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Assessment of Free Radical Scavenging Activity of Crude Extracts of Some Medicinal Plants

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Abstract: In the present study, antioxidant activities of *Citrullus colocynthis., Clitoria ternatea, Luffa acutangula* and *Madhuca indica* were investigated. Their ethanolic extracts were determined on the basis of their scavenging activity of the stable 1, 1-diphenyl-2-picryl hydrazyl (DPPH) free radical scavenging assay. It is found that all the extracts have remarkable antioxidant activities. The IC_{50} 's (inhibition concentration 50) of the ethanolic extracts of *Citrullus colocynthis, Clitoria ternatea, Luffa acutangula* and *Madhuca indica* were 0.27, 2, 0.33 and 0.23µg/ml, respectively. The results obtained in the present study indicate that *Citrullus colocynthis, Clitoria ternatea, Luffa acutangula* and *Madhuca indica* can be a potential source of antioxidant agents. Therefore, the research clearly indicates these plants are exceptionally advantageous for human health.

Key words: Antioxidant activity · Citrullus colocynthis · Clitoria ternatea · Luffa acutangula · Madhuca indica · Ethanolic extracts and IC_{50}

INTRODUCTION

A free radical is a compound with one or more unpaired electrons in its outer orbital [1]. Such unpaired electrons make these species very unstable and therefore quite reactive with other molecules due to the presence of unpaired electron(s) [2]. They try to pair their electron(s) and generate a more stable compound. Antioxidants may be defined as radical scavengers which protect the human body against free radicals that may cause pathological conditions such as ischemia, anaemia, asthma, arthritis, inflammation, neurodegenertion, Parkinson's diseases, mongolism, ageing process and perhaps dementias. Flavonoids and flavones are widely distributed secondary metaboliteswith antioxidant and antiradical properties [3-10]. In recent years, one of the areas which attracted a great attention is the possible therapeutic potential of antioxidants in controlling degenerative diseases associated with marked oxidative damage. Several plant extracts and different classes of phytochemicals have been found to have quite prominent antioxidant activity [11-13]. The majority of the active antioxidant compounds are flavonoids, isoflavones, flavones, anthocyanins, coumarins, lignans, catechins and isocatechins.

This study aimed to investigate the antioxidant activity of the crude extracts of some medicinal plants.

MATERIALS AND METHODS

Plant Material and Extraction: Aerial part of *Citrullus colocynthis., Clitoria ternatea, Luffa acutangula and Madhuca indica* were collected freshly from the different areas and identified by the herbarium of Botany Department, Rajasthan University and voucher specimens were deposited there. For ethanolic extraction, powdered dry plant material (50 gm) was extracted with 100 ml ethanol for 24 hrs. by using Soxhlet apparatus. The extracts were filtered and concentrated under vacuum sounding apparatus for 30 min. and the extracts were stored at 4°C.

DPPH Radical Scavenging Activity: The antioxidant activity of the ethanolic extracts was determined on the basis of their scavenging activity of the stable 1, 1-diphenyl-2-picryl hydrazyl (DPPH) free radical. DPPH is a stable free radical containing an odd electron in its structure and usually utilized for detection of the radical scavenging activity in chemical analysis. 1ml of each solution of different concentrations (1-500µg/ml) of the extracts was added to 3 ml of 0.004% ethanolic DPPH free radical solution. After 30 minutes the absorbance of the preparations were taken at 517 nm by a UV spectrophotometer which was compared with the

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corresponding absorbance of standard ascorbic acid concentrations (1-500 µg/ml). According to Hatano *et al*. [14] with some modifications. Then the % inhibition was calculated by the following equation:

% radical scavenging activity = [(absorbance of blank-absorbance of sample)/(absorbance of blank)] x 100

RESULTS

DPPH is one of the free radicals widely used for testing preliminary radical scavenging activity of a compound or a plant extract. In the present study, ethanolic extracts of *Citrullus colocynthis., Clitoria ternatea, Luffa acutangula* and *Madhuca indica* showed potential free-radical scavenging activity. The antioxidant activities of the individual compounds, present in the extracts may depend on structural factors, such as the number of phenolic hydroxyl or methoxyl groups, flavone hydroxyl, keto groups, free carboxylic groups and other structural features[15]. *Madhuca indica* shows more activity as compared to other experimental plants which is clear from Table 1.

From the Fig. 1 and 2, it is found that IC_{50}'s (inhibition concentration 50) of the ethanolic extracts of *Citrullus colocynthis, Clitoria ternatea, Luffa acutangula* and *Madhuca indica* were 0.27, 2, 0.33 and 0.23µg/ml respectively, which indicates the remarkable antioxidant activity of the extracts.

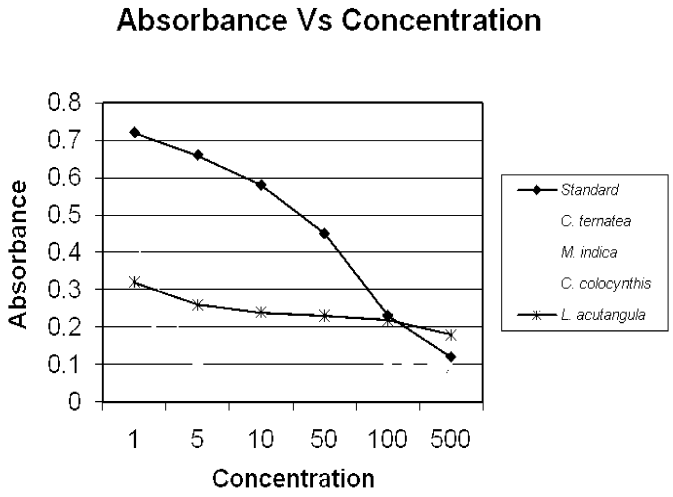

Fig. 1: DPPH scavenging Assay of the ethanolic extracts of *Citrullus colocynthis., Clitoria ternatea, Luffa acutangula* and *Madhuca indica* compared with standard ascorbic acid

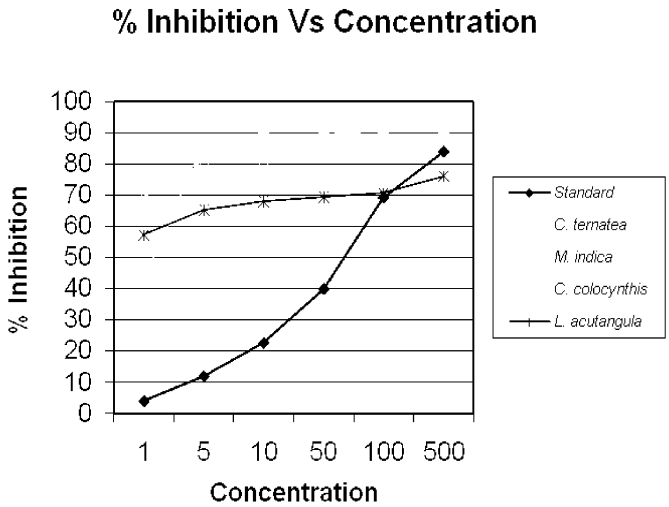

Fig. 2: Evaluation of IC_{50} 's of the ethanolic extracts of *Citrullus colocynthis., Clitoria ternatea, Luffa acutangula, Madhuca indica* and standard ascorbic acid

Table 1: Free Radical Scavenging activity of ethanolic extracts of *C. colocynthis*, *C. ternatea*, *L. acutangula* and *M. indica*

		Conc.					
Samples	Observations	1µg/ml	5 µg/ml	10 µg/ml	50 µg/ml	100 µg/ml	500 µg/ml
Standard	Abs.	0.72	0.66	0.58	0.45	0.23	0.12
	% inhibition	4	12	22.66	40	69.33	84
C. colocynthis	Abs.	0.23	0.14	0.14	0.12	0.11	0.10
	% inhibition	69.33	81.33	81.33	84	85.33	86.66
C. ternatea	Abs.	0.43	0.1	0.08	0.08	0.07	0.07
	% inhibition	42.66	86.66	89.33	89.33	90.66	90.66
L. acutangula	Abs.	0.32	0.26	0.24	0.23	0.22	0.18
	% inhibition	57.33	65.33	68	69.33	70.66	76
M. indica	Abs.	0.13	0.13	0.12	0.12	0.11	0.08
	% inhibition	82.66	82.66	84	84	85.33	89.33

DISCUSSION

There is a growing demand of natural products in human diet, both due to the possible negative effects of synthetic food additives on human health and to the increased consumer perception of this problem in recent years. Numerous studies demonstrate that a great number of medicinal and aromatic herbs, as well as fruits and leaves of some berry plants biosynthesize phytochemicals possessing antioxidant activity and may be used as a natural source of free radical scavenging compounds [16-20]. Thus from the above findings we can conclude that these plants are potent source of antioxidants and may contribute to modern world nutraceuticals.

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