

## ANTI-INFLAMMATORY SCREENING OF SOME MEDICINAL PLANTS OF EUPHORBIACEAE

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This study is based on ethnobotanical knowledge of Euphorbiaceae growing in Vidharbha region, Maharashtra. Euphorbiaceae is known as warehouse of several potential therapeutic chemicals like steroids, diterpenoids, triterpenoids, flavonoids, alkaloids and phenols. Present study highlights the scientific evaluation of screening of nine species of Euphorbiaceae for anti-inflammatory activity and their use as drugs. Carrageenan induced rat paw oedema assay was conducted for this screening. These observations will enable to assess the therapeutic value of five plants against inflammations.

**Keywords:** Anti-inflammatory screening; Euphorbiaceae.

Plants have been playing central role in human life from time immortal. They still have the important role in day-to-day life. Hundreds of plants are documented in 'Ayurveda' and other medicinal literature. Notable among these are species of Euphorbiaceae, which have been used in the Ayurvedic system of medicine against different diseases<sup>1</sup>. Ethnomedicinal surveys represent number of Euphorbiaceous plants used as anti-inflammatory agents by the tribals of Gadchiroli and Chandrapur districts of Maharashtra. It was therefore, attempted to find out the efficacy of the crude drugs used by the tribes as anti-inflammatory agents. Literature reveals that in 16<sup>th</sup> century the Portuguese exported *Euphorbia antiquorum* from the Malabar region as the true medicinal *Euphorbia*<sup>2</sup>. Family Euphorbiaceae is known for number of compounds which have medicinal potential for number of diseases. In particular, diterpenoids from Euphorbiaceae have been found to possess interesting biological activities<sup>3</sup>. Molluscicidal properties of Euphorbiaceae plants were reported by Zani *et al.*,<sup>4</sup> and Schall *et al.*,<sup>5</sup>. The whole plant of *Phyllanthus amarus* is a potential diuretic, anti-hypertensive and hypoglycemic for human<sup>6</sup>. Vamshidhar and Santos *et al.*,<sup>8</sup> have reported antinociceptive activity of *E.heterophylla* and *Phyllanthus* species, respectively. Reports about antimalarial virtue of species of Euphorbiaceae have been made<sup>9</sup>. Alarcon-Aguilara *et al.*<sup>10</sup> studied some members of Euphorbiaceae for anti-hyperglycemic activity of ethnopharmacologically used antidiabetic plants. Phorbol ester bioactivity in Euphorbiaceae plants has been investigated in Phyllanthoideae and Oldfieldoideae<sup>11</sup>, in Antidesmeae, Crotonoideae, Euphorbioideae and Acalyphoideae<sup>12-13</sup>. Santos *et al.*,<sup>8</sup> studied antinociceptive properties of *Phyllanthus amarus*, *P.orbicularis*, *P.fraternus* and *P.stipulatus*.

Survey of literature shows only few references of anti-inflammatory activity. Asmawi *et al.*<sup>14</sup>, reported anti-inflammatory activities of *P.emblica*. Oliveira-Filho and Paumgarten<sup>15</sup> analysed anti-inflammatory activity of *E.royleana* latex.

Aerial parts of the following plants were selected for screening anti-inflammatory activity: *Cleistanthus collinus*, *Euphorbia geniculata*, *E.hirta*, *E.tirucalli*, *Kirganelia reticulata*, *Pedilanthus tithymaloides*, *Phyllanthus virgatus*, *Putranjiva roxburghii* and *Securinega virosa*. The "Carageenan Induced Rat Paw Odema Assay"<sup>16</sup> was adopted to study the anti-inflammatory action of the crude drugs.

The plants selected were washed thoroughly and dried in shade. The dried plant material was ground to fine powder. About 1kg of the plant material was collected and extracted repeatedly in absolute alcohol by using Soxhlet apparatus. The extracts were filtered and allowed to dry at room temperature. These extracts were weighed and tested against inflammation. Extracts of the plant materials were concentrated and paste was prepared. This paste was suspended in 5% gum Acacia and homogenous suspension was prepared.

The test compound administered orally at the dose of 100mg/kg body weight of albino rat and 1% Acacia gum was used as control. After an hour carrageenan 0.05ml was injected into the planter tissue of right hind paw. The paw columns were measured plethysmographically at 1 and 3 hrs after the carrageenan injection. The percentage inhibition of the paw oedema was calculated using the equation:

$$\text{Percentage inhibition} = (1 - Vt/Vc) \times 100$$

Where Vt and Vc are the volumes of the paw oedema in the treated and control animals respectively. The observations were recorded in tabular form (Table 1).

**Table 1.** Screening for anti-inflammatory action of extracts of selected plants of Euphorbiaceae.  
(All values represent average of 5 readings)

S.No	Drug	Mean edema		Percent inhibition	
		1hr	3hr	1hr	3hr
1	<i>Acacia gum</i> (negative control)	0.7±0.1	1.3±0.254	-	-
2	<i>Cleistanthus collinus</i>	0.5±0.158	0.7±0.158	28.57	46.15
3	<i>Euphorbia geniculata</i>	0.4±0.158	0.9±0.244	42.85	30.76
4	<i>Euphorbia hirta</i>	0.6±0.291	1.2±0.316	14.29	7.7
5	<i>Euphorbia tirucalli</i>	0.2±0.122	1.9±0.458	71.43	-
6	<i>Kirganelia reticulata</i>	1.0±0.158	1.6±0.223	-	-
7	<i>Pedilanthus tithymaloides</i>	0.8±0.18	2.2±0.29	-	-
8	<i>Phyllanthus virgatus</i>	0.4±0.1	0.5±0.14	42.85	61.53
9	<i>Putranjiva roxburghii</i>	0.6±0.233	1.1±0.353	14.29	15.38
10	<i>Securinega virosa</i>	0.3±0.122	0.6±0.158	57.14	53.84

Note: Dosage of drug 100mg/Kg

Varied inhibitory activity of plant extracts for inflammation was observed in present investigation. Extracts of *Phyllanthus virgatus*, *Putranjiva roxburghii* and *Cleistanthus collinus* showed with increasing percentage of inhibition from 1<sup>st</sup> hour to 3<sup>rd</sup> hour. While *Euphorbia tirucalli* showed good anti-inflammation at 1<sup>st</sup> hour (71.43%) and gradually decreased to negative value. *Euphorbia tirucalli*, *Kirganelia reticulata* and *Pedilanthus tithymaloides* are being used by the tribals as anti-inflammatory agents but present carrageenan induced rat paw oedema reported here with negative results.

Various phytochemicals viz., flavonoids<sup>17</sup>, steroids and triterpenoids<sup>18</sup> and polyphenols<sup>19</sup> are reported to act against inflammations. These chemicals were reported to be present in various species of Euphorbiaceae<sup>20</sup>. Hence, one or few of these compounds may be active in inhibiting the inflammation in present investigation. These plants can be used in future for preparation of anti-inflammatory drug.

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