International Journal of Pharmaceutical Research and Development (IJPRD)
Platform for Pharmaceutical Researches & Ideas
www.ijprd.com

# COMPARATIVE ANTHELMINTIC ACTIVITY OF ETHANOLIC AND METHANOLIC LEAF EXTRACTS OF *EUCALYPTUS GLOBULUS*

**Sarojini Nayak[*1],**
Chandra Kanti Chakraborti[1], Seema Kumari[1], Sanjeet Kumar[1], Shambhu Kumar[1]

[1]Kanak Manjari Institute of Pharmaceutical Sciences, Rourkela, Orissa-769015.

***ABSTRACT***
*To know the anthelmintic activity of the leaves of Eucalyptus globulus, present study was conducted. For this work the leaves were extracted separately with ethanol and methanol by following maceration method. The ethanolic and methanolic extracts were more or less equally potent as far as their anthelmintic activity was concerned. The extracts produced anthelmintic activity in a dose dependant manner. Both the extracts ( at 10mg/ml) were inferior to the positive control (piperazine citrate),while those extracts at higher concentrations (25mg/ml and 50mg/ml) showed better anthelmintic activity than the positive control. Distilled water with tween 80 (negative control) did not show any anthelmintic activity.*

**Key words:** *Anthelmintic activity, Eucalyptus globulus, ethanolic extract, methanolic extract, positive control, negative control.*

**Correspondence to Author**

**Sarojini Nayak**

Kanak Manjari Institute of Pharmaceutical Sciences, Rourkela, Orissa-769015.

**Email:** nayak.sarojini88@gmail.com

## INTRODUCTION

Natural drugs are obtained from the plant, animal or mineral kingdoms. The plant kingdom is the store house of the organic compounds[1]. *Eucalyptus globulus* is commonly known as blue gum tree and belong to family Myrtaceae. It is an evergreen plant which grows from 30-35meters tall. Its trunk is smooth and grey-white in the upper part, and rough deeply furrowed near the base. Leaves are glaucous, glossy-green,bluntly pointed at the tip and rounded at the base. Single, creamy-white flower is usually produced on the leaf's axil. Flowering occurs in early summer. Useful parts of the plant are leaves and essential oils. It also contains volatile oil, polyphenolic acids, flavonoids, tannins, aldehydes and bitter resin. It was inhaled for headaches, or drunk as an infusion in cases of colds. Eucalyptus oil is strong antiseptic, useful in treatment of lung diseases, cold and sore throats. Its expectorant properties are useful in case of bronchitis. It can also be used as a vapour bath or chest rub for asthma and other respiratory ailments. It can also be used as massage oil for painful joints. A cold extract made from the leaves is helpful in treatment of indigestion and intermittent fever. It is taken in large doses and the oil irritates the kidneys. The plant shouldn't be used internally[2].

Traditional system of medicine reports the efficacy of several natural products eliminating helminths. Moreover, it has already been mentioned that oil of the plant possesses anthelmintic activity[3]. Considering this information, the present investigation deals with the evaluation of anthelmintic activity of leaf extracts of *Eucalyptus globulus*.

**MATERIALS AND METHODS:-**

**Plant Material:-**

The leaves of the plant *Euclyptus globulus* were collected from Chhend, Rourkela, during December 2011. The sample was authenticated by Dr. Prativa Sahoo, Botanist, Rourkela Autonomous College, Rourkela. The shade dried leaves were powdered and stored in a dessicator until evaporation.

**Preparation of Extracts**:-

The powdered leaves were passed through a sieve (No.40). Then those leaves (10gm) of *Euclyptus globulus* were extracted by using maceration method. The powdered leaves were macerated in 60ml of ethanol for 3 days at room temperature. The resulting extract was filtered through a filter paper (Whatman No.1). The residue was further extracted using the same procedure. The filtrates obtained were combined and then evaporated to dryness under reduced pressure. Instead of using ethanol, the above mentioned procedure was conducted separately for methanol[4].

**Anthelmintic Activity:**-

The anthelmintic activity was performed on adult Indian earthworm, *Pheritima posthuma,* due to its anatomical and physiological resemblance with the intestinal roundworm parasite of human beings[5]. Indian adult earthworms, collected from moist soil and washed with normal saline to remove all fecal matter, were used for anthelmintic activity. Different concentrations of the dried extracts (at 10 mg/ml, 25mg/ml and 50mg/ml in distilled water with tween 80) were prepared[3]. At first, 10ml of each concentration of the ethanolic extract was delivered into a Petridish .Then six worms (of same type) were placed in it. Similarly, for each concentration of methanolic extract, 6 worms were used. Time for paralysis was noted when the worms did not revive even in normal saline. Time for death of worms were also recorded when the worms lost their motility followed by fading away of their body colour after placing in warm water of $50^0$C. Piperazine citrate (15mg/ml in distilled water) was used as positive control, while distilled water with tween 80 was the negative control[6].

**Statistical analysis:** -

Data were analyzed using one way factorial ANOVA tests followed by Dunnett's t-test on each group[7]. P values were calculated in each case, accordingly interpretation was done. Statistical analysis of both paralysis time and death time of the helminths, in cases of positive control and different concentrations of each sample, was done.

**RESULTS:-**

The ethanolic and methanolic extracts were more or less equally potent as far as their anthelmintic activity was concerned. Considering the anthelmintic activity, both ethanolic and methanolic extracts (at 10mg/ml) were inferior to the positive control (piperazine citrate), while those extracts at higher concentrations (25mg/ml) showed better activity than piperazine citrate.

In case of ethanolic extract (at 10mg/ml), the time of paralysis and death time were observed as 144min and 165min, respectively, whereas in case of methanolic extract (at the same concentration), they were 104min and130 min, respectively. In addition, the time of paralysis and death time were 57 min and 80 min, respectively, in case of ethanolic extract at 25mg/ml, while they were 80 min and 100min, respectively, in case of methanolic extract at the same concentration. Similarly, the time of paralysis and death time were 17min and 29 min, respectively, in case of ethanolic extract at 50mg/ml, whereas they were 20 min and 30 min, respectively, in case of methanolic extract at the same concentration. The extracts produced anthelmintic activity in a dose dependant manner ( Table-1, Figure-1). Negative control, distilled water with tween 80, did not show any activity against earthworms.

**Table-1:** Evaluation of anthelmintic activity of *Eucalyptus globulus*

| Sl no | Test subastance | Concentration ( mg/ml) | Paralysis Time (min)Mean±S.E.M | Death Time (min)Mean±S.E.M |
|---|---|---|---|---|
| 1 | Distilled water | - | - | - |
| 2 | Piperazine citrate | 15 | 97±0.57 | 116±1.15 |
| 3 | Ethanolic Extract | 10 | 144±1.15 | 165±1.15 |
| | | 25 | 57±1.52 | 80±0.57 |
| | | 50 | 17±1.73 | 29±0.57 |
| 4 | Methanolic Extract | 10 | 104±1.15 | 130±1.15 |
| | | 25 | 80±1.15 | 100±0.57 |
| | | 50 | 20±1.73 | 30±1.73 |

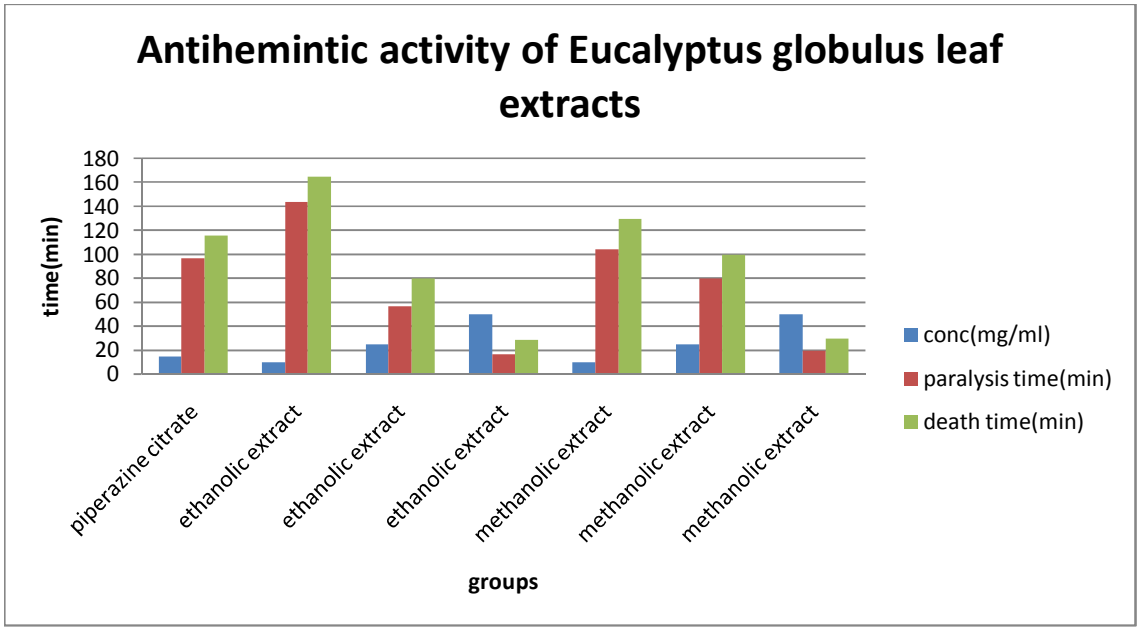


**Figure-1** Anthelmintic activity of *Eucalyptus globulus* leaf extracts

In Table-2 and Table-3, Statistical analysis of both paralysis time and death time of the helminths, in cases of positive control and different concentrations of each sample, has been mentioned.

**Table:-2** Statistical analysis of the paralysis time of the helminths in cases of positive control and different concentrations of samples

| Samples | DF (degree of freedom) | t value | P value | Interpretation |
|---|---|---|---|---|
| Positive control and ethanolic extract (10mg/ml) | 14 | 24.73 | P<0.001 | Highly significant |
| Positive control and ethanolic extract (25mg/ml) | 14 | 21.05 | P<0.001 | Highly significant |
| Positive control and ethanolic extract (50mg/ml) | 14 | 42.10 | P<0.001 | Highly significant |
| Positive control and | 14 | 3.68 | P<0.01 | Significant |

| | | | | |
|---|---|---|---|---|
| methanolic extract (10mg/ml) | | | | |
| Positive control and methanolic extract ( 25mg/ml) | 14 | 8.94 | P<0.001 | Highly significant |
| Positive control and methanolic extract (50mg/ml) | 14 | 40.52 | P<0.001 | Highly significant |

**Table:-3** Statistical analysis of the death time of the helminths in cases of positive control and different concentrations of samples

| Samples | DF (degree of freedom) | t value | P value | Interpretation |
|---|---|---|---|---|
| Positive control and ethanolic extract (10mg/ml) | 14 | 1.006 | P<0.5 | Significant |
| Positive control and ethanolic extract (25mg/ml) | 14 | 24 | P<0.001 | Highly significant |
| Positive control and ethanolic extract (50mg/ml) | 14 | 58 | P<0.001 | Highly significant |
| Positive control and methanolic extract (10mg/ml) | 14 | 9.33 | P<0.001 | Highly significant |
| Positive control and methanolic extract (25mg/ml) | 14 | 10.66 | P<0.001 | Highly significant |
| Positive control and methanolic extract (50mg/ml) | 14 | 57.33 | P<0.001 | Highly significant |

**DISCUSSION:-**

Although the oil of the plant has got anthelmintic activity[3], we found that even the leaves of *Eucalyptus globulus* possessed very potent anthelmintic activity. Moreover, both the extracts were better than piperazine citrate (positive control) as far as their anthelmintic activity was concerned.

**CONCLUSION**

From this study it may be concluded that in addition to leaves, other parts of the same plant should be explored thoroughly (using several extracts) to know the exact role of the plant as far as its different biological activities (e.g., anthelmintic activity, etc.) are concerned.

**REFERENCES**


1. Shah C S,Quardy J S, A text book of pharmacognosy 7th revised edition,B S Shah Prakashna,Ahamadabad,1989-90, P.1-7
2. Available from: Nature.net/Blue-Gum-Tree html.
3. Taur DJ, Kulkarni VB, Patil RY. Chromatographic evaluation and anthelmintic activity of Eucalyptus globulusoil.Pharmacognosy Res.,2 (3), 2010,125-127.
4. PhrompittayaratW,PutalumW,TanakaH , Jetiyanon K, Areekul W, Ingkaninan K. Comparison of various extraction methods of Bacopamonnieri. http://www.thaiscience.info Dated at 28-03-2011.
5. Vidyarthi RD,A Textbook of Zoology.14thed New Delhi:S. Chand and Co,1997,P.329.
6. Salhan M, Kumar B, Sharma P, Sandhar HK, Gautam M. Comparative anthelmintic activity of aqueous and ethanolic leaf extract of Clitoriaternatea. IJDDR .,3 (10), 2011, 62-68.
7. kulkarni S K,Hand book of Experimental pharmacology,3th edition Vallabh Prakashan,Delhi,1999,P.178-180.


*****