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EVALUATION OF ANTI-INFLAMMATORY AND ANALGESIC PROPERTIES OF *EVOLVULUS ALSINOIDES*

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ABSTRACT

Evolvulus alsinoides, belonging to Convolvulaceae family commonly known as Shankhpushpi is used as brain-tonic in traditional system of medicines like Ayurveda and Unani. The plant is known to posses antibacterial, anticatatonic, and antiulcer. In the present study ethanolic extract of the entire herb of *Evolvulus alsinoides* was used to evaluate analgesic and anti-inflammatory activity. The result proved that *Evolvulus alsinoides* has considerable analgesic and anti-inflammatory activities.

Introduction:-

The use of plants or plant extracts for medicinal purpose from thousands of years have been the source of much useful therapy.[1]For many centuries medical treatment has relied to a large extent on the use of plants.[2] Natural products in current use posses nearly every type of conceivable type of biological activity. The usage of herbal drugs in various ailments is increasing in modern civilization. WHO Estimates that 4-billion people from all over the world use herbal medicines. The discovery of a vegetable extract of medicinal benefit leads for the benefits of the isolation of the active principle and its subsequent chemical characterization. Once this has been established the synthesis of analogues relating the essential structural features for improved therapeutic activity becomes possible. The Drugs which are in use presently for the management of pain and inflammatory conditions are either narcotics e.g. opoids or non-narcotic e.g. salicylate and corticosteroids. All of these drugs have well documented toxic effects. Prolonged use of both steroidal & Non-steroidal anti-inflammatory drugs is well known to be associated with peptic ulcer formation.[3]Hence search for new anti-inflammatory agent that posses therapeutic efficacy and yet are devoid of these adverse effects is justified. Now a days herbal drugs are being proved as effective as synthetic drug with lesser side effects. For last several years we are screening indigenous medicinal plant to develop safe and potent anti-inflammatory drug for clinical use.[4]

For the present study, " *Evolvulus alsinoides*" belonging to Convolvulaceae family was selected. It is commonly known in the local language as Shankhapushpi and in English as " Speed Wheel". The whole plants aerial parts and roots are extensively used in Ayurveda as a brain tonic in the treatment of neurodegenerative diseases, asthama & amnesia. The whole herb is used medicinally in the form of decoction with cumin and milk in fever, nervous disability, loss of memory and Syphilis.[5]

According to an ethnobotanical survey conducted among Kanikaran ethnic groups in Southern Western Ghats of India, whole plant of *Evolvulus*

alsinoides is used for the treatment of veneral diseases.[6]

The plant is known to posses antibacterial[7], anticatatonic, and antiulcer[8] properties. But so far no report in the literature is available regarding the analgesic & anti-inflammatory activity. Therefore the following study was performed and evaluated scientifically the analgesic and anti-inflammatory activity on albino mice and rats.

MATERIAL AND METHODS:

Materials:-

Shade dried powdered *Evolvulus alsinoides*, Petroleum etherAR, chloroform AR, Ethanol AR (S.D.Fine chemicals), Soxhlet apparatus, carragenin, Diclofenac Sodium. Pethidine, Aspirin and Plethysmograph were used as received.

Methods:-

Collection of plant:

Plant used in this study has been collected from Ghat region of Bhor taluka Pune dist, Maharashtra, India during post-monsoon and taxonomically identified and aunthenticated by the Agarkar Research Institute Pune. The plants were washed thoroughly and shade dried.

Preparation of Extract:

The shade dried powdered whole plant of *E.alsinoides* was extracted separately by continuous hot extraction process by using soxhlet apparatus with different solvents in increasing order of polarity from petroleum ether, chloroform and finally ethanol. After extraction, the extracts were concentrated under reduced pressure in freeze drier. During this study only ethanolic extract was used for the pharmacological investigation.

Anti-inflammatory Activity Studies:

Anti-inflammatory activity of ethanolic extract was determined by carragenin induced hind paw oedema using plethysmograph.[9,10] Albino rats of either sex weighing 150-200gm. Were divided into 4 groups and each group contained six animals. Group-I served as control and received 2ml. of normal saline. Group-II served as standard and received 6.75mg/kg of body wt. of Diclofenac Sodium. orally. Group-III served as test and received 18.75mg/kg.of body wt. of dried ethanolic extracts respectively. Normal saline , Diclofenac Sodium and extracts were administered one hour before the carragenin administration.

Carragenin 1% w/v. in the normal saline was injected into sub-plantar region of the left hind paw of all groups of animals and right hind paw served as control. The volume of hind paw oedema was measured by plethysmograph at 1hr,2hr, 3hr, and 4hrs. Mean increase in paw volume and % inhibition of inflammation were calculated. The % inhibition of inflammation produced by the extracts of *Evolvulus alsinoides* was compared with the standard. Percentage inhibition was calculated by using the formula,

Percentage of Inhibition = 100(1-Vt/Vo). where Vt= volume of the extract treated animals: Vo= volume of the control(saline).

The results are given in Table-I and represented in Graphs I and II.

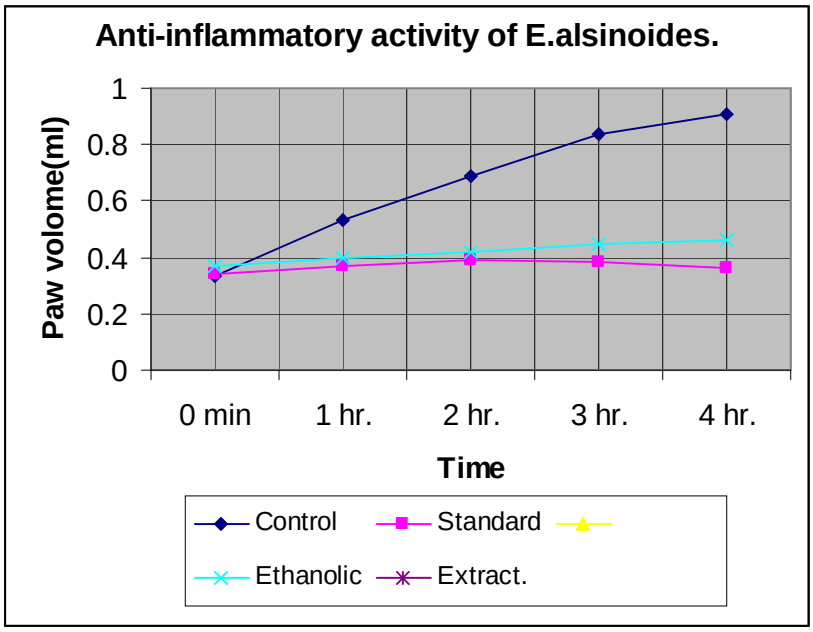
Table-I:- Anti-Inflammatory Activity of Ethanolic Extract of *Evolvulus alsinoides*

Sr. No	Animal Group	Paw Volume (ml) ± SEM and % of Inhibition				
		0 min	1 hr.	2 hr.	3 hr.	4 hr.
1	Control	0.33 ± 0.01	0.53 ± 0.01	0.69 ± 0.01	0.84 ± 0.02	0.91 ± 0.03
2	Standard	0.34 ± 0.02	0.37 ± 0.03 (30.25)	0.39 ± 0.02 (43.48)	0.38 ± 0.01 (54.77)	0.36 ± 0.02 (60.50)
3	Ethanolic Extract.	0.37 ±0.01	0.40 ± 0.03 (24.52)	0.42 ± 0.02 (39.13)	0.45 ± 0.03 (46.42)	0.46 ± 0.01 (49.49)

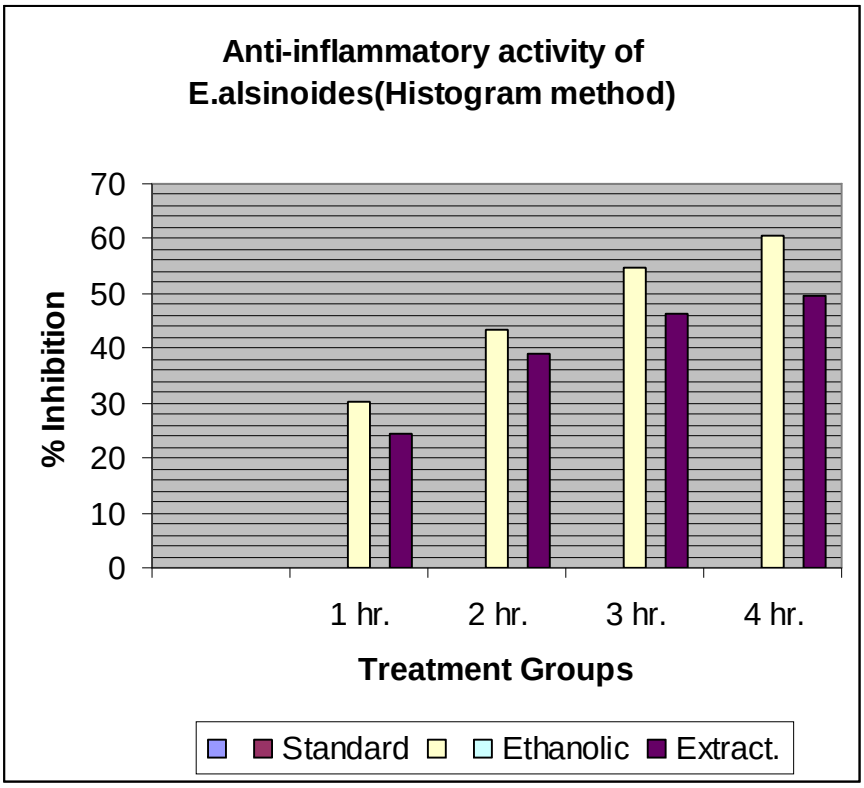
Significant reduction compared to Control = Diclofenac sodium = (P≤ 0.01)

Numbers in parenthesis indicates % reduction in paw oedema.

Graph-I :- Anti-Inflammatory activity of *Evolvulus alsinoides*



Graph-II:- Anti-Inflammatory activity of *Evolvulus alsinoides* (Histogram method)



Analgesic Activity Studies:

The analgesic activity was evaluated by both tail flick method by tail withdrawal from the radiant heat by using analgesiometer and acetic acid induced writhing method to ascertain narcotic and non-narcotic type of activity respectively.

Tail Flick Method:

In tail flick method, albino male mice of (20-25g) were randomly distributed into three groups consisting of six animals in each group.The first group served as control group and the animals were administered normal saline. The second group of animals were administered pethidine at a dose 15 mg/kg. The animals of the third group were treated with 200 mg/kg ethanolic extract respectively. The reaction time was noted at 15 min, 30 min and 45 min time intervals after drug administration.

Acetic Acid Induced Writhing Test

The non-narcotic analgesic activity was evaluated by acetic acid induced writhing in mice. In this method , mice of either sex of weight between 20-25g were randomly distributed in three groups each consisting of six animals. The first group served as control and the animals were administered intraperitonially with 0.5 Ml of 1% acetic acid dissolved in 0.9% saline. The number of writhes were counted during a 30 min. period following the injection of acetic acid. The animals of the second group were administered with plant extract at dose level of 200mg/kg orally and 15 min later, the animals of these groups were administered with acetic acid as before. The third group was administered with aspirin at a dose of 25mg/kg, intraperitonially and then acetic acid was given for induction of writhing, which was recorded as described for the groups.

Percentage of protection against acetic acid induced writhing was calculated using the formula:

$$\textbf{Percent protection} = \frac{(Wc-Wt) \times 100}{Wc}$$

Where, Wc = Control group; Wt = the mean values of number of writhing in the test groups and tail flick.

Statistical Analysis:

The data were statistically analyzed using one-way ANOVA followed by Dunnett's test for individual comparison of groups with control.'p' values below 0.05 were considered as significant.

Here all values of statistical analysis are expressed as mean ± SEM.

Table-II Effect of Ethanolic extract of *E.alsinoides* on Tail Flick induced Analgesic test in Mice.

Sr.No	Group	Mean time(s) ± SEM		
		15 min	30 min	45 min
1	Control	1.8 ± 0.15	1.7± 0.16	1.9 ± 0.13
2	Standard (pethidine)	7.9 ± 1.13	13.2 ± 1.28	14.6 ± 0.76
3	Ethanolic Extract	6.5 ± 0.85	9.2 ± 0.84	10.2 ± 1.04

Table-III Effect of Ethanolic extracts of *E.alsinoides* on Acetic acid induced writhing test in mice.

Sr.No	Group	Number of writhes	% inhibition
1	Control	32.26 ± 0.48	---
2	Standard (Aspirin)	4.32 ± 0.26	86.60
3	Ethanolic Extract.	9.8 ± 0.41	69.62

RESULTS:

Pharmacological studies of *Evolvulus alsinoides* revealed that the inhibition of inflammation for ethanolic extract was remarkable i.e. 49.49% at 240 min. The comparison between ethanolic extract with Diclofenac Sodium is shown in Table-I and represented in Graphs I and II.

Evolvulus alsinoides shows significant analgesic activity. The percent protection of analgesic activity was found to be 69.62% as compared to standard Aspirin 86.60%.The narcotic and non-norcotic analgesic activity was shown in Table-III and IV.

DISCUSSION:

After the observations of the results obtained, it was concluded that the plant *Evolvulus alsinoides* possess considerable anti-inflammatory and analgesic activities.

Our Pharmacological studies substantiate the use of *Evolvulus alsinoides* extracts as an anti-inflammatory agent. This gives valuable information regarding the treatment of anti-inflammatory condition with lesser side effects and toxicities, which are encountered in convential pain killer drugs. The common adverse effects of conventional pail killer are ulcer, hepatotoxicity and nephrotoxicity on prolonged use in condition like arthritis etc. These adverse effects can be minimized by using the extracts of *Evolvulus alsinoides.*

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