

# An In-Vitro Evaluation of Flowers of *Tagetes Spp.*(L) as A Natural Anti-Solar Agent

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**Abstract:** The aim of this work was to evaluate UV absorption ability of *Tagetes* spp. in view of a possible application as anti solar agent. The methanol extract was prepared and method was performed by UV visible spectrophotometry in range of 200- 400 nm for both the plants. The interest of our study was to find the better anti solar species amongst the two species. Results showed that *Tagetes patula* (L) exhibited a better anti-solar activity than that of *Tagetes erecta*, (L). [Nature and Science 2010;8(10):274-276]. (ISSN: 1545-0740).

**Key words:** UV rays; *Tagetes erecta*; *Tagetes patula*; anti-solar.

## 1. Introduction

The sun rays are a major source of vitamin D and help the body's system to acquire much needed Calcium for building healthy bones. However the body's health can actually suffer negative effects when it is exposed too long to the sun's rays, especially if unprotected. It is mainly due to the UV radiations of sunlight.

UV radiation is a component of sunlight and can be classified into three types: UVA, UVB and UVC, depending on its wavelength. (Saraf S, et al 2005). UVA, UVB and UVC can all damage collagen fibers and thereby accelerate aging of the skin. UV radiation between 290- 320 (UVB region) is known to rapidly produce damaging effects on the skin including reddening, edema, blistering or other skin eruptions whereas the radiation between 320- 400 nm (UVA region) contributes to the premature aging of the skin. Fortunately, radiation of UVC region (200-290 nm) is completely absorbed by gases in the atmosphere before it reaches the earth.

UV radiation appears to diminish the effectiveness of the immune system by changing the activity and distribution of cells responsible for triggering immune responses. Harmful effects of UV radiation can vary from damage to immune system suppression and ultimately cancer, even for the young.

Between 50-90 % of the skin cancers are due to UV radiation. In 2000, there were 2, 00,000 cases of melanoma and 65,000 melanoma- associated deaths worldwide. In addition, there were 2.8 million cases of basal cell carcinoma. (WHO, 2009).

Since, research has shown that UV damage from the sun is the main cause of skin cancer; we need to take a proactive approach in relation to sun exposure to avoid harmful skin damage. In response

to this, various herbal formulations and chemicals are being available to block UV rays and to prevent skin damages. Our objective is to find out such herbal components that can be used as anti-solar.

The flowers of *Spathodea companulata* L, *Rosa damascene*, *T. erecta*, *Butea monosperma* (*Lam*) have been already reported as anti-solar. (Patil, 2009; Saraf, 2005; Saraf, 2010)

*Tagetes* spp.( Fam. Asteraceae) commonly known as 'Marigold' is a common garden plant which is an erect, branched annual herb reaching a height up to 50- 100 cm. *Tagetes erecta* (L) and *Tagetes patula* (L) are the two species of *Tagetes* commonly known as Mexican Marigold and French Marigold respectively. *T. erecta* (L) is quick growing with large yellow- orange flower heads whereas *T. patula* (L) is a low growing plant with flowers of blended red colour. *Tagetes* has been medicinally used to treat stomach ache, parasites, diarrhea, liver illness, vomiting, indigestion, severe constipation and toothache. Also useful in scabies, belching, scorpion & snake poisoning, liver complaints, bleeding piles (Yunani) (Kirtikar, 2005). Wound healing activity of *T. erecta* (L) leaves has been reported by T. Ghosh (2004), Yellow- orange color of flowers is mainly imparted by carotenoids viz., Lutein & Zeaxanthin. H. S. Mahal (1933) isolated and identified the yellow colouring matter of the flowers as the known "quercetagenin"

Earlier the anti-solar activity of flower extract of *Tagetes erecta* (L) has been reported by Saraf (2005). Here the work has been carried out to compare the antisolar activity of *Tagetes erecta* (L) and *Tagetes patula* (L) with each other.

## 2. Material and Methods

The flowers of *Tagetes erecta* (L) and *Tagetes patula* (L) were freshly collected from flower market, Dadar, Mumbai, India and identified at Department of Botany, The Institute of Science, Mumbai, India. The petals were separated and air dried. 10 g of powdered petals was extracted with methanol by maceration. The methanol extract of powdered petals was evaporated to dryness on steam bath. The general flavonoids identification test was performed on the extract. (Harborne, 1984) Test : The extract was treated with lead acetate solution to yield yellow colored precipitate indicating presence of flavonoids.

Preparation of sample: Sample was prepared in 10 mg % w/v concentration by using distilled water.

The UV absorption spectrum for the extract was obtained in the range of 200-400 nm using UV 1800- Shimadzu UV spectrophotometer. Figure 1 and 2 indicate absorption spectra of the extract in the given range.

## 3. Results

Sunscreens contain a wide variety of chemicals that have specific absorbance in some part of the UV spectrum. There are very few chemical substances that have absorbance over full range of UV. The scanning results of the methanolic extracts of *T. erecta* (L) and *T. patula* (L) indicate that both the extracts have an ability to absorb in the entire UV range. Scanning of the extract of *T. erecta* (L) in range of 200- 400 nm showed very good absorbance of 0.8 and 0.7 at 260 nm and 244 nm respectively. Less than moderate absorbance of 0.3 was observed in the region of UVB at 307 nm. The extract also showed good absorbance of 0.6 at 352 nm in region of UVA.

Slightly different results were observed in case of *T. patula* (L) which showed very good absorbance of 0.8 and 1.0 at 241 and 257 nm respectively in the region of UVC and moderate absorbance of 0.4 at 305nm in the region of UVB. Unlike *T. erecta* (L), excellent absorbance of 1.2, 0.9, & 1.1 was observed in the region of UVA at 361 nm, 365nm and 369 nm respectively.

## 4. Discussion

Scanning results showed the ability of both the extracts of *T. patula* (L) & *T. erecta* (L) to absorb UV radiation in range from 200-400 nm. The UV absorbing ability of *T. patula* (L) is found to be greater than that of *T. erecta* (L). Peaks obtained in the region of UVC (290-200nm) showed very good absorbance. Moderate absorption was found in the

region of UVB (320-290 nm). The maximum absorption was found in the region of UVA (400-320 nm), the radiations of which contribute to the premature aging of the skin.

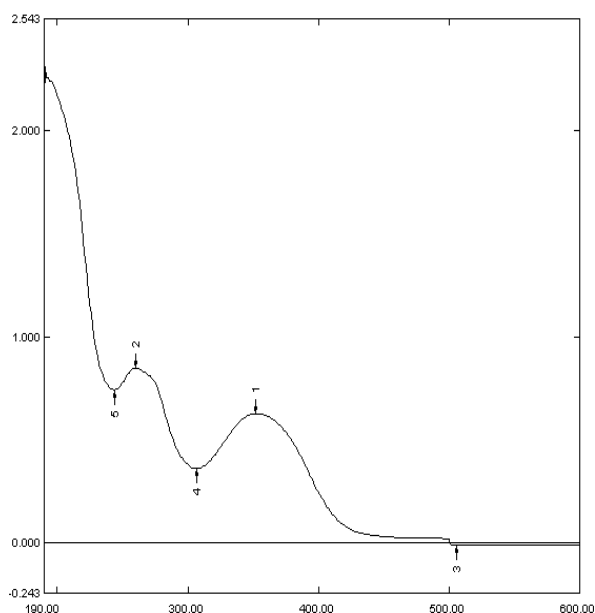


Figure 1. Scanning Spectra for *Tagetes erecta* (L)

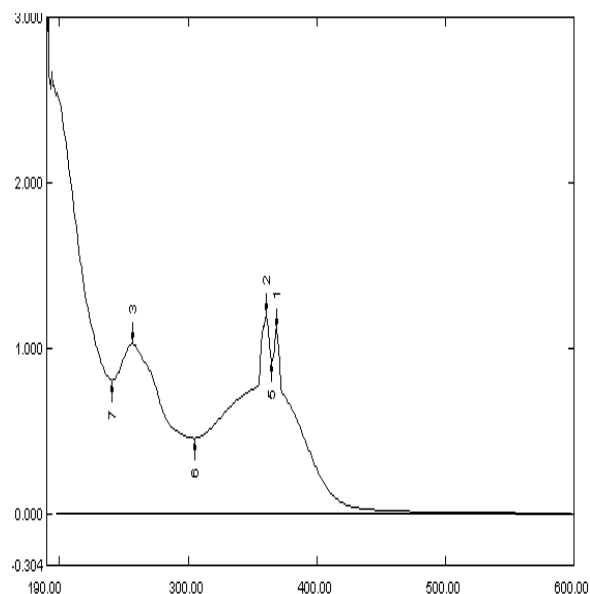


Figure 2. Scanning Spectra for *Tagetes patula* (L)

Qualitative investigation indicated the presence of flavonoids whose principle maxima in the range of 350- 390 and 250- 270 nm highlights the presence of flavonols. (Harborne, 1984). It has been proposed that flavonoids with their high absorptivity at 250- 270 & 335- 360 nm act as good UV screens (Vincenzo Lattanzio, et al,2006) The importance of flavonoids in UV protection has also been proved using mutants of *Arabidopsis* which have a block in flavonoids production and are therefore UV-hypersensitive phenotypes (Ryan, 2001).

### 5. Conclusion

The extract has an ability to absorb in the entire UV range. This property to absorb in the entire UV range can be utilized for the methanolic extract to be considered as a proper wide spectrum sunscreen and also in anti ageing cream preparation, which would be a better, cheaper and safe alternative to harmful chemical sunscreens used in modern day industry.

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