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Research Article

Bioactivities, Characterization, and Therapeutic Uses of *Dracaena cinnabari*

Israa Adnan Ibraheam [1], Haider Mashkoor Hussein [2], Imad Hadi Hameed[*]

[1]*Department of Biology, College of Science for women, University of Babylon, Iraq*
[2]*College of Science, University of Al-Qadisiyah, Iraq*
[3]*College of Nursing, University of Babylon, Iraq*

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ABSTRACT

Young specimen of *Dracaena cinnabari* in the Koko Crater Botanical Garden, Honolulu, Hawaii, United States The dragon blood tree has a unique and strange appearance, with an "upturned, densely packed crown having the shape of an uprightly held umbrella". This evergreen species is named after its dark red resin, which is known as "dragon's blood". Its leaves are found only at the end of its youngest branches; its leaves are all shed every 3 or 4 years before new leaves simultaneously mature. Branching tends to occur when the growth of the terminal bud is stopped, due to either flowering or traumatic events (e.g. herbivory). The trees can be harvested for their crimson red resin, called dragon's blood, which was highly prized in the ancient world and is still used today. Dragon's blood is used as a stimulant and abortifacient. The root yields a gum-resin, used in gargle water as a stimulant, astringent and in toothpaste. The root is used in rheumatism, the leaves are a carminative. The local inhabitants of the city in the Socotra Island use the dragon's blood resin as a cure-all. They use it in general wound healing, as a coagulant, cure for diarrhea, for dysentery diseases, for lowering fevers. It is also taken for ulcers in the mouth, throat, intestines and stomach.

Keyword: *Dracaena cinnabari*, Review, GC-MS, Bioactivities, Characterization, Therapeutic, Applications.

INTRODUCTION

Unlike most monocot plants, Dracaena displays secondary growth, D. cinnabari even has growth zones resembling tree rings found in dicot tree species[1-3]. Along with other arborescent Dracaena species it has a distinctive growth habit called "dracoid habitus". Its fruits are small fleshy berries containing between 1 and 3 seeds. As they develop they turn from green to black, and then become orange when ripe[4-10]. The berries are eaten by birds (e.g. Onychognatus species) and thereby dispersed. The seeds are 4–5 mm in diameter and weigh on average 68 mg. The berries exude a deep red resin, known as dragon's blood. Like other monocotyledons, such as palms, the dragon's blood tree grows from the tip of the stem, with the long, stiff leaves borne in dense rosettes at the end. It branches at maturity to produce an umbrella-shaped crown, with leaves that measure up to 60 cm long and 3 cm wide[11-16]. The trunk and the branches of the dragon blood are thick and stout and display dichotomous branching, where each of the branches repeatedly divides in two sections. Around the Mediterranean basin it is used as a dye and as a medicine, Socotrans use it ornamentally as well as dying wool, gluing pottery, a breath freshener and lipstick. Because of the belief that it is the blood of the dragon it is also used in ritual magic and alchemy. The resin of *D. cinnabari* is thought to have been the original source of dragon's blood until during the mediaeval and renaissance periods when other plants were used instead[17].

Bioactivities and therapeutic uses

Antimicrobial and antiviral activity

The aqueous ethanol extract, some fractions of the methanol extract, catechin and acetyl aleuritolic acid of Sangre de Drago obtained from Croton urucurana are reported to show inhibition of *Staphylococcus aureus* and *Salmonella typhimurium*[20-22]. Study reported in vitro antifungal activity of Sangre de Drago from Croton urucurana, which could be due to the presence of catechins like gallocatechin and epigallocatechin. Antiviral properties of Croton's sap have also been evaluated.

Antitumor and cytotoxic activity

A number of compounds isolated from Sangre de Drago (Croton) are found to show cytotoxicity. Taspine from Croton lechleri sap has shown potent activity againstKBandV-79 cells, while flavan-3-ols and proanthocyanidins, which are the major components of the sap, are not cytotoxic[23].

Antihemorrhagic activity

Total inhibition of hemorrhage was observed, probably owing to the chelation of zinc required for the catalytic activity of venom's hemorrhagic metalloproteinases[24-30]. Aqueous extracts of Croton urucurana antagonized the hemorrhagic activity of the venom of Bothrops jararaca and proanthocyanidins were involved in this activity.

**Author for Correspondence: imad_dna@yahoo.com*

Table 1: Major phytochemical compounds identified in *Dracaena cinnabari*.

Part of plant	System	Effects	Preparation	Ref.
Root		stimulant, astringent and in toothpaste	root yields gum	9
	treatment	rheumatism	extract	10
		diarrhoea in travellers	extract	10
		Antimicrobial antiviral activity	extract	11
		Antitumor	extract	12
		Antihemorrhagic	extracts	5 6
	Bioactivities and therapeutic	Antiulcer	powder	28
		antidiarrhoeal	extracts	26
		Analgesic	extracts	27
		Antioxidative Anti-inflammatory Mutagenic Antimutagenic Wound healing activity	extracts	4
	immune response	Immunomodulator	extracts	28
Resin		wound healing	Ethanol extract	12
		coagulant	Extract	12
	tretment	diarrhea lowering fevers Hemostatic and antithrombotic methanol extract Analgesic activity	Powder /infusion	12
		dysentery diseases	Extract	12
		carminative	Methanol extracts	12
Trees		dying wool, gluing pottery, a breath freshener and lipstick ritual magic and alchemy	Extract	
Leaves		carminative		10

Immunomodulatory activity

The human immune response is a highly complex system involving both innate and adaptive mechanisms. A biological or pharmacological effect of compounds on humoral or cellular aspects of the immune response is referred as immunomodulating activity[31-35].

Antiulcer and antidiarrhoeal activity

The extracts from Croton species have been shown to impair the capsaicin-stimulated ion transport across guinea pig ileum when added to the serosal bath in Ussing chambers and thus may prove to be a cost-effective treatment for gastrointestinal ulcers.

Antioxidative activity

Researcher suggested that Sangre de Drago (Croton lechleri) is highly effective in scavenging peroxyl and hydroxyl radicals at high concentrations. However, prooxidant activity was observed at lower concentrations[36-40].

Anti-inflammatory activity

In a study on edema in rats, reported, for the first time, anti-inflammatory activity of alkaloid taspine isolated from Croton latex. The latex from Croton lechleri has strong anti-inflammatory activity when administered.

Mutagenic and antimutagenic activity

The mutagenic and antimutagenic activity of Croton lechieri sap was examined through the Ames/Salmonella test and no mutagenicity of 2-aminoanthracene was found in the Salmonella typhimurium strains T98 and T100[41-44].

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