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Research Article

Isolation of One Compound from *Ageratum conyzoides* L. Leaves Responsible for UV Radiation Absorption

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Abstract

Solar UV radiation is one of the important environmental risk factors for development of non-melanoma skin cancer. It can also cause atrophy, wrinkling, pigmentary changes, photosensitivity reactions to ingested drugs etc. Efforts are, therefore, going on to invent sources through which solar UV rays can be absorbed. Recently we have shown that ethanol extract of *Ageratum conyzoides* Linn (*A. conyzoides* L.) leaves of summer sample has maximum UV radiation absorption activity. Aim of the present work was to isolate the active compound(s) from the *A. conyzoides* L. leaves responsible for UV radiation absorption. *A. conyzoides* L. leaves were collected in summer, identified by the taxonomist and processed for isolation work to get the active compound responsible for UV radiation absorption property by standard methods. Solvent extraction and acid hydrolysis were done followed by solvent treatment, chromatographic experiments. Finally a compound was crystallized. UV absorption property of the isolated compound was studied. The compound showed maximum absorption at 200 nm. The compound, therefore, may be used to prepare sun screen lotion to protect humans from UV radiation.

Keywords: *Ageratum conyzoides* Linn. Leaves; UV Absorbing Property; Isolation of Active Compound; Sun Screen Lotion.

Introduction

Ultraviolet (UV) radiation is the non-ionizing radiation. It falls under 180 – 400 nm wavelength region of the electromagnetic spectrum, Ultraviolet radiation is divided into three regions: UVA known as black light (wave length, 315 - 400 nm), UVB known as erythemal (wave length, 280 - 314 nm) and UVC known as germicidal (wave length, 180 - 280 nm). Main source of UV radiation is sunlight though UV ray may also generate from laboratory through the use of germicidal lamps, biological safety cabinets, crosslinkers, transilluminators, lasers etc. So, there is enough scope for human body to get exposure of ultraviolet radiation [1,2].

No doubt, solar UV-radiation is good for human body because the radiation is required for cutaneous synthesis of vitamin D which covers almost 90% of the vitamin D-requirements of the human body, But, UV radiation has bad effects too. It helps to develop non-melanoma skin cancer. UVB radiation causes immune-suppression, pigmentation, sunburn, and photo carcinogenesis. Both UVA and UVB can cause sunburn, erythema and inflammation as well as photo ageing. UV exposure can also cause photosensitivity reactions to ingested drugs [3]. Therefore, efforts are going on to invent sources through which solar/artificial UV rays can be absorbed. In this context work has been extended even in the field of medicinal plants [4].

Several medicinal plants have shown UV absorption property. Few are, *Ophiorrhiza mungos, Mollugo cerviana, Olax zeylanica, Atalantia ceylanica, Hibiscus furcatus, Leucas zeylanica* and many others [5]. Recently we have shown that ethanol extract of *Ageratum conyzoides* Linn (*A. conyzoides* L.) leaves of summer sample has maximum UV radiation absorption activity. Paper is under communication. Aim of the present work was, therefore, to isolate the active compound(s) from the *A. conyzoides* L. leaves responsible for UV radiation absorption

Materials and Methods

Plant material

A. conyzoides L. leaves were collected from the medicinal plants garden of the University of North Bengal, Siliguri (26041'30.9984" N, 88027'4.5756" E, elevation, 410 ft), Dist. Darjeeling, West Bengal, India during Summer (March - May) of 2019 at about 9 am. Summer sample was collected as our earlier studies suggested that *A. conyzoides* L. leaves of summer possess maximum UV absorbing property. Leaves were authenticated by the experts of the department of Botany of the said university. A voucher specimen (No. SM-MB-08) was kept in the department of Medical Biotechnology, Sikkim Manipal Institute of Medical Sciences of the Sikkim Manipal University, Gangtok, Sikkim, India for future references.

A. conyzoides L

Figure a

Preparation of the plant leaves

A. conyzoides L. leaves were washed thoroughly under running tap to remove dust and then by distilled water. Leaves were shade dried and powdered. The powder was used for isolation study.

Chemicals

Chemicals required for the study were purchased from Merck, Germany and Himedia Lab as well as Loba Chem. Lab, India.

Isolation of active compound

This was carried out by the following steps. Principles of standard isolation procedures of chemical compounds from plant sources are applied [6-9].

UV absorption property of the isolated compound

Distilled water (100 ml) was added to 10 mg of the isolated compound. The solution was filtered and the filtrate was processed in a spectrophotometer for UV ray absorption at the ranges of 200-400 nm at 10 nm intervals.

Figure b

Results and Discussion

Isolation of the compound

One brown coloured compound was isolated.

UV absorption property of the isolated compound

Isolated compound absorbed UV ray in all wave lengths of UV region. Absorptions at 200 nm, 250 nm, 300 nm, 350 nm, 400 nm were, 1.77, 0.91, 0.76, 0.52 and 0.39 respectively. Maximum absorption, therefore, was noted at 200 nm. Results are summarized in figure 1.

Nonmelanoma skin cancers, consisting of mainly squamous cell carcinoma and basal cell carcinoma, are the most frequent malignant conditions worldwide. The incidence is maximum among the White population. More than one-third of all cancers in the United States are nonmelanoma skin cancers.

Ultraviolet B, wavelength 290–320 nm, includes the most important wavelengths for induction of skin cancer. Ozone in atmosphere can resist entry of ultraviolet B. Due to pollution problems there is depletion in ozone layer and level of ultraviolet B radiation increases at the surface of earth causing risk of skin cancer. Protection from solar UV radiation is therefore needed to keep away the skin cancer [1-3]. Synthetic sun screen lotions are available in market but have many adverse and undesired effects. Efforts therefore have started to invent sources through which solar ultraviolet B rays can be absorbed.

Medicinal plants are found good sources in this direction.

Figure 1: UV radiation absorption by the compound isolated from *A. conyzoides* L. leaves.

Bambal., *et al*. studied sunscreen activity of *Nyctanthes arbortristis* L. as well as *Tagetes erecta* L. and found that both the two plants have strong UV radiation absorbing activity [10]. Macari., et al. observed UVB-absorbing activity of *Maytenus guyanensis* Klotzch. (*Celastraceae*) bark extracts [11].That methanolic extract of *Calotropis gigantea* (L.) leaves acted as an anti-solar was the finding from Gajanan and Adhikrao. Authors found that the extract has an ability to absorb the entire UV range [12]. Patil., *et al.* studied anti-solar activity of *Spathodea campanulata* L. flower and noted that methanolic extract had maximum activity [13]. Mitra., *et al.* showed that ethanol extract of *Costus speciosus* Leaves of Sikkim Himalayas possesses anti solar activity [14]. Authors isolated active compound from *Costus speciosus* Leaves responsible for anti solar activity [15].

A. conyzoides L. (family, *Asteraceae*), one of the medicinal plants, is known to have diverse pharmacological activities like antimicrobial, antioxidant, analgesic, allelopathy, antidiabetic, spasmolytic, anti-inflammatory, anticancer, antiprotozoal and many more [16]. Recently we have noticed UV absorbing property of *A. conyzoides* L. leaves. In the present work we have isolated an active compound from *A. conyzoides* L. leaves and noted that the compound can absorb all UV radiations (200 - 400 nm), maximum absorption was at 200 nm. Work on characterization of the isolated compound is now going on in our laboratory.

Conclusion

Isolated compound from *A. conyzoides* L. leaves may be utilized for preparation of sun protecting garments to protect humans from UV radiation.

Recommendation

Isolated compound from *A. conyzoides* L. leaves may be used in preparation of sun screen lotion in future.

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Conflict of Interest

Nil.

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