Asian Pac. J. Health Sci., 2014; 1(2): 104-106 ISSN: 2349-0659

Document heading doi: 10.21276/apjhs.2014.1.2.12 Original Article

In-vitro EVALUATION OF FLOWERS OF *Crossandra infundibuliformis (L) NEES* AS A NATURAL ANTI-SOLAR AGENT

Sowjanya Pulipati*, Vamsi Anil Krishna Ch, Srinivasa Babu P

Vignan Pharmacy College, Vadlamudi- 522 213, Guntur (Dt), Andhra Pradesh, India.

ABSTRACT

UV rays extends down to the earth's atmosphere from sunlight assist our body to synthesize Vitamin D which strengthens our bones and teeth. Commercially UV radiation has various uses like sterilization and disinfection. But excessive unprotected exposure to sunlight may lead to sun burns and other skin complications. The present study was designed to evaluate the UV absorption ability of aqueous extracts of fresh and dry flowers of *Crossandra infundibuliformis* as an anti-solar agent. The method was performed by UV visible spectrophotometry in range of 200-400nm. The results suggested that aqueous fresh flower extract of *Crossandra infundibuliformis* exhibited better anti-solar activity than the dry flower extract. Therefore it was concluded that *C.infundibuliformis* flowers can be used in various sunscreen formulations.

Key words: Anti-solar, *Crossandra infundibuliformis*, UV radiation

INTRODUCTION

Sunlight is a portion of electromagnetic radiation given off by the sun. The sun emits ultraviolet rays, x-rays, visible light, infrared rays and radio waves [1]. The electromagnetic radiation differs in their energy content. Ultraviolet (UV) radiation is more energetic than visible radiation and therefore has a shorter wavelength. The UV radiation power is can be divided into three regions in increasing order of wavelength [2]. UV-C (100-280), this spectrum of radiation has germicidal property. These rays do not reach the earth's surface because of the ozone layer. They are more energetic and when they meet the ozone molecule, the energy inherent in them is enough to break apart the bond of the molecule and absorb energy. Therefore no UV-C rays from sun ever come in contact with life on earth. UV-B (280-315) rays vary with season that damages DNA and causes sun burns [3].

**Correspondence*
Sowjanya Pulipati,
Assistant Professor,
Vignan Pharmacy College, Vadlamudi,
Chebrolu Mandal, Guntur, India
E-mail: sowjypulipati@gmail.com

These rays have a lower energy level and a longer wavelength than UV-C. Their energy is not sufficient to split an ozone molecule; hence some of them extend down to the earth's surface. UV-A (315-400) rays do not have enough energy to break apart the bonds of the ozone, so UV-A rays passes the earth's atmosphere almost unfiltered and causes cancer. The ozone layer depletion decreases our atmospheres natural protection from the sun's harmful ultraviolet radiation. The UV radiation causes skin cancer, premature aging, cataracts and other eye damage, immune system suppression. As both UV-B and UV-A can be detrimental to our health, it is important that we protect ourselves. This can be done through a variety of ways. The sun protection products including sunscreen creams and lotions are available in the market to absorb or reflect the sun's UV radiation to protect the skin for such damages. The natural substances like anthraquinones, flavonoids and polyphenols have been considered as sunscreen agents because of their ultra violet radiation absorption [4] and antioxidant activities [5].

Crossandhra infundibuliformis (Acanthaceae) is an important plant in horticulture. It is abundantly present in tropical areas such as South India and Sri Lanka. The leaf extracts of *Crossandhra infundibuliformis* shows aphrodisiac [6], anti-inflammatory and analgesic properties [7]. The leaf extracts also reported for wound healing [8], antibacterial, antioxidant activities [9]. Due to its medicinal value, this plant is used to treat various ailments. Present work was aimed to evaluate the fresh and dry flowers of *Crossandra infundibuliformis* for anti-solar potential.

MATERIALS AND METHODS

Plant Material

The fresh flowers of *C. infundibuliformis* were collected in and around Guntur, Andhra Pradesh, India. The plant was identified and authenticated by BSI, Coimbatore, Tamil Nadu, India.

Extraction of Fresh and Dry Flowers

The aqueous extract of fresh flowers of *C. infundibuliformis* was prepared by taking 50g of fresh flowers in mortar and ground with pistle using 200 mL water and kept in a shaker for 24 h and then filtered through 5 layers of muslin cloth and the extract was collected. The extraction process was repeated twice.

The aqueous extract of dry flowers of *C. infundibuliformis* was prepared by taking 50 g of dried flowers powder in separate container and boiled with 200mL of water for 2 h at mild temperature and kept for 24 h, then filtered through 5 layers of muslin cloth and extract was collected. The extraction process was repeated twice.The collected extracts were pooled, concentrated and dried at mild temperature [10]. The dried extracts were used for phytochemical screening anti-solar activity.

Phytochemical Screening and anti-solar activity

The preliminary tests such as shinoda test, lead acetate and sodium hydroxide tests were performed to confirm the presence of flavonoids [11-12].

- ***Shinoda test***
  To the aqueous extracts 5 ml of 95% ethanol and few drops of concentrated HCl and 0.5 g of magnesium turnings were added. The development of pink colour indicated the presence of flavonoids.

- ***Lead acetate test***
  To the aqueous extracts lead acetate solution was added and the formation of yellow precipitate indicated the presence of flavonoids.

- ***Sodium hydroxide test***

  To the aqueous extracts an increasing amount of sodium hydroxide was added and the formation of yellow colour which decolourized after the addition acid confirmed the presence of flavonoids.

Evaluation of anti-solar activity

The anti-solar activity was performed by UV-Visible spectrophotometry [13]. The fresh and dry flowers were extracted with water by maceration process. 10mg/100mL concentration was prepared with distilled water. The absorbance was measured in the range of 200-400 nm. Figure 1 and 2 indicates the absorption spectra of the both extracts in the given range.

RESULTS

Anti-solar activity was observed by measuring absorbance. The fresh flowers exhibited maximum absorbance (~ 2.5) at 214 nm and minimum absorbance (~ 0.69) at 254-260 nm. The dry flowers exhibited maximum absorbance (~ 1.6) at 210 nm and minimum absorbance (~ 0.35) at 254-260 nm.

DISCUSSION

Qualitative investigation showed the presence of flavonoids in the extracts. Flavonoids are well known for their pharmacological activities. It absorbs light and helps to protect the photosensitive substances in flowers and leaves. Absorption of UV radiation is the main characteristic feature of the flavonoids. The results showed strong to moderate absorption of UV radiation and this ability is due to the presence of flavonoids.

CONCLUSION

The aqueous extracts of both fresh and dry flowers have ability to absorb UV radiation. The proved anti-solar activity of the plant shows its importance and prophylactic utility in anti-solar formulations. This will be a better, cheaper and safe alternative to harmful chemical sunscreens that used nowadays in the industry.

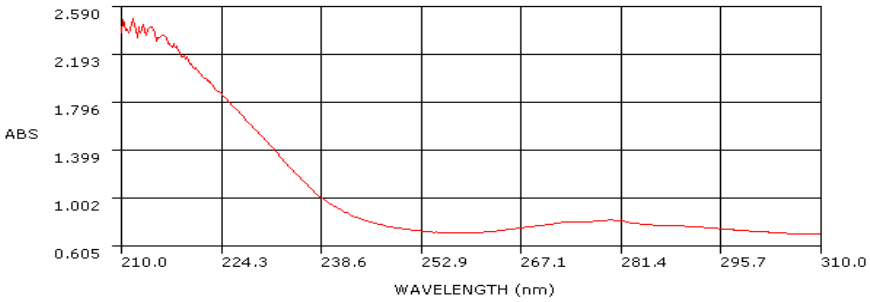

Figure 1: Scanning spectra of aqueous extract of fresh flower extract of *C.infundibuliformis* on UV spectrometer

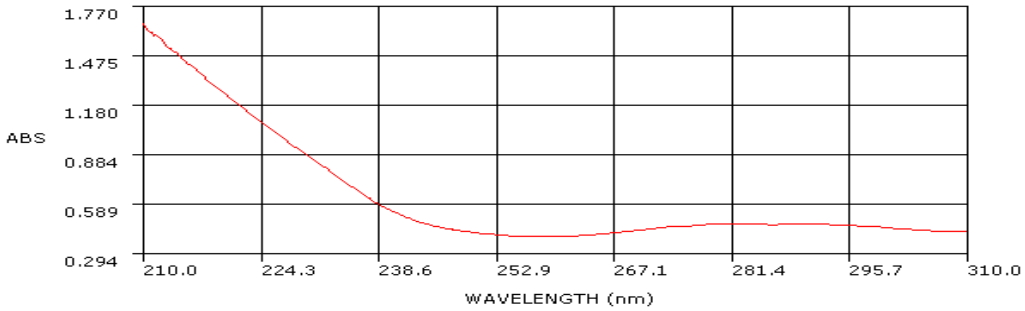

Figure 2: Scanning spectra of aqueous extract of dry flower extract of *C.infundibuliformis* on UV spectrometer

REFERENCES

1. "The Multispectral Sun, from the National Earth Science Teachers Association". Windows2universe.org. 2007-04-18. Retrieved 2012-02-12.
2. Naylor, Mark; Kevin C. Farmer (1995). "Sun damage and prevention". *Electronic Textbook of Dermatology*. The Internet Dermatology Society. Retrieved 2008-06-02.
3. Elwood JM, Jopson J. Melanoma and sun exposure: an overview of published studies. *International journal of Cancer*, 1997;73:198-200.
4. Liu MC, Lin CT, Shau MD, Chen ZS, Chen MT. *J Food Drug Anal* 1996; 4: 243-248
5. Bonina F, Lanza M, Montenegro L, Puglisi C, Tomaino A, Trombetta D. *International Journal of Pharmacy*. 1996; 145: 87-91.
6. Kumar SA, Sumalatha K, Lakshmi S. Aphrodisiac Activity of *Crossandra infundibuliformis* (L.) on Ethanol induced Testicular Toxicity in male rats. *Pharmacologyonline*. 2010; 2:812-817.
7. Mallikarjuna M. et al. The Analgesic and Anti-inflammatory Activities of the Leaf Extract of *Crossandra Infundibuliformis. International Journal of Innovative Pharmaceutical Research*. 2012; 3(2): 203-207.
8. K. Sumalatha. Wound healing process and effect of petroleum ether extract of *Crossandra infundibuliformis* l. Leaf extract in excision wound model. *International Journal of Preclinical and Pharmaceutical Research*; 2012; 3(1): 42-49.
9. Sharmila N, Gomathi N. Antibacterial, Antioxidant activity and Phytochemical studies of *Crossandra infundibuliformis* leaf extracts. *International Journal of Phytomedicine*. 2011; 3(2): 151.
10. Maneemegalai S and T. Naveen. Evaluation of Antibacterial Activity of Flower Extracts of *Cassia auriculata L., Ethnobotanical Leaflets*, 2010; 14: 182- 92.
11. Evans WC, Trease and Evans Pharmacognosy, 15th ed., W.B. Saunders Company Ltd., London, 2005: 191-393.
12. Kokate CK, Purohit AP, Gokhale SB, Pharmacognosy, 39th Edition, Nirali Prakashan, Pune, 2005:607-611.
13. Vinayak V Patil, S.B. Patil, M.S.Kondawar, N. S. Naikwade, C.S. Magdum. Study of methanolic extract of flower of *Spathodea campanulata* L. as an anti-solar. *International Journal of Green Pharmacy*. 2012; 3:248-249.

Source of Support: NIL
Conflict of Interest: None