ANTI-INFLAMMATORY ACTIVITY OF DODONAEA VISCOSA
N. MAHADEVAN, SAMA VENKATESH AND B. SURESH*
Swami Vivekanada College of Pharmacy, Elayampalayam, Tiruchengode, Tamil Nadu.
J.S.S College of Pharmacy, Rocklands, Ooty- 643 001.*

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ABSTRACT: Dodonaea viscose, Linn is a widely grown plant of Nilgiris district of Tamil and is commonly used by the tribals of Nilgiris as a traditional medicine for bone fracture and joint sprains. Since it is generally believed that fractures are accompanied by either some degree of injury or inflammations, it was felt desirable to carry our anti inflammatory activity of Dodonaea viscose. Anti-inflammatory activity of the plant was carried out by carrageenin induced paw edema method in Wister albino rats.

INTRODUCTION

Dodonaea viscose, Linn is a small tree belonging to the family sapindaceae. It is widely used by the tribal of Nilgiris as a traditional medicine for bone fracture and other inflammation conditions. As per the tribals information the leaves of Dodonaea viscose is to be made into a paste it ground nut oil and applied at the site of fracture. The application of leaves paste on the fractured area will set right quickly the bone fracture as per their folk claim. The present investigation was carried out on the leaves of Dodonaea viscose.

MATERIALS AND METHODS

Collection of Planat Material

The leaves of Dodonaea viscose, Lin were collected from Ketty village, Ooty, of tail Nadu during the month of June. The leaves were cleaned and left for shade drying. When the leaves got thoroughly dried, these were powdered and the powder was passed through sieve no 60. and stored in a airtight container.

Extraction 

The 2 kgs of shade dried powder material was extracted directly with methanol by cold maceration a room temperature for 10 days in 3 liters round bottom flasks. After extraction, the methanolic extract was filtered through whatmann filter paper to remove impurities, if present. The methanolic extract was concentrated by vaccum distillation to reduce the volume to 1/10th. The concentrated extract was transferred to a 500 ml beaker to evaporate the remaining solvent on a water bath. The methanolic extract was cooled and placed in a desicator.

150 gms of the dried methanolic extract was suspended in 500 ml of distilled water (mother liquor). The mother liquor was taken in a one liter separating funnel and defatted with petroleum ether (60-80°C) by fractionation. After defatting the mother liquor, it was fractionated into chloroform, Ethyl acetate and n-butanol soluble fraction. The fractionated extracts were concentrated and dried. The colour and consistency of these extracts re recorded in table no.1. The dried methanolic extract and its fractionated extracts were packed in airtight container and used for further studies.
Table No.1
The colour and consistency of methanolic extract and its fractions (leaves)

| Sl.No | Solvent extracts           | Colour       | Consistency         |
|-------|----------------------------|--------------|---------------------|
| 1     | Methanolic extracts        | Brownish green| Viscous             |
| 2     | Petroleum ether (60-80°) fraction | Green       | Viscous mass        |
| 3     | Chloroform fraction        | Green       | Resinuous mass      |
| 4     | Ethyl acetate fraction     | Brownish green| Sticky mass         |
| 5     | n-butanol fraction         | Reddish brown| Sticky mass         |

Qualitative Phytochemical Analysis

The methanolic and its fractionated extracts were subjected to qualitative analytical tests for detection of various plant constituents viz., Alkaloids, steroids, carbohydrates, fixed oils and fats, Tannin-Phenolic compounds etc.

The drug powder on shaking with water gave frothing which was constant for more than 15 minutes. It indicates that the leaves ma contain saponins.

The various qualitative tests indicates the presence of steroids, Flavonoids, saponins, Triterpenoids, carbohydrates and tannin-phenolic compounds.

Screening for Anti-inflammatory activity by carrageenin induced paw edema method in rats

The anti-inflammatory activity of Methanolic extract and its fractions vi., chloroform, Ethyl acetate and n- butanol fractions were carried out by 1% carrageenin induced paw edema in wister albino rats. The animals (175-250 gms) were divided into 6 groups each consisting of 6 animals.

The animals of group I-IV received a methanolic extract and its fractions chlorogormm, ethyl acetate and n-butanol respectively at a dose of 200 mg/kg as a fine suspension in 0.5% w/v carboxymethyl cellulose. Group V and VI served as positive control and solvent control by administering Ibuprofen (100 mg/kg) and 0.5% w/v carboxy methyl cellulose (1ml/kg) respectively. All the treatments were made by orally.

After 30 mins. Of drug administration 1 %w/v solution of carageenin in normal saline was injected at a dose of 0.1 ml to the lateral malleous of subplanter region of the right hindpaw of the rat. To the left paw a same dose of normal saline was injected.

The volume of displacement by the inflammed paw were measured by the help of mercury plethysmorgraph. In all the cases the volume of displacement was measured at 0 min, 30 min, 60 min, 120 min, 180 min and 240 min. The data is tabulated in Table No 2.
### Table 2
The Anti-inflammatory Activity of Dodonaea viscosa, Linn by Carrageenin induced Paw Edema Method

| Groups  | Extracts          | Dose in Mg/Kg | Average Volume of Mercury Displacement in ML ± SEM | Percentage protection at 3<sup>rd</sup> hour |
|---------|-------------------|---------------|---------------------------------------------------|---------------------------------------------|
|         |                   |               | 0 min    | 30 min    | 60 min    | 120 min   | 180 min   | 240 min   |                                    |
|         |                   |               | 4.725 ± 0.288 | 5.875 ± 0.098 | 6.625 ± 0.339 | 6.5 ± 0.515 | 6.125*** ± 0.279 | 5.875***± 0.473 | 50                                    |
| I       | Methanolic extract | 200           |          |          |          |          |          |          |                                    |
| II      | Chloroform fraction | 200           | 4.5 ± 0.544 | 4.937 ± 0.375 | 5.875 * ± 0.326 | 6.375 ± 0.604 | 6.25*** ± 0.408 | 5.375***± 0.395 | 46.15                                 |
| III     | Ethyl acetate fraction | 200           | 4.5 ± 0.288 | 5.125 ± 0.314 | 5.5 ** ± 0.427 | 6.375 ± 0.568 | 6.5 * ± 1.07 | 7.25 ± 0.76 | 38.46                                 |
| IV      | n-Butanol fraction  | 200           | 4.5 ± 0.25 | 4.625 * ± 0.59 | 4.75* ± 0.641 | 6.0 ± 0.625 | 6.875*** ± 0.36 | 7.375 ± 0.489 | 26.92                                 |
| V       | Ibuprofen         | 100           | 4.75 ± 0.25 | 5.15 ** ± 0.314 | 5.5 ** ± 0.375 | 5.625* ± 0.568 | 5.625*** ± 0.76 | 4.75***± 0.494 | 73.07                                 |
| VI      | Solvent control 0.5% w/v cmc | 1 ml/kg | 5.5 ± 0.408 | 6.0 ± 0.408 | 6.625 ± 0.478 | 6.875 ± 0.853 | 8.75 ± 0.5 | 8.925 ± 0.75 | -                                    |

*p<0.05 **p<0.02 ***p<0.001
The percentage protection was calculated at 3\textsuperscript{rd} hr using the following formula:

\[
\text{Percentage inhibition of edema} = \frac{C-T}{C} \times 100
\]

Where,

\(C\) = Mean edema of control group.

\(T\) = Mean edema of treated group.

The results were analysed statistically by using students “t” test.

**RESULTS AND DISCUSSION**

Qualitative chemical tests showed the presence of steroids, carbohydrates, tannins, flavonoids, carbohydrates, tannins, flavonoids, triterpenoids and saponins. Methanolic extract and chloroform fraction showed significant anti-inflammatory activity at 180 minutes. However, the activity shown by others groups was found to be less. The peak and significant anti-inflammatory activity (\(P < 0.0001\)) of methanolic extract and chloroform fraction was observed at 180 minutes after the carrageenin administration. The percentage protection of methanolic extract, chloroform fraction and Ibuprofen were 50, 46, 15 and 73.07 respectively. The anti-inflammatory activity was observed from 60 minutes onwards after the carrageenin administration.

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