

IN-VITRO EVALUATION OF ANTI-SOLAR ACTIVITY OF LEAVES OF *CROSSANDRA INFUNDIBULIFORMIS* (L.) NEES

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ABSTRACT

Sun light is the major source of U.V radiation; it extends to the earth's atmosphere and helps our body to synthesize vitamin D, which promotes the bone growth. But due to high exposure to U.V radiation from sun may cause sunburns, wrinkles etc. The UV-A penetrates the skin and causes premature ageing of skin, UV-B mostly causes sunburns and damage to DNA in skin. The present study was aimed to evaluate the U.V absorption ability of aqueous extracts of fresh and dry leaves of *crossandra infundibuliformis* as an Anti-solar agent. U.V visible spectrophotometer is used to perform this method. The results shown that aqueous fresh leaves extract of *C. infundibuliformis* has better Anti-solar activity than dry leaves extract. As it contains natural

flavanoids and polyphenols they are considered as excellent sunscreen agents. Therefore it was concluded that *C. infundibuliformis* leaves extract can be used in preparation of various highly effective sunscreen formulations as it provides the better advantage of avoiding the harmful effects of synthetic sunscreen preparations.

KEYWORDS: Anti-solar, *crossandra infundibuliformis*, UV radiation, U.V visible spectrophotometer.

INTRODUCTION

Sun light is a part of electromagnetic radiation.^[1] The sun radiates energy in a wide range of wavelengths based on wavelength UV light is divided into 3 regions in the following order of the wave length.^[2] UV-A(long wave) and the wave length is about 315nm-400nm, UV-B(mid range) the wave length is about 280nm-315 nm, and UV-C (short wave) covers 280nm down

to 30 nm. UV radiation from sun has always played important roles in our environment and affects nearly all living organisms. The moderate exposure to sun help to produce vitamin D but due to high exposure to UV radiation from sun may cause sun burns, wrinkles and premature ageing of skin.^[3] Commercially UV lamps are used for sterilizing the surgical equipment.

A layer of ozone in the upper atmosphere absorbs UV radiation and prevents most of it from reaching the earth. Due to Human activities there has been change in the chemistry of atmosphere which reduces the amount of ozone in stratosphere day by day. This means that more U.V radiation can pass through the atmosphere to the earth's surface. About 95% of the UV-A radiation reaches the earth surface and causes damage to the skin by causing wrinkles or premature ageing of the skin, UV-B radiation mostly effect the top layer of the skin and causes sun burns and damage to the DNA, UV-C does not reach the earth surface but people who work with mercury lamps may be exposed to UV-C which is the more dangerous type of UV. As both UV-B and UV-A are harmful to our health, it is important to protect ourselves by using various products like sunscreen creams and lotions. The natural substances like anthrax quinines, flavanoids and poly phenols have been used as sunscreen agents because of their U.V radiation absorption capacity^[4] and Anti oxidant activities.^[5]

Crossandra infundibuliformis is commonly called as fire cracker flower. It belongs to the family Acanthaceae. This plant is grown in temperate regions and is cultivated as house plant. It has many medicinal values such as Aphrodisiac.^[6] Anti inflammatory and Analgesic^[7] and Wound healing,^[8] Anti bacterial and Anti oxidant properties.^[9] The present study was aimed to evaluate the Anti-solar potential of fresh and dried leaves of *crossandra infundibuliformis*.



Kingdom : Plantae
Order : Lamiales

Family : Acanthaceae
Genus : Crossandra
Species : *infundibuliformis*

MATERIALS AND METHODS

Plant material

Fresh leaves of *C.infundibuliformis* were collected in Karimnagar district, Telangana state, India. The plant was identified and authenticated by BSI, Hyderabad, and Telangana, India. The plant authentication number is BSI/DRC/2018-19/Tech/505.

Extraction of Fresh and Dry Leaves

Take 50 Gms of fresh leaves of *crossandra infundibuliformis* in mortar and grind with pestle using 200 ml of distilled water. Then keep it in a rotary shaker for 24 hours by maintaining 100 RPM. Collect the extract by filtering through a 4 layers of muslin cloth. This extraction process was repeated again.

Take 50 Gms of dried leaves powder of *crossandra infundibuliformis* and add 200 ml of distilled water and heat it at mild temperature for 2 hours. Then keep it aside for 24 hours. Collect the extract by filtering through a 4 layers of muslin cloth. This process was repeated again. The collected extracts were dried at mild temperature.^[10] The dried extracts are used for photochemical studies.

Phytochemical Screening Shinoda test, lead acetate test and sodium hydroxide test were done to confirm the presence of flavonoids.^[11-12]

- **Shinoda test:** To the 2ml of aqueous extract add 95% ethanol and few drops of concentrated HCL and 0.5 g of magnesium turnings, the development of pink color indicates the presence of flavanoids.
- **Lead acetate test:** To the 2ml of aqueous extracts add lead acetate solution and the formation of yellow precipitate indicates the presence of flavanoids.
- **Sodium hydroxide test:** To the 2 ml of aqueous extract an increasing amount of sodium hydroxide was added and the formation of yellow color which decolorized after the addition of acid confirmed the presence of flavanoids.

Evaluation of Anti-Solar Activity

By using the UV visible spectrophotometer anti-solar activity was performed^[13] the extraction of fresh and dry leaves with water is done by maceration process. The individual extracts are taken in the concentration of 10mg/100 ml concentration with distilled water. The absorbance was measured in the range of 200-400 nm.

RESULTS

Anti-solar activity was observed by measuring absorbance. The fresh leaves exhibited maximum absorbance (~3.4) at 201.4 nm and minimum absorbance at 250nm-300nm. The dried leaves exhibit maximum absorbance at (~1.8) at 202.2 nm and minimum absorbance at 250nm-300nm.

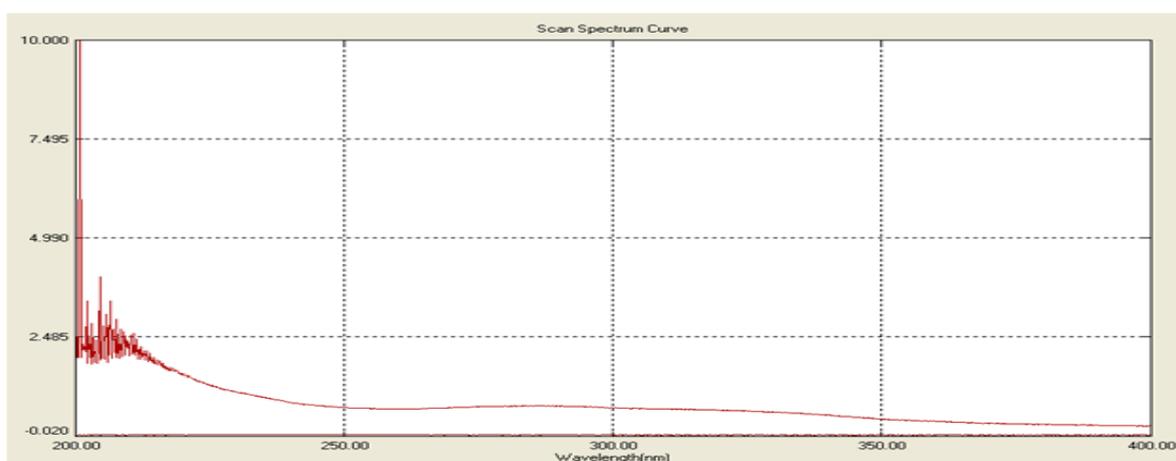


Figure 1: Scanning spectra of aqueous extract of fresh leaf extract of *C.infundibuliformis* on UV Spectrophotometer.

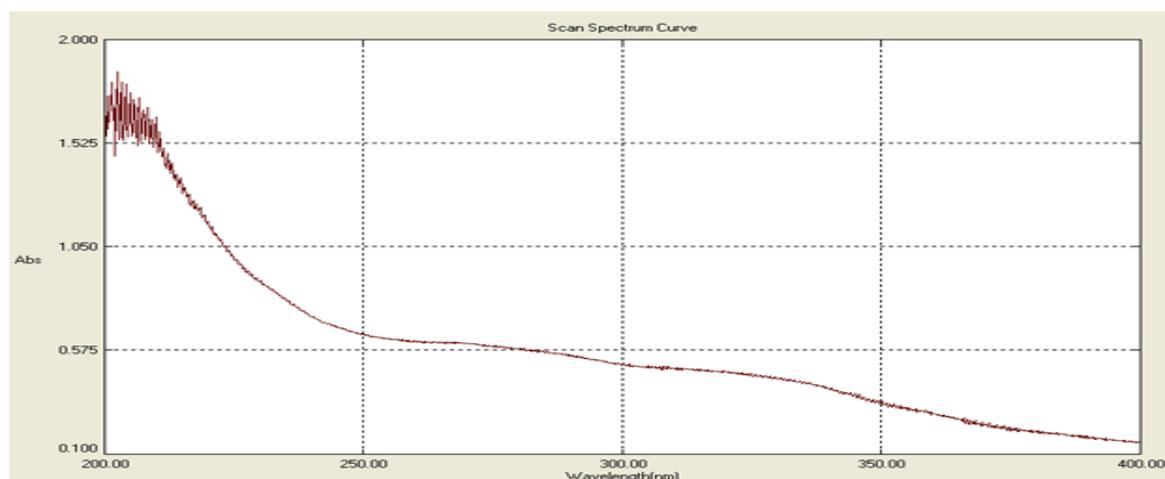


Figure 2: Scanning spectra of aqueous extract of dry flower extract of *C.infundibuliformis* on UV Spectrophotometer.

DISCUSSION

The qualitative investigation of the extracts has shown the presence of flavanoids. Flavonoids are abundant in plants, in which they perform several functions. The main characteristic feature of flavanoids is the absorption of U.V radiation. The U.V absorption characteristics of flavanoids have long been considered as evidence for the role of flavanoids in U.V protection.

The aqueous extracts of fresh and dried leave have ability to produce U.V radiation. Hence the anti-solar activity of the plant that has been proved shows its importance and prophylactic utility in anti-solar formulations. This will be a better, cheaper and harmless alternative to harmful chemicals used nowadays in the industry.

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