

## ORIGINAL RESEARCH

EVALUATION OF ANTIFUNGAL AND ANALGESIC PROPERTY OF *STELLARIA MEDIA* L.

Smriti Rekha Chanda Das\*, Atharul Islam Mondal

Girijananda Choudhury Institute Of Pharmaceutical Science, Azara Guwahati, Assam 781017, India

Submitted on: 25.04.18; Revised on: 30.05.18; Accepted on: 15.06.18

## ABSTRACT

*Stellaria media*, chickweed, is cool-season annual plant under the family caryophyllaceae native to Europe, but naturalized in many parts of North America and Asia. In the present investigation anti-fungal and analgesic effect of the plant extract of *Stellaria media* was studied using disc diffusion method as anti-fungal test model and hot plate in mice as the analgesic model. In the present investigation, it was found that the ethanolic extract of *Stellaria media* exhibits antifungal activity against *Trichophyton rubrum* and *Candida albicans*. The ethanolic extract of the plant forms an approximately 16 mm of zone of inhibition. In the analgesic model it was observed that 500mg/kg body weight of the ethanolic extract of *Stellaria media* possess a potent analgesic property which is slightly higher than the 10mg/kg body weight of diclofenac sodium. The present study evaluates the scope of *Stellaria media* as analgesic and antifungal agent.

Key words: *Stellaria media*, caryophyllaceae, Anti fungal, analgesic property

Corresponding author: S. R. C. Das  
E- mail: [das\\_smritirekha@rediffmail.com](mailto:das_smritirekha@rediffmail.com)  
Mobile No: +91-9401162750

Indian Research Journal of Pharmacy and Science; 17(2018)1456-1461;  
Journal Home Page: <https://www.irjps.in>  
DOI: 10.21276/irjps.2018.5.2.8

## INTRODUCTION

*Stellaria media* (L.) Vill of the plant family Carophyllaceae, commonly known as chickweed, is a cosmopolitan plant found in most regions of the World including India. They are prostrate to erect, 7-50 cm, with a slender taproot. Stems have hairy internodes. Leaves are more or less evenly spaced with ovate blades 8-45 mm in length. Inflouescences are terminal or axillary with few flowers. Flowers have 5 sepals, 3-4.5 mm, and 5 petals, 0.7-0.9 x the length of the sepals. Seeds are reddish or purplish brown with a papillate surface. The *S. media* contains anthraquinones emodin, parietin (physcion) and questin, the flavonoid kaempferol-3,7-O- $\alpha$ -L-dirhamnoside, the phytosterols  $\beta$ -sitosterol and daucosterol, and the fatty alcohol 1-hexacosanol can be found in *S. media*.<sup>1</sup> Other flavonoid constituents are apigenin 6-C-beta-D-galactopyranosyl-8-C-alpha-L-arabinopyranoside, apigenin 6-C-alpha-L-arabinopyranosyl-8-C-beta-D-galactopyranoside, apigenin 6-C-beta-D-galactopyranosyl-8-C-beta-L-arabinopyranoside, apigenin 6-C-beta-D-glucopyranosyl-8-C-beta-D-galactopyranoside, apigenin, 8-di-C-alpha-L-arabinopyranoside. The plant also contains triterpenoid-saponins of the hydroxylatedoleanolic acid type and tannins (including phlobatannins). Proanthocyanidins are present in the testa of seeds.<sup>2,4</sup>

*S. media* is edible and nutritious, and is used as a leaf vegetable, often raw in salads.<sup>4</sup> *S. media* is used medicinally as a tonic, diuretic, demulcent, expectorant, and mild laxative. It is traditionally recommended for treatment of asthma, bronchitis, or congestion and aids in the control of obesity. *S. media* relieves itching and inflammation and has soothing and moisturizing effects. It is used for minor

skin infections or irritations but most of these traditional uses are not supported by scientific data.<sup>4</sup> This study was therefore designed to investigate the anti-fungal and analgesic activities of *S. media* leaves using laboratory animal models.

## MATERIAL AND METHOD

### *Plant Collection and Identification*

The fresh plants were collected from the Azara, Guwahati, Assam, India. The plants were dried in drier for 72 hours after which they were pulverized into powdery form. The powdered drugs were extracted using different solvent (petroleum ether, chloroform, benzene and methanol) by following the maceration process. After 5 days, the solvent was filtered by using filter paper and the solvent was evaporated on water bath.

### *Preparation of Plant Extract*

Fresh plant material of whole parts were washed under running tap water, shade dried and then homogenized to fine powder and stored in airtight bottles. About 30g of coarsely powdered parts of plant (30g/250mL) were extracted separately in a round bottom flask by cold maceration method for 4 to 7 days sequentially with petroleum ether, chloroform, benzene and ethanol separately in order to extract non-polar and polar compounds.<sup>5,6</sup>

### *Determination of extraction yield (% yield)*

The yield (% w/w) from all the dried extracts was calculated as:

$$\text{Yield (\%)} = (W1 * 100)/W2$$

Where W1 is the weight of the extract after evaporation of solvent, and W2 is the weight of the plant powder.<sup>7</sup>

### **Preparation of Fungal Media**

Sabouraud dextrose agar was prepared, autoclaved at 121° C for 15minutes at 15lbs and poured in sterile petri-plates up to a uniform thickness of approximately 5- 6mm and the agar was allowed to set at ambient temperature and used.<sup>8</sup>

### **Microorganism**

The fungal strains *Candida albicans* a dimorphic gram + fungi and *Trychophyton rubrum*, dermatophytic fungi were used in the present study. These strains were obtained from microbiology lab, GIPS, Azara, Guwahati, Assam, 781017

### **Experimental Animal**

Swiss Albino mice (20-25gm) of both sexes obtained from Animal House, GIPS, Azara, Assam and were distributed into groups and housed in standard polypropylene cages under a 12hr light dark cycle at 24±1 °C with free access to standard laboratory food and water. They were kept for 2 hrs prior to the experiment to get acclimatized with the laboratory environment. The animals were used only once. The procedures were maintained in accordance to the Departmental Animal Ethics Committee recommendations (Approval No-GIPS/IAEC/B.PH/2017/8).

### **Acute Toxicity Test**

The acute toxicity and lethality (LD50) of the plant extracts in mice were estimated using an Up-and-Down Method for Acute Toxicity testing described

by Bruce (1985)<sup>6</sup>. Mice were administered with 3,000 mg/Kg body weight of the extract. The mice were observed for mortality for 2 days. No mortality was observed, after which 4 more mice were administered with 5,000 mg/Kg b.w and observed for mortality for another 5 days. There was no death recorded for the first and second groups within 7 days of observation.<sup>9,10</sup>

### **Disc Diffusion Method**

This method is suitable for organism that grows rapidly over night at 35-37°C. The fungicide impregnated disc absorbs moisture from the agar and fungicide diffuses in to the agar medium. The rate of extraction of the fungicide from the disc is greater than the rate of diffusion, as the distance from the disc increases. Zone of inhibition around each disc is measured.<sup>11,12</sup>

### **Hot Plate Method**

Hot plate test method (Eddy et al 1950) was employed to evaluate analgesic activity. The experimental animals were divided into control, test and positive control group with 3 mice in each group. The animal of test group received test sample (plant extract) at doses of 250mg/kg body weight and 500mg/kg body weight. Positive control group was administered with 10mg/kg body weight of diclofenac sodium. And the control group was administered with 10ml/kg body weight of distilled water. In this method the animal were positioned on Eddy's hot plate kept at a temperature of 55 ±0.5°C. The test sample and standard drug were administered before 30 min of beginning of experiment. The mice were observed at 15min, 30min and 60min. Reaction time was recorded when animal licked their fore or hind paws or jumped.<sup>13,14</sup>

**RESULT AND DISCUSSION:****Antifungal activity**

In this study the antifungal activities of the *Stellaria media* was observed. The antifungal study were

performed against two fungal strain i.e. *Trychophyton rubrum* and *Candida albicans*. Plant was extracted using petroleum ether, benzene, chloroform and ethanol. Among them only ethanolic extract shown a promising antifungal activity. Fluconazole was used as standard drug. (Table 1.)

**Table 1.:** Antifungal activity of different extracts of *Stellaria media*.

Fungal strains	Zone of inhibitions (mm)				
	Pat. Ether	Benzene	Chloroform	Ethanol	Fluconazole (Standard drug - 30µg)
<i>Candida albicans</i>	+	+	+	- 17	- 20
<i>Trychophyton rubrum</i>	+	+	+	- 16	- 23

(-) No growth (Inhibition), (+) Growth (No inhibition)

**Analgesic activity**

The extract was found to be dose dependently cause a prolongation of the hot plate latency (Table 2.). The

longest latency was obtained at 60 minute prior to the administration of 500mg/kg body weight of the extract. Diclofenac sod. Tablet IP 50mg was used as standard drug.

**Table 2.:** Response time against thermal pain.

Treatment Group.	Response Time (Sec.)		
	15 min	30 min	60 min
Extract 250 mg/kg	2.73±0.13	2.93±0.12	3.58±0.11
Extract 500 mg/kg	3.07±0.13	3.98±0.15	4.22±0.11
Diclofenac sod. 10 mg/kg	2.20±0.16	2.74±0.16	3.38±0.18
Control Distilled water 10 ml/kg	1.89±0.12	1.90±0.20	1.86±0.11

## DISCUSSION

The animal models of analgesia used in this study showed that ethanolic extract of *Stellaria media* possesses potent analgesic property, especially at 500mg/kg body weight of the extract.

In this study, *S. media* significantly prolonged the reaction time to thermal pain. The reaction time to pain in mice administered with 500mg/kg body weight of the extract was longer than in mice administered with diclofenac sodium. The hot-plate test of analgesia is considered selective for opioid-like receptors. Although the central and peripheral analgesics act by inhibiting the number of contractions provoked by chemical pain stimuli, only the central analgesics increase the time of response in the hot plate test<sup>15</sup>. This test therefore suggests an involvement of centrally mediated mechanism of analgesic action of *S. media*, as well as peripheral mechanism.

The results obtained from the present investigation revealed that the antifungal activity was exhibited by the ethanolic extract. The basis of varying degree of

sensitivity of test organisms of fungi may be due to the intrinsic tolerance of microorganisms and the nature and combinations of phyto-compounds presents in the crude extracts.

In the extract of petroleum ether, chloroform and benzene growth of fungi observed whereas the ethanolic extract inhibited the growth of both *Candida albicans* and *Trychophyton rubrum*.

## CONCLUSION

The results obtained from this work showed that plant extracts of *Stellaria media* exhibit antifungal and analgesic effects. In the concluding part, the future scope of *Stellaria* species has been emphasized with a view to establish their biological activities and mode of action.

Further studies are needed to determine the chemical identity of the bioactive compounds responsible for the observed antifungal and analgesic activity. Natural plant-derived product may be a source of new alternative active compounds, in particular with antifungal and analgesic activity.

## REFERENCES:

1. Dong Qi, Qiao Shan-Yi, Huang Yuan, Studies on the Chemical Constituents From *Stellariamedia* (II)., Pharmaceutical Journal of Chinese People's Liberation Army, 2007-03, Available from: [https://en.wikipedia.org/wiki/Stellaria\\_media](https://en.wikipedia.org/wiki/Stellaria_media).
2. Dong, Q, Huang, Y, Qiao, SY, "Studies on chemical constituents from stellaria media, China journal of Chinese materiamedica (in Chinese),32 (11): 1048-51, PMID 1767234, Available from: [https://en.wikipedia.org/wiki/Stellaria\\_media](https://en.wikipedia.org/wiki/Stellaria_media).
3. Oyebanji B. O. et al, Anti-inflammatory and analgesic effects of methanol extract of *Stellaria media* (L.) Vill leaf, Afr. J. Biomed. Res.Vol.15 (January 2012); 29 – 34
4. Anupam Sharma et al, Phytochemical and Pharmacological Potential of Genus *Stellaria*: A Review, J Pharm Res, 5(7), 2012, 3591-3596.
5. Elgorashi E.E et al., Pharmacological screening of six Amaryllidaceae species, J. Ethnopharmacol. 2004; 90: 27-32.
6. JamunaSenguttuvan et al, In vitro antifungal activity of leaf and root extracts of the medicinal plant, *Hypochoerisradicata*, Int. J Pharm. Pharm. Sci., Vol 5, Issue 3, 2013, 758-761
7. Andrea Cabrera et al,Antifungal activity of medicinal plant extracts against phytopathogenic fungus

- alternariaspp, Chilean JAR, 71(2), 2011, 231-239.
8. D.K. Shrivastava et al, Antifungal Activity of leaf extract of Neem (*Azadirachta Indica* Linn), Int J Curr Microbiol App Sci, 3(5), 2014, 305-308
  9. P. Lalitha et al, Acute toxicity study of extracts of *Eichhornia crassipes* (Mart.) Solms, Asian J Pharm Clin Res, 5 (4), 2012, 59-61.
  10. Steve O. Ogonnia et al, Evaluation of acute toxicity in mice and subchronic toxicity of hydroethanolic extract of *Parinaricuratellifolia* Planch (*Chrysobalanaceae*) seeds in rats, Afr. J. Biotechnol., 8 (9), 2009, 1800-1806.
  11. T. Bharathi et al, Antimicrobial Activity of Solvent Extracts of *Ocimum sanctum*, *Azadirachta Indica* and *Phyllanthus amarus* Against Clinical Pathogens, Global J. Pharmacol., 8 (3), 2014, 294-305.
  12. Patel N, Mohan J.S.S, Antimicrobial Activity and Phytochemical Analysis of *Moringa oleifera* Lam. Crude Extracts Against Selected Bacterial and Fungal Strains, International Journal of Pharmacognosy and Phytochemical Research 2018; 10(2); 68-79.
  13. Veena M.E, Analgesic activity of *Cryptocaryastockii* plant by hot plate method, Int. J. Herb. Med., 4(1), 2016, 39-41.
  14. K. Chandrasekaran et al, Analgesic activity of ethanolic extract of *Pentatropiscapensis* and *Sarcostemma camone*, Int. J Pharma. Bio. Sci, 2(4), 2011, 73-76.
  15. García M.D et al, Antinociceptive and anti-inflammatory effect of the aqueous extract from leaves of *Pimentaracemosa* var. *ozua* (*Mirtaceae*), J. Ethnopharmacol., 91, 2014, 69-73.

CONFLICT OF INTEREST REPORTED: NIL ; SOURCE OF FUNDING: NIL