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Report on medical potential of *Calotropis procera*

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ABSTRACT

Calotropis procera, on the basis of literature findings has been found capable for the treatment of leprosy, ulcers, tumors, piles and other diseases. The latex of the plant exhibited anti inflammatory, antipyretic and anthelmintic activity. The aqueous extract of *Calotropis procera* has been evaluated for its spasmolytic activity. The root bark of the plant showed antitumor activity and has been used as treatment for elephantiasis and leprosy[1].

Key words: *Calotropis procera*, Asclepiadaceae, latex, biological activity.

INTRODUCTION

Calotropis procera (giant milk weed), a wild growing plant has been used traditionally for the treatment of leprosy, ulcers, tumors and piles[2]. It is a perennial, woody shrub with fleshy leaves and grows in warm temperate regions. The plant is found in almost all parts of India. The plant has been used in traditional medicine as a purgative, anthelmintic, anticancer as well as to treat leucoderma, ulcers, piles and disease of spleen[3].

The milky white latex exhibits potent anti-inflammatory activity that is comparable to standard anti-inflammatory drugs. Experimentally, it has been well established that drug possessing anti-inflammatory activity also exhibit anticancer properties. The plant is also reported to act as an antifertility agents along with uterine stimulating and embryo toxic effects. The literature studies have revealed that the chloroform fraction of *Calotropis procera* root extract possess significant analgesic, antipyretic and anti-inflammatory activity.

Commercially also, this plant is an important one. The proteolytic enzymes isolated from *Calotropis procera* have shown its thermal and pH stabilities. The high proteolytic action at 70°C supported the suitability of the proteases enzyme as a coagulant[4] in future commercial production of Nigerian Ware cheese.

In the present manuscript, important biological activities associated with *Calotropis procera* have been summarized.

Anti-inflammatory activity

The extract prepared form latex of the plant has been reported to exhibit anti-inflammatory activity against carrageenan and formalin that are known to release various mediators and also against inflammation induced by histamine, serotonin, compound 48/80, bradykinin (BK) and prostaglandin E_2(PGE_2) in the rat paw oedema model. The aqueous and methanolic extract of the dried latex and standard anti-inflammatory drugs were administered orally an hr before inducing inflammation. Both extract produced about 80%, 40% and 30% inhibition of inflammation induced by BK, compound 48/80 and serotonin[5].

In another reported assay, the methanolic extract (MeDL) (50 and 500 mg/kg) of *Calotropis procera* and standard anti-inflammatory drug rofecoxib (20 and 100 mg/kg) produced a significant attenuation in the inflammatory response and

ameliorated the arthritic changes in the joint. The protection afforded by MeDL and rofecoxib was more pronounced than that of phenylbutazone. However, the overall protection exhibited by rofecoxib was better than that of MeDL[6].

The various extracts of dry latex of *Calotropis procera* when tested in the carrageenan induced rat paw oedema model, exhibited anti-inflammatory activity by inhibition of oedema. The effect was found to be greatest with the acetone and aqueous extracts[7].

Anthelmintic activity

The crude latex of *Calotropis procera* was studied for anthelmintic activity using adult earthworms. Both fresh as well as aqueous extracts of dried latex exhibited a dose-dependent inhibition of spontaneous paralysis. With higher doses, the effects were comparable with that of 30% piperazine. However, the worms treated with piperazine were recorded within six hours whereas no such recovery was observed in case of latex. The results showed that latex possesses wormicidal activity and thus may act as an anthelmintic agent[8].

The anthelmintic activity *of Calotropis procera* was investigated in sheep that had been infected with 12000 infective *Haemonchus contortus* larvae. Inappetence, dullness, erosive abomasitis decreased hemoglobin concentration and increased eosinophils were the main feature of haemonchosis in the sheep. The sheep treated with the latex reduced significantly the production of eggs. Although the appetite improved, the hemoglobin concentration and serum copper, iron and zinc levels were still reduced after therapy with *Calotropis procera* latex. Thus, the latex showed a concentration-dependent larvicidal activity *in vitro* within 20 min of application[9].

The studies also revealed anthelmintic effects of crude aqueous and crude methanolic extracts of *Calotropis procera* flowers on live *Haemonchus controtus* indicating their mortality or temporary paralysis. The flowers were administered as crude powder (CP), crude aqueous extract (CAE) and crude methanolic extract (CME) to sheep naturally infected with mixed species of gastrointestinal nematodes. Egg count percent reduction (ECR) was recorded 88.4 and 77.8% in sheep treated with CAE and CP respectively. CME was least effective resulting in 20.9% reduction in ECR. Thus, it was found that *Calotropis procera* flowers possess good anthelmintic activity against nematodes[10].

Spasmolytic activity

The aqueous extract of *Calotropis procera* was evaluated for its spasmolytic effect using in vitro trachea smooth muscle chain of Guinea pig. The extract (50, 100 and 200 µg/ml) showed a dose-dependent relaxant activity probably exhibited through the direct relaxant action on the smooth muscle[11].

Antitumor activity

A novel compound, cardenolide (2"-oxovoruscharin) isolated from the methanolic extract of *Calotropis procera* root barks has been reported to possess antitumor activity. The compound exhibited *in vitro* antitumor activity on a panel of 57 human cancer cell lines similar to taxol, and higher than SN-38 (the active metabolite of irinotecan). Two of the most potent drugs used in hospitals to combat cancer[12].

Antiulcer activity

The available reports have revealed that *Calotropis procera* significantly inhibited aspirin, reserpine, absolute alcohol and serotonin-induced gastric ulcerations in rats. The same also protected the gastric mucosa from aspirin-induced ulceration in pyloric-ligated rats and significant protection was observed in histamine-induced duodenal ulcers in guinea pigs[13].

Antibacterial activity

A new compound proceragenin isolated from *Calotropis procera* has shown strong antibacterial activity and was found to be active against *Micrococcus luteus, Aeromonas sobriae, Aeromonas caviae, Pseudomonas pseudomalliae, Escherichia coli, Streptococcus fecalis, Vibrio cholera, Klebsiella pneumoniae, Corynebacterum diptheriae* and *Bacillus subtilis*. It also showed strong antitumor activity causing 75% reduction in the tumor formation[14].

Antinociceptive activity

The latex protein fraction from the *Calotropis procera* showed the antinociceptive effect in a dose-dependent manner and it was concluded that the protein fraction derived from the whole latex possesses antinociceptive activity, which is independent of the opioid system[15].

Antipyretic effect

The latex of *Calotropis procera*, ethanolic extract of its flowers and the chloroform soluble fraction of roots have shown significant anti-inflammatroy activity besides other medicinal properties. Further reports revealed that the latex is as potent as standard anti-inflammatory and analgesic drugs. The ethanolic extract of its aerials parts has been reported to possess antipyretic effect. As drugs possessing anti-inflammatory and all analgesic properties may also exhibit antipyretic effect. The anti pyretic effect was compared with that of aspirin, which was found to be more potent and brought down the temperature of male albino rats[16].

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