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Antioxidant Properties of Petals of Marigold Flowers

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Abstract

Antioxidant properties were analyzed in ethanol extracts of yellow marigold flowers. The preliminary screening of marigold flowers contain phytochemicals. These phytochemicals are able to reduce the oxidative stress in living organisms under adverse conditions. The major phytochemicals antioxidants in *marigold petal* extracts were reported to be phenolics and carotenoids. The petals of marigold flower was evaluated for antioxidant properties in vitro using Diphenyl-1-picrylhydrazyl (DPPH), free radical scavenging activity, total phenolic content and total flavonoid contents. The objective of this study to determined the antioxidant properties of petals of marigold flowers.

Key words : Antioxidants; DPPH; Flavonoids; Phenol.

Introduction

India is known for the medicinal plants for the prevention of the diseases. Marigold flower is an aromatic annual herb belongs to the family Asteraceae.[1] During the 16th century, marigold plants spread all over world. In India mainly yellow or orange flowers plant of marigold are traditionally used as spices, tea and medicine. The active constituents of the plants are carotenoids, flavonoids, sterols, tannins, saponins, polysaccharides.[2] Specific fragrance in marigold plant is due to secondary metabolites. Secondary metabolites are responsible for the important role in biological and pharmacological activities.[3] Antioxidants are free radical capturing substance, which is already present in plants. It may protect cells from the damage of unstable molecules *i.e.* free radicals.[4,5,6] Petals of marigold flower extract exhibits anti-inflammatory, antibacterial, antifungal insecticidal astringent, diuretic, skin disorders, and hepatic disorder activity, in addition to antioxidant activities associated with free radical scavenging. In this paper, we had report the antioxidant properties of petals of yellow marigold flowers.

Materials and Methods

The material used in the study for antioxidant

activity were taken from Nursery in Kanpur and Kannauj.

All chemicals used were of analytical grade. Ethanol, Lutein (LT), Gallic Acid (GA), Quercetin (QT) standard, and all solvents used were HPCL grade.

Extraction of Marigold petals

Fresh petals were extracted with 95% ethanol using Soxhlet apparatus. The solvent was removed under vacuum. Extraction of the brownish residue was steam distilled, gave the volatile oil.

Evaluation of Antioxidant Property
DPPH radical scavenging activity assay

The oil of marigold petals were mixed with 0.1 mm DPPH radical in ethanol solution.[7,8] The mixture was incubated in the dark at room temperature for 30 minutes. After that absorbance recorded at 519 nm. Test and analyses were performed in triplicate and average. The percentage scavenging activity of the DPPH radicals was calculated as follows :

$$\% \text{ Inhibition} = \frac{\text{absorbance (control) - absorbance (sample)}}{\text{absorbance (control)}} \times 100$$

Determination of Total phenolics :

Total phenolic contents were determined by the modified Folin-Ciocalteu method.[9,10,11] 0.1 ml of marigold petal extract was mixed with 0.5 ml of Folin-Ciocalteu reagent and 1.2 ml of sodium carbonate solution which is of 20%. This reaction mixture was incubated in the dark at room temperature for 1h. A dark blue colour was developed and the absorbance measured at 760 nm using the Hewlett Packard UV-VIS spectrophotometer. *Gallic acid was used as standard for the formation of calibration curve to the calculating of total phenol content in mg/g*. The total phenolic content was expressed as mg/g of Gallic Acid Equivalent (GAE).

Determination of total flavonoid contents :

Total flavonoid contents of extract of petals of marigold flower were determined by using the spectrophotometric method based on the formation of the flavonoid complex with aluminium.[12,13] The aliquots of 2 ml of the extracts of petals of marigold flower were added to 2 ml of 3% $Alcl_3$ solution in methanol. After 30 minute at room temperature, the absorbance was measured at 430 nm. The yellow colour indicated that the extracts contained flavonoids. The total flavonoid content was calculated as the concentration of quecetin mg/g.

Result and Discussion

In the present paper, the antioxidant activities, total phenolic and flavonoid contents were determined in the extract of petals of marigold flower. The antioxidant activity of the extracts of the petals of marigold flower was determined by using the DPPH method.[14,15,16] The antioxidant activity of the extracts was investigated by the spectrophotometric method using the ability of the extract to catch stable DPPH radicals. The free radical scavenging activity of extracts of petals of marigold flowers were compared with standard antioxidant Ascorbic acid.

The ethanolic extract exhibited a strong scavenging activity against DPPH radical is 95.86$\pm$0.26. The free radical scavenging activities of extract depend on the presence of antioxidant compounds because it has a property to donate hydrogen atom and form structural conformation of DPPH components.[17,18]

The total phenolic content of petals of marigold flowers were determined by the method. Folin-Ciocalteu method and was expressed as mg GAF-g^{-1}.

Table 1. Antioxidant Activity (µg/ml)

Extract	DPPH Assay	Total Phenolic content	Total Flavonoid contain
Ethanol extract of marigold petals	95.86±0.26	27.79±0.7	0.17±0.00

Phenols are very important plant constituents because of their scavenging ability on free radicals due to their hydroxyl groups. Therefore the phenolic content of plants may contribute directly to their antioxidant action.[19,20]

On the basis of the experimental results shown in Table 1. The content of total flavonoids was much lower than the phenol content. The total flavonoid contents is expressed in the form of mg of quercetin equivalent per gram of the sample (mg QEg^{-1}). Flavonoids are most significant bioactive component.[21] The best property of flavonoids is their capacity to act as antioxidants. They show protective effect against various diseases.[22]

Conclusion

The present study indicates that the petals of marigold flowers are potential source of antioxidant activity leads by secondary metabolites. This study suggest that the petals of marigold flowers have higher content of flavonoids and phenolics. Due to their importance in food supplements, human health, and a considerable understanding of structure - activity relationship, they act as therapeutic agents, hence can be referred to as "nutraceuticals." Determination of antioxidant compound in extracts will use to developed new drugs in pharmaceutical fields and in cosmetic world.

Scope of Future work :

There is huge scope for research; the plant could be further exploited in future as a source of useful phytochemical compounds for the pharma industry.

There are many other traditional uses of marigold flowers in different traditional systems, which serves as basis for further studies.

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