

ECOLOGICAL AND BIOCHEMICAL STUDY OF *CROTON SPASIFLORUS* MORANG FAMILY EUPHORBEACEAE

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ABSTRACT:- The genus *Croton*, belonging to the Euphorbiaceae family, is a plant with shrubby characteristics, with the ability to regrow in times of rain, develops wildly, especially in deforestation areas, being reported mainly in the Jayantikunj and Forest region of Rewa(M.P.). One of the main characteristics of this genus is that several species are rich in chemical constituents of importance for medicine. In the present study an objective that findings regarding the biological activities and chemical composition of *Croton* species. The articles studied have shown different activities for *Croton* species, such as anti-inflammatory, antihypertensive, antifungal, antimicrobial, antidiabetic, antioxidant, antinociceptive and anti-tumor. Regarding toxicological aspects, the findings suggest caution in the use of *Croton* species, as some are toxic. While, regarding the chemical composition, in most species the presence of several secondary metabolites is observed, such as alkaloids, terpenoids, flavonoids and other phenolic compounds. Therefore, the results described in this article suggest that the therapeutic application of *Croton* species is supported by the literature, however we point out that caution is required in the use of *Croton* species, some present due to toxicity.

KEYWORDS -: *Croton* sp; Biological activities; Chemical composition; Toxicology.

INTRODUCTION:-

A family of about 300 genera and 7500 species (Jones and Luchsinger, 1987), Euphorbiaceae are cosmopolitan in distribution. They are abundant in both tropical and temperate regions, and not well - represented in arctic regions. Over 60 genera and about 350 species have been reported from India. Some of the common genera along with the approximate number of their world over reported species as well as the common names of some

of them are *Euphorbia* (2000, spurge or poinsettia), *Croton* (750), *Phyllanthus* (600), *Acalypha* (450, chenille plant), *Jatropha* (175), *Manibot* (170), *Sapium* (120), *Tragia* (100, nosebum), *Clusia* (70), *Manadenium* (47), *Ricinocarips* (16), *Hevea* (12, Para-rubber) and *Ricinus* (1, castor bean).

Many members of the Euphorbiaceae family, including the genus *Euphorbia*, contain a poisonous milky - latex sap. The toxin is a mixture of diterpene esters, and contact with the skin may cause inflammation and a blistering rash. An Australian company called Peplin Biotech is conducting Research on the sap of *E. peplus* as a simple topical treatment for certain skin cancers, such as basal cell carcinomas and squamous cell carcinomas. These are the most common human cancers, particularly in people who spend a lot of time outdoors in direct sunlight. For years, people in Australia have used the milky sap of *E. peplus* to cure cancerous spots on their skin. The fresh sap from *E. peplus* is applied directly to the cancerous spot. After a few days the area develops into an enlarged, swollen sore, followed by a scab that eventually dries and falls off. According to Peplin Biotech, the sap penetrates the skin and destroys the malignant tissue. This is essentially what happens when a dermatologist applies liquid nitrogen directly to a superficial cancerous growth on the skin. A patent has already been applied for this remarkable discovery.

Traditional uses of plants for treating various human diseases by indigenous people have provided an insight to the researchers to search for the presence of active metabolites. One such plant weed which is under scrutiny is *Croton sparsiflorus* Morang. It is present on barren lands and road sides Sisodia and Siddqui (2010) of South India, especially Tamil Nadu and Puducherry Union Territory. This plant possesses alkaloids-

crotsparine, N-methyl crotsparine and N, O-dimethyl crotsparine, crotsparinine, N- methyl crotsparinine, sparsiflorine Bhakuni, *et al.* 1970; amidescrotamides A and B (Mehmood, *et al.* 2010); cortosparsamide (Mehmood and Malik, 2010). Scientific Study on the medicinal properties of this plant have been emerging now. Hypotensive active (Dubey, *et al.* 1969), anti-inflammatory and anti-pyretic activity (Kumar, *et al.* 2010), antibacterial activity (Ramakrishnan, *et al.* 2012, Saggoo, *et al.* 2010, Singh, *et al.* 2011, Udayaprakash, *et al.* 2011, Saranya, *et al.* 2012, Duraipandyan, *et al.* 2011) and antifungal activity have been studied using various solvent extracts of *C. sparsiflorus*. Allelopathic effects of various extracts (Sisodia and Siddiqui, 2010) and genotoxic effects of this plant were reported earlier (Saggoo, *et al.* 2010).

AIMS AND OBJECTIVE:-

The changing climate and lifestyle have emerged as serious global concerns because of certain issues like; health disorders i.e. cancer, hepatitis, stress-related disorders, urinary disorders, and bacterial infections. Plants have been reported to possess good therapeutic action against many of such diseases. Different classes of secondary metabolites, alkaloids and terpenoids have been accounted for *Croton* species. The proposed research was carried out by the application of modern analytical techniques and bioassay methods, and the set aims and objectives of the research were to;

- Evaluate the biological activities of the crude extracts of the selected plant.
- Isolate compounds from the crude extracts of selected plant.

- Elucidate the chemical structure of the isolated compound.

REVIEW OF LITERATURE:-

In India some ecological study have been made for few medicinal plants including morphology, ecology study, reproductive biology etc. Kritikar and Basu (1935), Punt (1980), Joshi *et al.* (1980), Atal and Kapoor (1982), Mishra and Sahu (1984), Chopra, *et al.* (1992), Devi and Gupta (2000), Udayaprakash, *et al.* (2011), Saranya, *et al.* (2012), Shende, *et al.* (2015), Mitra and Nayar (2017), Khanna. (2017), Reddy, *et al.* (2017), Akkulanna and Kailas (2020), and Renu and Nahid (2020).

METHODOLOGY:-

The genus is selected, for a present study is a member of Euphorbiaceae family. Following methods will be applied for investigation. For the detailed investigation, the plant will be described Taxonomical and Morphology. The vegetative and reproductive parts both will be studied visually as well as microscopically. With the help of flora, finally described taxonomically. For Phytosociological studies the quadrates methods will be applied and calculation will be completed by the formula suggested by Misra *et al.* (1968).

RESULTS AND DISCUSSION:-

Popular Use

The main species of the *Croton* genus found in India and used in folk medicine is *Croton sparsiflorus*. The diversity of activities reported to the species of the genus are compiled in Table 1, according to the form of use of the plant and the region in which each species can be found in Rewa (M.P.)

Table No.1 - The genus *Croton*, belonging to the Euphorbiaceae family and Phenological activities.

Species	Native	Applications in folk Medicine	References
<i>Croton sparsiflorus</i>	Jayani Kung forest region Rewa MP.	The infusion of leaves, bark and stem is used to treat diabetes, control cholesterol and treat gastric and liver disorders	Nascimento et al. (2017)

Biological Activity:-

1 Antihypertensive activity-

Tests carried out with trans-dehydrocrotonin diterpene isolated from the bark of the stem *Croton sparsiflorus* concluded that the in vivo assay the diterpene promoted hypotensive and bradycardic effect, which were related to effect separate and independent vasorelaxant in the

aortic endothelium. The results suggested that the hypotensive activity is not related to muscarinic, β -adrenergic stimulation or even to ganglionic blockade, however it is suggested that it may be related to the release of nitric oxide by the endothelium. With respect to bradycardia, the results indicated negative chronotropic effect resistant atropine.

2. Anti-inflammatory and antinociceptive activity-

The extract of *Croton sparsiflorus* leaves arises from obtaining extracts with supercritical CO₂ (using different conditions, such as temperature and pressure variation) and was evaluated against in vivo anti-inflammatory activity. The extracts showed high levels of total phenolics and total flavonoids, while in the histopathological analysis of ischemic injury in the motor cortex of rats, the extracts showed influence on tissue reconstruction and cell density reduction, the treatment suggests a potential anti-inflammatory effect and neuroprotective, showing reduced injury in animals treated with SC-CO₂ extract (Bezerra et al., 2020).

3 Antimicrobial and antiprotozoal activity-

The tests were carried out with the crude aqueous and alcoholic extracts of the bark and leaves of *Croton sparsiflorus* Balak, against enteric pathogens causing urinary tract infections, and the results concluded that the extracts of the leaf bark were not successful against *Salmonella typhimurium*; however, the results were promising against *Staphylococcus aureus* and *Escherichia coli*. And the study also suggests that the alcoholic extract showed better activity when compared to aqueous extract.

4. Antidiabetic activity-

The effect of the methanol extract of *Croton sparsiflorus* leaves in streptozotocin-induced diabetic rats. The results suggested a considerable increase in the blood glucose level of the test animals when compared to the control group, in addition to demonstrating that the glucose levels in animals treated with the extract at a dose of 200 mg/kg and the positive control with metformin a 200 mg/kg, a significantly reduced was observed, thus suggesting that the extract has regulatory activity on blood glucose levels in diabetic rats. These results suggest that the methanol extract showed significant activity in the oxidative inhibition and inflammation, as it was observed that the extract reduced the glucose present in the blood circulation and improve renal histological damage frame and pancreatic having potential for application to treat diabetes.

5. Antioxidant activity-

Tests with the bark of *Croton sparsiflorus* show that the presence of flavonoids in the crude ethanol extract and

fractions (butanolic and ethyl acetate) were able to inhibit deoxyribose, albeit at low rates (1 µg/mL).

6. Toxicity-

Tests performed in male rats with volatile oil of *Croton sparsiflorus* in order to investigate systemic toxicity, observed some morphological changes in the organs, but there was no induction of structural abnormalities in the organs, and with this, the findings suggest that doses with concentrations below 250 mg/kg offer a low toxicological risk.

7. Chemical composition-

Phytochemical studies with species of the *Croton* genus demonstrated that in most species, it is possible to observe the presence of several secondary metabolites, such as alkaloids, terpenoids, flavonoids and other phenolic compounds. Among the constituents, terpenoids are the most widespread and most relevant to the genus (Salatino et al., 2007).

CONCLUSION:-

Medicinal plants are used since ages by the primitive society and may of them have figured in Ayurvedic literature also. The present study will provide mankind a medicine which is safe and free from side effects. The present study will for future work i.e. identification, biochemical constituents etc. The data presented in this review on *Croton* species reflect a compilation of knowledge about their chemical composition and biological properties already elucidated. The *Croton* genus is widely used by folk medicine, and as information proves some activities, such as anti-inflammatory, anti-hypertensive, antifungal, antimicrobial, antidiabetic antioxidant, antinociceptive and antitumor. However, the results described in this article suggest that caution is needed in the use of *Croton* species, as some of them are toxic. In view of this, in-depth studies are needed to correlate biological activities with chemical composition.

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