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Isolation of Anti Solar Compound from *Murrya koenigii* (Linn) Spreng Wettst Leaves

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Abstract **Original Research Article**

Ultraviolet (UV) radiation, comes mainly from sun, has many bad effects. Eyes and skins are affected. Prolonged exposure of UV radiation may cause skin cancer and develop cataract. Therefore there is continuous search for anti-solar compounds from different sources including medicinal plants. *Murrya koenigii* Linn. Spreng Wettst (*M. koenigii* L.) is a medicinal plant having many pharmacological properties. Recently we found that the plant leave can absorb ultraviolet radiation. Aim of the present work was to isolate the anti-solar compound from the plant leave for its future use. *M. koenigii* L. leaves were collected, identified by taxonomist and processed for isolation work by standard methodologies. After solvent extraction and acid hydrolysis followed by solvent treatment, chromatographic experiments were done. Finally a compound was crystallized. UV absorption property of the isolated compound was studied. The compound showed maximum ultraviolet absorption at 200 nm. The compound, therefore, may be used as anti-solar compound in the preparation of sun screen lotion.

Keywords: *Murrya koenigii* Linn. Leaves, UV absorbing property, isolation of active compound, sun screen lotion.

INTRODUCTION

Ultraviolet radiation is non-ionizing radiation. In electromagnetic spectrum it falls under 180 – 400 nm wavelength region. Depending on wave length ultraviolet radiation are of mainly three types: UV-A (320-400 nm), UV-B(280-320 nm) and UV-C(200-280 nm). UV–A is also known as black light whereas UV-B and UV-C are known as erythemal and germicidal respectively. Out of the three types of ultraviolet radiation UV-C is most dangerous and can cause biological damage to skin and eye. Eventually UV-C radiations are filtered by the ozone layer. So, UV-A and UV-B are now considered the reason of causing skin cancer and cataract in humans [1].

Common source of UV radiation is sunlight. It also generates through the laboratory equipment like germicidal lamps, lasers, biological safety cabinets, Trans illuminators, and cross linkers. It is true that ultra violet radiation is required for cutaneous synthesis of vitamin D and this covers almost 90% of the vitamin D requirement of human body. But there are numerous bad effects of ultraviolet radiation. It can cause injury to skin and eye and stimulate genetically determined photo sensitivities and photosensitivity reactions to ingested drugs. Excessive exposure of ultraviolet radiation may cause skin cancer and formation of cataract. Squamous cell carcinoma, basal cell carcinoma or malignant melanoma type's skin carcinoma may develop. Ultraviolet radiation can also destroy disease-fighting white blood cells in humans thereby affects immune system also [2].

Under the circumstances attempts are going on to search for anti-solar compounds from different sources. In this context research has been extended even in the field of medicinal plants. Several medicinal plants like *Cassia fistula* L.,*Mentha piperita, Azadirachta indica, Carica papaya, Aloe vera, Lycopersicon esculantum,Oscimum sanctum, Phyllostachys pubescens*, Calotropis gigantea L. etc. are now known to have anti solar activity [3].

M. koenigii L. (family, Rutaceae), commonly known as curry leaf, is a medicinal plant. Leaves of the plant have wide range of pharmacological activity [4]. Recently we found that methanol extract of *M. koenigii* leaves of summer season can absorb maximum ultraviolet radiation at 200 nm wave length. Results are under communication. Aim of the present work was, therefore, to isolate the anti-solar compound from the plant leave for its future use.

MATERIALS AND METHODS

Collection of plant material

M. koenigii L. leaves were purchased from the local market during summer. Leaves were authenticated by the taxonomist of the department of Botany of the University of North Bengal, Dist. Darjeeling, and West Bengal, India. A voucher specimen 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.

Fig-1: *Murrya koenigii* Linn. Spreng Wettst

Chemicals

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

Preparation of the plant leaves

M. koenigii L. leaves were washed thoroughly under running tap and then by distilled water. Leaves were shade dried and powdered. The powder was kept for isolation study.

Isolation of active compound

This was carried out by the following steps involving principles of standard isolation procedures of chemical compounds from plant sources [5-8].

Powdered leaves of *M. koenigii* L. (80 g)

↓

SOLVENT EXTRACTION

Extracted with 600 ml of methanol in soxhlet at 37^0C for 10 minutes
It was then centrifuged. Supernatant collected and evaporated to dryness.

↓

Brown mass

ACID REFLUX

Refluxed with 50 ml of 1(N) HCl for 10 min on a water bath at 100 ^{0}C. It was then cooled and centrifuged. Supernatant was evaporated to dryness.

↓

Brown mass

TREATMENT WITH HEXANE

Extracted with 50 ml of hexane on a rotary shaker for 15 min. It was then centrifuged.
Supernatant was evaporated to dryness.

↓

Brown mass

ALUMINA COLUMN CHROMATOGRAPHY

Extracted with 30 ml of methanol for 5 min. It was then filtered. With filtrate alumina column chromatography was performed. Elution was done by methanol – ethyl acetate mixture (60:40 v/v).

Fifth band was found active

SILICA GEL G CHROMATOGRAPHY

Eluent of active fifth band was evaporated to dryness. The dry mass was extracted with 30 ml of methanol for 50 min. It was then filtered. With filtrate silica gel G column chromatography was done. Elution was by methanol – ethyl acetate mixture (60:40 v/v).

Third band was found active

POLYAMIDE COLUMN CHROMATOGRAPHY

Eluent of active third band was evaporated to dryness. The dry mass was extracted with 30 ml methanol for 5 min. It was then filtered and the filtrate was subjected to column chromatography using polyamide as adsorbent. Elution was done by methanol – ethyl acetate mixture (60:40 v/v). .

First band was found active

CRYSTALLIZATION

Eluent of the active first band obtained from the above step was
Evaporated to dryness. Repeated crystallization was done from ethyl
Acetate, benzene mixture (40:60, v/v).
Crystals obtained (7.9 mg)

UV absorption property of the isolated compound

To 20 mg of the isolated compound distilled water (100 ml) was added. 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.

RESULTS

Isolation of the compound

A brown coloured compound was isolated.

UV absorption property of the isolated compound

Results, shown in figure – 2, indicate that the isolated compound absorbed UV ray in all wave lengths of UV region. Absorptions in respect of wave lengths were, 0.52 (400 nm), 0.68 (350 nm), 0.75 (300 nm) and 0.91 (250 nm). Maximum absorption, however, was noted at 200 nm (1.8).

DISCUSSION

M. koenigii L., commonly known as curry leaf, is being used for medical treatment since long. In traditional system of medicine, the plant is used as tonic, blood purifier, antiemetic, febrifuge, anti diarrhoeal, stomachic etc. Modern researchers found a lot of pharmacological activities of this plant. These include anti-cancer, anti-inflammatory, anti-microbial, anti-gastric ulcer, anti-diabetic, anti-oxidant, anti-allergic, gastro protective and hepato protective activities [4].

Phytochemical studies revealed that *M. koenigii* leaves contain girinimbiol, girinimibine, mahanine, koenine, koenimbine, O-methyl murrayamine, isomahanine, bismahanine, koenigine, koenidine, A O-methyl mahanine, bispyrayafoline, scopotin, murrayanine and essential oil which yields D-pinene, dipentene, D-phellandrene, D-sabinene, D-terpinol and caryophyllene, carbazole and sitostero. 5,8-dimethyl furanocoumarin, 1-al, 3[6', 6' dimethyl 5-hexene etc.[9]

Pande *et al.* observed photo-protective effect of *M. koenigii* L. against photo damage induced in Swiss albino mice under acute exposure to ultraviolet radiation [10]. Recently we have observed UV absorption property of *M. koenigii* L. leaves and maximum aborption was found in methanol extract of the plant leaves of summer.

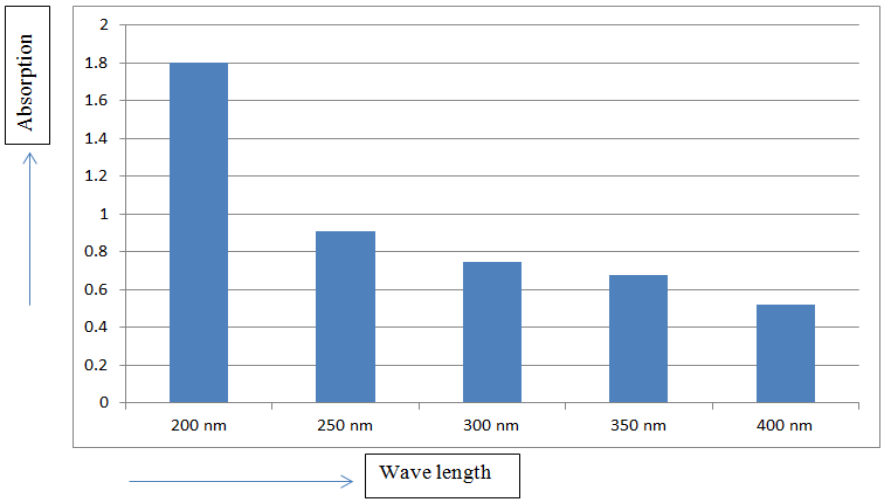

Fig-2: UV radiation absorption by the isolated compound from *M. koenigii L*. leaves

In the present work, we have isolated one compound from *M. koenigii* L. leaves. The compound can absorb rays in all wave length of UV region but maximum absorption was at 200 nm. The isolated anti solar compound may be used in the preparation of sun screen lotion. Before that the compound should be characterized. Presently work is going in this direction in our laboratory.

CONCLUSION

In the present study we found UV radiation absorption property of the isolated compound from M. *koenigii* L. leaves. The property may be utilized in future to protect humans from UV radiation.

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