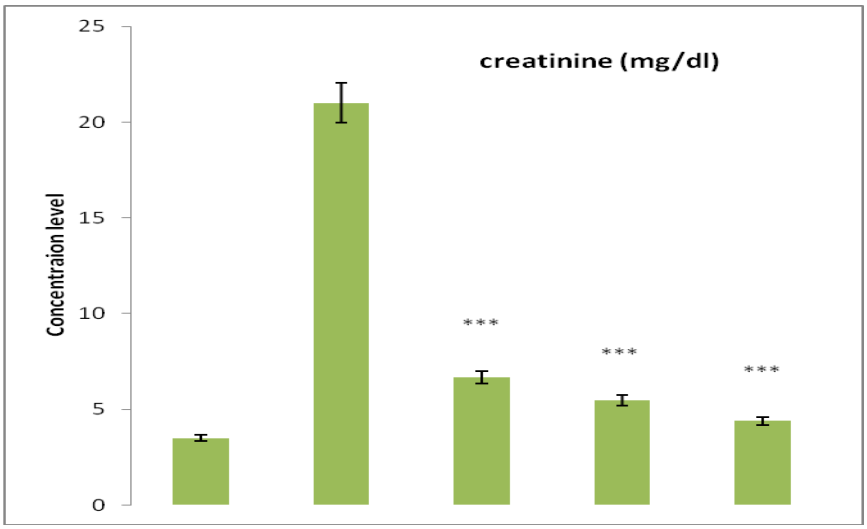
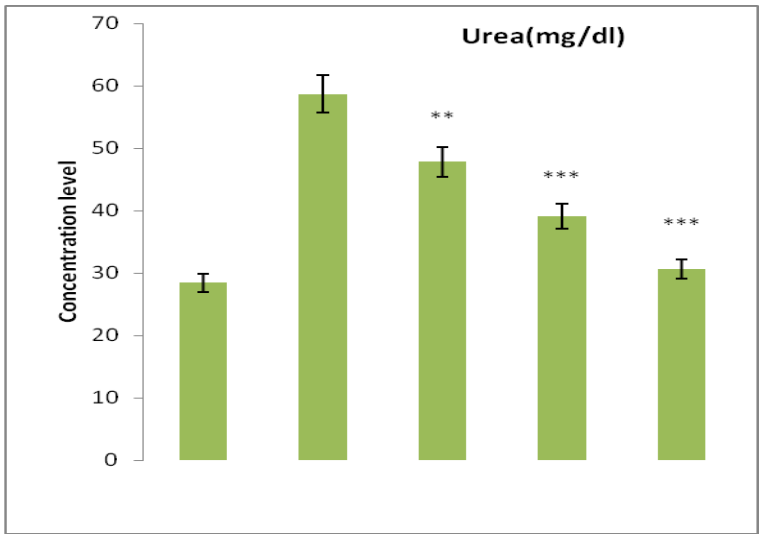


Table 4:Effects of BC on serum urea levels in rats treated with azathioprine

Group name	Urea (mg/dl)
Normal group	28.4± 0.6
Toxic control (20mg/kg)	53.1± 0.5
BC low dose(100mg/kg)	49.0± 0.3**
BC high dose (200mg/kg)	35.3± 0.3***
Standard ascorbic acid(10mg/kg)	30.6± 0.8***



CONCLUSION:

On the basis of our findings, it may be worthy to suggest that

- *Baccharis cordifolia* has antioxidant activity against Azathioprine induced oxidative stress in rats by decreasing the oxidative stress biomarkers serum creatinine, serum urea in kidneys.
- *Baccharis cordifolia* has antioxidant effect, elevated by measuring antioxidant enzymes. There is increase in superoxide dismutase in liver and kidney tissues in Azathioprine induced oxidative stress in rats.
- *Baccharis cordifolia* has high scavenging activity against DPPH free radical generating system.
- *Baccharis cordifolia* has nephropretective effect against Azathioprine induced toxicity in kidneys by observing the histopathological changes in rat kidney tissues.
- *Baccharis cordifolia* has many pharmacological activities like anticancer, antimicrobial, anti-inflammatory, analgesic, antiarthritic, antibacterial, anti-HIV, and antihelmntic activities.

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