World Journal of Science and Research 1(2): 71-74 (2015).

ISSN: 2455 2208

Available online at http://www.harmanpublications.com

World Journal of Science and Research

Research Article Botany

PHYTOCHMICAL SCREENING AND ANTI-INFLAMMATORY ACTIVITY OF *Mirabilis jalapa* Linn.

C. Nirosha and R. Sagaya Giri*

Department of Botany, Kundavai Naachiyaar Government Arts College for Women (Autonomous), Thanjavur, Tamil Nadu, S. India

ABSTRACT

In the present study to investigate the Phytochmical screening and anti-inflammatory activity of *Mirabilis jalapa* Linn. The phytochemical screening *Mirabilis jalapa* leaves showed that the presence of flavonoids, phenolics, tannin, saponins, glycosides, alkaloids, carbohydrate, tri terpenoids, steroids, phlobatannins and protein while terpenoids and anthroquinones were absent. There are certain problems in using animals in experimental pharmacological research, such as ethical issues and the lack of rationale for their use when other suitable methods are available or could be investigated. Hence, in the present study the protein denaturation bioassay was selected for *in vitro* assessment of anti-inflammatory property *Mirabilis jalapa*. Overall, the *Mirabilis jalapa* leaves are a rich source of phytochemicals and anti-inflammatory activity that can be important in inflammatory disease prevention including arthritis. In future isolation of lead molecules responsible for the activity will be carried out which may be beneficial for the development of new anti-inflammatory agent.

Citation: C. Nirosha and R. Sagaya Giri (2015). Phytochmical screening and anti-inflammatory activity of *Mirabilis jalapa* Linn. World Journal of Science and Research. 1(2): 71-74.

Article Info:

Received on 2nd Dec. 2015
Accepted on 30 Dec. 2015
Online: 28th Dec. 2015

Keywords:
Enicostema axillar, alcoholic extract, paracetamol, antipyretic activity

Corresponding author
Dr. R. Sagaya Giri
Assistant Professor,
Department of Botany,
Kundavai Naachiyaar Government Arts College for Women (Autonomous),
Thanjavur, Tamil Nadu, S. India

INTRODUCTION

Use of plants for treating various elements of both man and animal is as old practice as man himself. India is richly endowed with a wide variety of plants having medicinal value. These plants are widely used by all sections of the society as pharmaceutical preparation of modern medicine (Bhagwati uniyal, 2003). Medicinal plants are a major source of biodynamic compounds of the therapeutic values (Havsteen, 2002).

Inflammation is caused by a variety of stimuli including physical damage, ultra irradiation, microbial invasion, and immune reactions. The classical key features of inflammation are redness, warmth, swelling, and pain. Inflammation cascades can lead to the development of diseases such as chronic asthma, rheumatoid arthritis, multiple sclerosis, inflammatory bowel disease, and psoriasis. Many of these diseases are debilitating and are becoming increasingly common in our aging society. Rheumatoid arthritis and osteoarthritis are the major inflammatory diseases affecting people worldwide.

A number of natural products are used in the traditional medical systems in many countries. Alternative medicine for treatment of various diseases is getting more popular. Making medicinal plants provide relief of symptoms comparable to that obtained from allopathic medicines. The majority of clinically important medicines belong to steroidal or non-steroidal anti-inflammatory chemical therapeutic for treatment of various inflammatory diseases. Though these drugs have potent activity, they have various and severe adverse effects. Therefore, agents

of natural origin with very little side effects are required as substitute of chemical therapeutics. In order to investigate phytochemicals and *in vitro* anti-inflammatory activity of the leaves *Mirabilis jalapa* Linn.

MATERIALS AND METHODS

Plant materials:

The fully mature *Mirabilis jalapa* leaves were collected in November 2015 from L.I.C. Colony, Thanjavur, Thanjavur District, Tamil Nadu, India.

Preparation of alcoholic extract:

The leaf of *Mirabilis jalapa* plant was first washed well and dust was removed from the leaves. Leaf was washed several times with distilled water to remove the traces of impurities from the leaf. The leaf was dried at room temperature and coarsely powdered. The powder was extracted with 70% methanol for 24 hours. A semi solid extract was obtained after complete elimination of alcohol under reduced pressure. The extract was stored in refrigerator until used.

Phytochemical screening

Chemical tests were carried out on the alcoholic extract and on the powdered specimens using standard procedures to identify the constituents as described by Sofowara (1993), Trease and Evans (1989) and Harborne (1973, 1984).

Determination of *in-vitro* anti-inflammatory activity

In vitro anti-inflammatory activity was carried out by the method of Sangita Chandra *et al*. (2012). *In vitro* anti-inflammatory activity was carried out by the method of Sangita Chandra *et al*. (2012).

RESULTS AND DISCUSSION

Phytochemical simply means plant chemicals. "Phyto" is the Greek word for plant. Plants have basic nutritional importance by their content of protein, carbohydrate, fats and oils minerals, vitamins and water responsible for growth and development in man and animals. Phytochemicals are classified as primary or secondary constituents, depending on their role in plant metabolism. Primary metabolism is important for growth and development of plants include the common sugars, amino acids, proteins, pureness and pyrimidines of nucleic acids, chlorophyll's etc. Secondary metabolism in a plant plays a major role in the survival of the plant in its environment. Attractions of pollinators, natural defense system against predators and diseases, etc., are examples of the roles of secondary metabolites (Sofowara, 1993).

In the present study was carried out on the plant sample revealed the presence of medicinally active constituents. The phytochemical characters of the *Mirabilis jalapa* leaves investigated and summarized in (Table-1). The phytochemical screening *Mirabilis jalapa* leaves showed that the presence of flavonoids, phenolics, tannin, saponins, glycosides, alkaloids, carbohydrate, tri terpenoids, steroids, phlobatannins and protein while terpenoids and anthroquinones were absent.

Table I. Phytochemical screening of *Mirabilis jalapa* leaf

S.No	Phytochemical analysis	Observation	Results
1	Tannin	Blue black	+
2	Phlobatannins	Red precipitated	+
3	Saponin	Emulsion	+
4	Flavonoids	yellow	+
5	Steroids	Blue	+
6	Terpenoids	-	-
7	Triterpenoids	Violet	+
8	Alkaloids	White precipitated	+
9	Carbohydrate	Red precipitated	+
10	Protein	Pink	+
11	Anthroquinone	-	-
12	Polyphenol	Bule green	+
13	Glycoside	Brown ring	+

(+) Presence (-) Absence

IN VITRO ANTI-INFLAMMATORY ACTIVITY OF *MIRABILIS JALAPA*

There are certain problems in using animals in experimental pharmacological research, such as ethical issues and the lack of rationale for their use when other suitable methods are available or could be investigated. Hence, in the present study the protein denaturation bioassay was selected for *in vitro* assessment of anti-inflammatory property *Mirabilis jalapa*. Denaturation of tissue proteins is one of the well-documented causes of inflammatory and arthritic diseases. Production of auto antigens in certain inflammatory diseases may be due to *in vivo* denaturation of proteins. The mechanism of denaturation probably involves alteration in electrostatic, hydrogen, hydrophobic and disulphide bonding (Grant et al., 1970). Agents that can prevent protein denaturation therefore, would be worthwhile for anti-inflammatory drug development. The increments in absorbance of test samples with respect to control indicated stabilization of protein (Egg & bovine albumin) denaturation by and reference diclofenac sodium . *Mirabilis jalapa* exhibited anti-inflammatory activities in dose dependent manner (Table 2 and 3, fig 1and 2).

Sakat *et al* (2010) studied the methanol extract of whole plant of *Oxalis corniculata* Linn (Family: Oxalidaceae) was assessed for its anti-inflammatory activity by in vitro methods. *In vitro* anti-inflammatory activity was evaluated using albumin denaturation assay, membrane stabilization assay and proteinase inhibitory

activity at different concentrations. Aspirin was used as a standard drug for the study of anti-inflammatory activity. Results showed that, the extract exhibited significant. Extract also showed *in-vitro* anti-inflammatory activity by inhibiting the heat induced albumin denaturation and Red Blood Cells membrane stabilization with the IC50 values of 288.04±2.78 and 467.14±9.56µg/ml respectively. Proteinase activity was also significantly inhibited by the extract (IC_{50}=435.28 ± 5.82µg/ml). From the results, it is concluded that flavonoids and related polyphenols present in the *O. corniculata* extract may be responsible for the activity.

Table 2 *In vitro* anti-inflammatory activity of *Mirabilis jalapa* (Egg albumin)

	Doses (µg/ml)	Plant extract	Standard (Diclofenac sodium)
Control	100	17.30±1.21	21.37±1.98
1	200	23.56±1.64	36.45±2.37
2	300	40.03±2.80	55.94±3.47
3	400	68.12±4.76	79.45±4.65
4	500	73.80±5.16	93.45±6.84

Values are expressed as Mean ± SD for triplicates

Table 3 *In vitro* anti-inflammatory activity of *Mirabilis jalapa* (Bovine albumin)

	Doses (µg/ml)	Plant extract	Standard (Diclofenac sodium)
Control	100	15.70±1.09	19.20±1.56
1	200	33.75±2.36	32.75±2.14
2	300	46.56±3.25	51.25±2.95
3	400	64.23±4.49	75.42±4.44
4	500	75.77±5.30	90.68±6.11

Values are expressed as Mean ± SD for triplicates

Fig 1 *In vitro* anti-inflammatory activity of *Mirabilis jalapa*

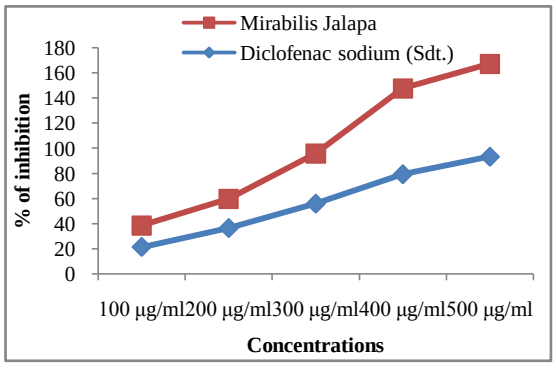
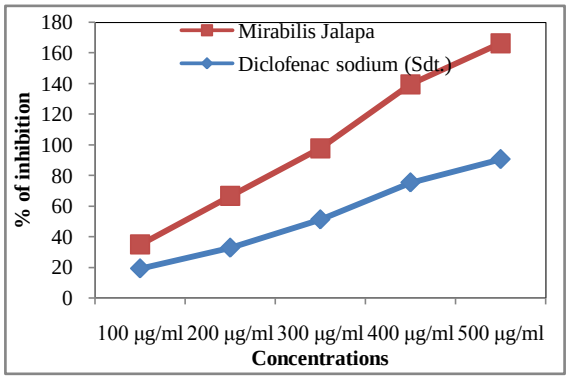


Fig 2 *In vitro* anti-inflammatory activity of *Mirabilis jalapa*



Sangita Chandra *et al*., (2012) evaluated the *in vitro* anti-inflammatory effect of aqueous extract of coffee (*Coffea arabica*) against the denaturation of protein. The extract at different concentrations was incubated with egg albumin in controlled experimental conditions and subjected to determination of absorbance and viscosity to assess the anti-inflammatory property. Diclofenac sodium was used as the reference drug. The present findings exhibited a concentration dependent inhibition of protein (albumin) denaturation by the coffee extract. The effect of diclofenac sodium was found to be less when compared with the test extract. He concluded that coffee possessed marked in vitro anti-inflammatory effect against the denaturation of protein

Sridevi *et al.* (2015) evaluated the anti-inflammatory effect of ethanolic extract of *Pergularia Daemai* (PD) by in vitro method by using membrane stabilization test and protein denaturation test. Membrane stabilization test was done by using human red blood cells (HRBCs). Protein denaturation test was done by using bovine serum albumin (BSA). The results revealed that PD extract was capable of rendering membrane stabilization by inhibiting the hypotonically-induced hemolysis of HRBCs in dose-dependent manner (50, 100, 200, 300, 400, 500 and 1000 µg/mL). In lesser concentration (50 µg/mL), the % inhibition of hemolysis was less (26.80%) and in higher concentration (1000 µg/mL), the % inhibition of hemolysis was more (76.30%), which was comparable with that of standard anti-inflammatory drug viz. diclofenac sodium (200 µg/mL – 80.60%). The PD extract was also capable of inhibiting BSA denaturation in dose-dependent manner (50 µg/mL – 20.40%, 1000 µg/mL – 83.60%) which was comparable to that of diclofenac sodium (200 µg/mL – 86.60%). This finding confirms the potentiality of PD extract as an anti-inflammatory agent and justifies the recommendation of PD extract for the treatment of painful inflammatory conditions.

Overall, the *Mirabilis jalapa* leaves are a rich source of phytochemicals and anti-inflammatory activity that can be important in inflammatory disease prevention including arthritis. In future isolation of lead molecules responsible for the activity will be carried out which may be beneficial for the development of new anti-inflammatory agent.

REFERENCES:

Bhagawati Uniyal (2003) Utilization of medicinal plants by rural women of Himachal pradesh. Ind. J. Trad. Knowl. 4, 366-370.

Grant NH, Alburn HE, Kryzanauskas C., (1970) Stabilization of serum albumin by anti-inflammatory drugs. Biochem Pharmacol.,19:715-722.

Harborne MK. 1973. Medicinal Plants of Kashmir and Ladakh. New Delhi: Indus Publishing Company;:49

Havsteen B. (2002) The biochemistry and medicinal significance of the flavonoids. Pharmocologic Therapeutic. 96: pp67-202.

Acknowledgement

The authors are grateful to Dr. S. Velavan, Director, Harman Institute of Science Education and Research (www.harmanresearchcentre.com), Thanjavur, Tamil Nadu for providing necessary support.

Sangita Chandra, Priyanka Chatterjee, Protapaditya Dey, Sanjib Bhattacharya. Evaluation of in vitro anti-inflammatory activity of coffee against the denaturation of protein. Asian Pacific Journal of Tropical Biomedicine (2012)S178-S180

Sofowara MG.(1993). A review of the evidence for the use of phytoestrogens as a replacement for traditional estrogen replacement therapy. Archives of Internal Medicine 161: pp.1161–1172.

Sridevi G, Sembulingam K , Muhammed Ibrahim , Srividya S, Prema Sembulingam. (2015) Evaluation Of In Vitro Anti-Inflammatory Activity Of Pergularia Daemia. World Journal Of Pharmaceutical Research 4(6), 1100-1108

Trease SK and Evans RA. 1989. Medicinal Plants of India, vol. 1. Algonac, MI: Reference Publications; p384.

Source of support: Nil;

Conflict of interest: None declared