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A PRELIMINARY STUDY ON *IN-VITRO* EVALUATION OF FLOWERS OF *SESBANIA GRANDIFLORA* (LINN) AS A NATURAL ANTI-SOLAR AGENT

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ABSTRACT

The present study was designed to evaluate the UV absorption ability of aqueous and methanolic extract of *Sesbania grandiflora* flowers as an anti-solar agent. The method was performed by UV visible spectrophotometry in range of 200-400 nm for both the extracts. The findings suggested that S. grandiflora methanolic extract exhibited as a better anti-solar activity than that of aqueous. From this, it was concluded that the methanolic extract from flowers of *S. grandiflora* may be used in various sunscreen formulations.

Key words: Anti-solar, *Sesbania grandiflora*, UV radiation.

INTRODUCTION

The sun rays are considered as a source of vitamin D and help the body system to synthesize calcium for proper growth of bone and muscle tissues (Holick MF. Sulight, 2008). Ultra violet radiation (UVR) that reaches the earth's surface is comprised of <5% of the total sunlight (Madronich *et al*., 1998). The components of sunlight including visible light and infrared radiation are not considered harmful to humans (Charlotte, 2009). UV is divided into the following regions-Ultraviolet C (UVC 2000-2900 A), Ultraviolet B (UVB 2900-3200 A) and Ultraviolet A (UVA 3200-4000 A).UVA is further divided into UVA II (UVA II 3200-4000 A), or short wave UVA, and UVA I (UVA I 3400-4000 A), or long wave UVA. UVR is composed of UVA, UVB and UVC wavelengths (Menzees *et al*., 1998). UVC rays are high energy, short wavelengths that can burn and tan the skin at extremely high elevations, but are almost completely absorbed by the stratospheric ozone layer (Edlich *et al*., 2004). UVB rays are longer, lower-energy wavelengths comprising about 2% of the UV radiation on the earth's surface. These UVB rays vary with season and are major cause of sunburns (Elwood JM and Jopson J, 1997).

Sunburned skin is a leading risk factor for melanoma and non-melanoma type of skin cancers. The face is the first area to be affected by the solar radiation since it is a permanently uncovered area and exposed to all factors (Bykov *et al*., 1999).

Stimulation of the skin by UVR is responsible for self protection through two mechanisms: one is the swelling of the epidermis by UVB radiation, increasing protection by 3 to 4 times; and other is an increase in the biosynthesis of melanin (tanning) induced by UVR, giving the skin 2 to 3 times more protection (Schimd *et al*., 2002) in this connection, sun protection products including sunscreen creams are available in the market to absorb or reflect the suns UVR to protect the skin from such damages. Present work was aimed with an objective to evaluate such herbal component for anti-solar potential.

Sesbania grandiflora (L) is a soft wooded tree belonging to the family Papilionaceae. Flowers are rich in nutrients and are used as vegetables in rural area. Bark is

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used in treating small pox and other eruptive fevers. The juice from the flower is used to treat head ache, head congestion or stuffy nose. Literature survey reveals that anti-solar activity of flower extracts of S. grandiflora has not reported yet. The present work was to evaluate and compare the anti-solar activity of *S. grandiflora* aqueous and alcoholic extract.

MATERIALS AND METHODS

Fresh flowers of *S. grandiflora* were collected from the botanical garden area, Anurag Pharmacy College, kodad, A.P in the month of November-2011, identified and voucher specimen of herbarium is preserved in department of Pharmacognosy. The petals were separated and then air dried. Twenty five grams of powdered petals were subjected to extraction with cold water and methanol by maceration process. Both the extracts were evaporated to dryness on steam bath. The general phytochemical tests were performed on these extracts to find out the presence of nature of component present in extracts. Sample concentration (10%w/v) for both extracts was prepared by using distilled water and methanol.

The UV absorption spectrum for the extracts was obtained in the range of 200-400 nm using UV spectrophotometer. Fig 1 and 2 indicates the absorption spectra of the extract in the given range.

RESULTS

Sunscreens are widely used to protect the skin from sun-related damage. Now days, people are preferring herbal sunscreens to avoid the complications arising due to synthetic and inorganic sun screening agents. This is really a challenging task to formulate a 100% natural product, but there is no doubt that some products can be made that satisfy the criterion up to certain extent. Incorporation of herbal oils or extract in such formulations as active sun screening agent is a recent trend that has been adopted by several formulators (Chandal D and swarnalata S, 2009). The essential criteria for being an active sun screening agent includes that the component must be having a potential to quench the free radicals as well as anti-solar properties (Golmohammadazadeh *et al*., 2010). Anti-oxidant activities of S. grandiflora flowers have been proved recently (Shyamala Gowri *et al*., 2010). In order to evaluate the anti-solar properties of *S. grandiflora* extract, scanning was done and the results indicated that both extracts are absorbed in the entire UV range. Aqueous extract exhibited the least absorbance (1.6) A in the UVC region at 233 nm (Fig 2). Methanolic extract showed moderate absorbance (2.6) A at 214 nm (Fig 1).

Figure 1: Scan spectra of Methanolic extract

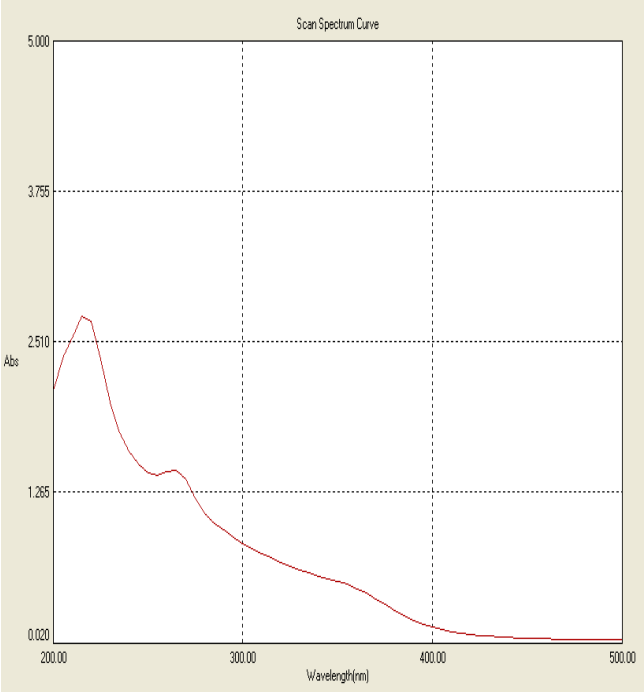
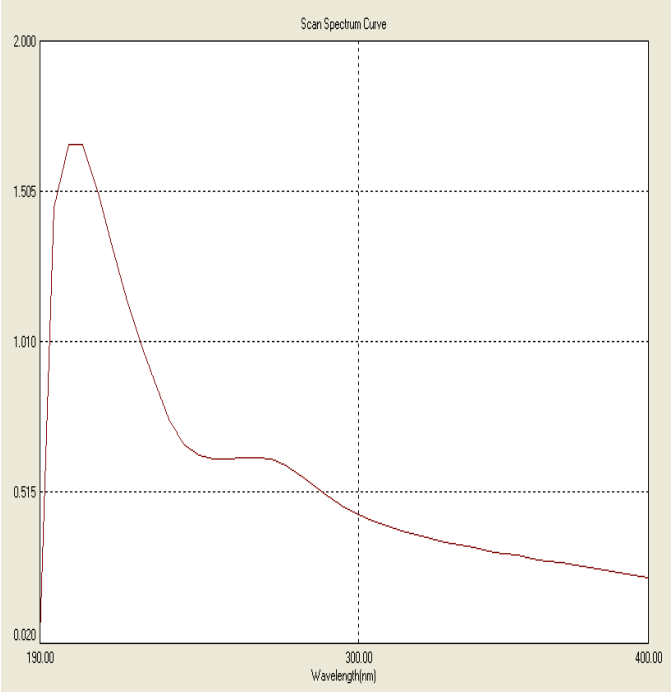


Figure 2: Scan spectra of Aqueous extract



DISCUSSION

Findings of this work showed the tendency of both the extracts of *S. grandiflora* to absorb UVR in the range of 200-400 nm. When comparing the two, methanolic extract of flowers of *S. grandiflora* exhibited more UV absorbing tendency. Methanolic extract of *S. grandiflora* showed good absorbance (2.6) in UVB region (290-320nm) and may be a good anti-solar agent for various formulations. Reasons behind this fact are that UVB fraction of solar radiation is the main contributor to skin sunburn, immune suppression, and skin cancer (Ullrich *et al*., 2002).

Several researchers have proved that the flavones and related compounds show absorbance in UV region and also have a potential to quench the free radicals. Potential to be absorbed in the UV region may lead S. *grandiflora* as an anti-solar agent as well as its free radical scavenging tendency may be beneficial for skin related problems, because number of skin problems are raised due to free radicals.

CONCLUSION

Both the extracts can absorb in the entire UV region especially, methanolic extract. The spectrum of this property thus proves its application in sunscreen creams, lotions, gels etc. This will be an outcome in the form of cosmetic formulation will be a cheaper and a safe alternative in comparison to harmful chemical sunscreens used in the current era.

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