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IN VITRO BIOEVALUATION OF ANTIOXIDANT ACTIVITY IN HEDYCHIUM CORONARIUM

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ABSTRACT

Hedychium coronarium Koen. (Family Zingiberaceae), popularly named butterfly ginger, is widely available in tropical and subtropical regions.The present study was undertaken to compare the antioxidant activity of hexane, chloroform and methanolic extract of rhizomes between ferric-reducing antioxidant power assay (FRAP) and Diphenyl picrial hydrazyl radical scavenging assay (DPPH). The results showed that, Diphenyl picrial hydrazyl radical scavenging assay (DPPH) has more hexane, chloroform and methanolic concerntrations than FRAP. The objective of the present study was to identify the main constituents of the rhizomes of *H. coronarium* and to investigate the antioxidant activity.

Keywords: *Hedychium coronarium*, (FRAP), (DPPH). Antioxidant activity

INTRODUCTION

The genus *Curcuma* (family zingiberaceae) comprises of more than 80 species of rhizomatous herbs. They occur in wild and cultivated forms and are widely distributed throughout the tropics of Asia, Africa and Australia [1]. Medicinal plants have been an integral part of the development of modern civilization as it has been the oldest form of health care known to mankind. In developing countries, it is estimated that about 80% of the population rely on traditional medicine for their primary health care [2]. The medicinal value of these plants lies in bioactive phytochemical constituents that produce definite physiological action on the human body [3]. Some of the important phytochemicals are alkaloids, phenolic compounds, essential oils, flavonoids, tannins, terpenoids, saponins, etc [4].The Zingiberaceae plant *Hedychium coronarium* Koen., which has many common names including butterfly ginger, butterfly lily, cinnamon jasmine, garland flower and ginger lily is widely available in tropical and subtropical regions, such as Japan, India, Brazil, South China, Southeast Asian countries and so on. The rhizome of *H. coronarium* ("Tuqianghuo"in Chinese) has been used for the treatment of headache, diabetes, contusion inflammation and sharp pain due to rheumatism in Chinese traditional medicine, while it is also used as a febrifuge, tonic, excitant and anti-rheumatic in the Ayurvedic system of traditional Indian medicine [5]. It has been reported that its rhizomes are used for the treatment of diabetes, tonsillitis, infected nostrils, tumor and fever [6, 7].In present study we have evaluated the antioxidant potential of various solvent extracts of *Hedychium coronarium* for antioxidant capacity assay.

MATERIAL AND METHODS

Collection of plant material: The plant material used in present study was collected from (Gudala, Allavaram and Amalapuram) Andhra Pradesh. The plant materials were further identified in the Department of Botany, Dr.V.S.Krishna College, Visakhapatnam, India.

Preparation of plant extracts: The rhizomes were cut into pieces and air dried at room temperature. The dried rhizomes were coarsely powdered and successfully extracted with methanol using Soxhlet

extractor at a temperature of 55-60 0C for a period of 7-8 hrs and concentrated to dryness (crude extract). Extracts were filtered using Whatmann No.1 filter paper. The dried extract was weighed and then stored in a freezer. The crude extract was used for the experiments.

Antioxidant capacity assay:

Ferric reducing or antioxidant power assay (FRAP): The total antioxidant power of the plant sample was assayed by the method as described earlier by [8]. The FRAP method for measuring the ferric reducing power (reduce the TPTZ-Fe (III) complex to TPTZ-Fe (II) complex ability) of plasma (FRAP) or plant extract. In the present FRAP assay, an aliquot of the samples (10-40 µl) was mixed with 3 ml of ferric-TPTZ-Fe (ii) reagent. The change in the absorbance was measured at 593 nm after initial mixing and up to 90 min. until it reached a plateau. Aqueous solution of known Fe (II) conc. (Feso4.7H2o) were used for calibration of the FRAP assay and Antioxidant. The results expressed as FRAP units.

Diphenyl picrial hydrazyl radical scavenging assay (DPPH): The DPPH (Diphenyl picrial hydrazyl) radical scavenging assay was carried out as described earlier by [9]. 5.0 ml of DPPH solution (0.004%) in methanol was added to 50 µl of plant extract. After 0.5 hrs of incubation period at room temperature, the absorbance was read against a blank containing a sample and methanol at 517 nm. Control containing the buffer and regent was carried out. Similarly positive controls are treated in the same way as test sample replaced by positive control. Butyl hydroxyl touline (BHT) used as positive control. Inhibition (I) Diphenyl picrial hydrazyl radical in present was calculated I the following way. Percentage of Inhibition (I) = Absorbance of control - Absorbance of test / Absorbance of control × 100.

RESULTS AND DISCUSSIONS

The importance of phenol compounds in plants as natural antioxidants and their use as substitutes to synthetic antioxidants in food additives is well known [10].DPPH radical was used as a stable free radical to determined antioxidant activity of natural compounds [11]. The antioxidant activity of plant extracts containing polyphenol components is due to their capacity to be donors of hydrogen atoms or electrons and to capture the free radicals [12]. Thus, the purple colour of 2, 2-diphenyl-1-picryl hydrazyl (DPPH) will reduce to α, α-diphenyl-β-picrylhydrazine (yellow coloured) [13]. According to [14] scavenging of the stable radical (DPPH) is considered a valid and easy assay to evaluate scavenging activity of antioxidants. In this study, the antioxidant activity is also determined on the basis of the ability of antioxidant in this plants extracts to reduce ferric (III) iron to ferrous (II) iron in FRAP reagent [15][16]. A graph is plotted between enzymatic, non enzymatic antioxidant levels and concentrations of extracts shown in Fig 1. The results showed that, Diphenyl picrial hydrazyl radical scavenging assay (DPPH) has more hexane, chloroform and methanolic concerntrations than FRAP.In IRON REDUCTION TEST and PHENOLS hexane, chloroform and methanolic concerntrations are completely absent. Free radicals are the cause for several major disorders. There was a good correlation between IRON REDUCTION TEST and antioxidant activity (DPPH) that support the idea of phenols as contributor of the antioxidant power of plants extracts. So, evaluation of antioxidant activity in plants could result in the discovery of natural antioxidants with pharmacological and food value.

CONCLUSION

The present study emphasizes the knowledge on the plant *Hedychium coronarium* Roxb. The rhizomes of the plant have enough bioactive properties as shown in the different animal model. The phytoconstituents are also proved to be identified. The results showed that, Diphenyl picrial hydrazyl radical scavenging assay (DPPH) has more hexane, chloroform and methanolic concerntrations. In IRON REDUCTION TEST, PHENOLS and FRAP, methanolic concerntrations are present whereas hexane, chloroform concerntrations were completely absent. This data may signify the investigations of different bio-active compounds from the plant *Hedychium coronarium* Roxb and the requisite level of activity (pharmacological & toxicological) would be considered for further scrutiny to develop the potential drug molecule.

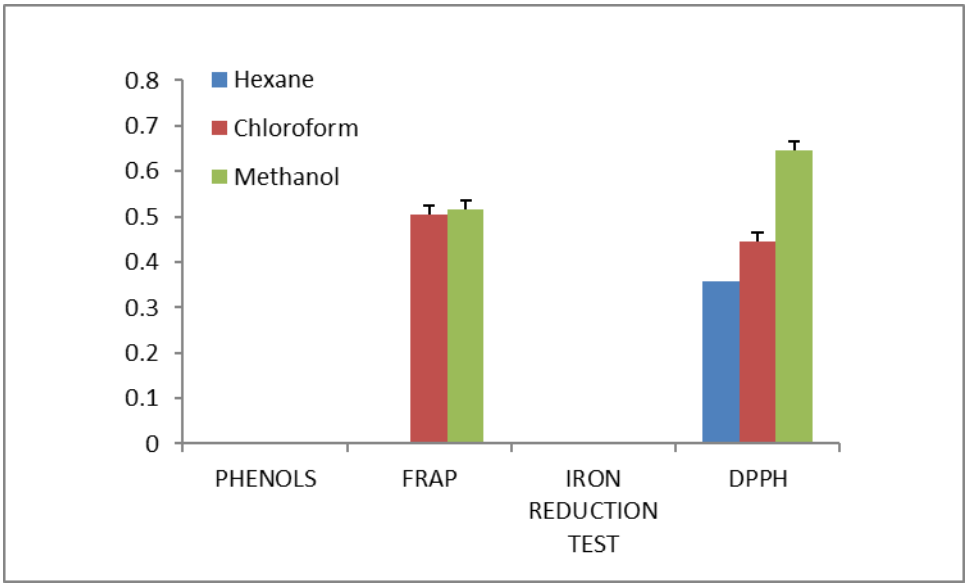

Fig 1. The correlation between solvent extracts of PHENOLS, FRAP, IRON REDUCTION TEST and DPPH activity.

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