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Study of important medicinal plants found at New Alipore College campus

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ABSTRACT :

Nature aided human beings from ancient times in providing the basic necessities like shelter and food for survival. Nature also protected them from innumerable diseases through plants with medicinal properties. Plants produce a myriad of biomolecules known as metabolites which show potential therapeutic effects on humans. The purpose of this project was to evaluate the Phyto environment in New Alipore College compound through biochemical analysis of selected plants which might provide a source of sustainable income with enhanced ethical and environmental value to the stakeholders of NAC in future.

INTRODUCTION :

Human beings explore nature from time immemorial for space, sustenance and protection. Plants have not only been used as dietary resource but also as source of medicine by us. Plants also helps to enrich the environment of a place and increase its aesthetic value. India is well known as birth place of alternative therapeutic treatments such as Siddha, Ayurveda and Unani which emphasises on treatment of various ailments through plants or plant parts. The benefits of phytomedicines cannot be overemphasized and at present, medicinal plants occupy a key position in plant research and medicine (Roger et al., 2015). Environmental elements supposedly play an important role in holistic development which essentially includes the atmosphere of the place. In our study we specifically selected plants with immense ecological and medicinal importance. Plants included *Ocimum sanctum* (laminaceae) and *Cymbopogan citratus* (Poaceae) for evaluation purpose. *Ocimum sanctum* (Tulsi) belongs to Lamiaceae (tribe ocimeae) and is cultivated throughout Southeast Asian region. *Cymbopogon citratus* (lemon grass) is a tropical perennial herb belonging to the family Poaceae.
Ocimum sanctum has various properties such as antistress, antiseptic, analgesic, anti-inflammatory, antimicrobial, immunomodulatory, hypoglycemic, hypotensive, cardioprotective and antioxidant. *Cymbopogon* is an aromatic perennial tall grass with rhizomes and densely tufted fibrous root used in folk medicine in the treatment of nervous and gastrointestinal disturbances, fever and hypertension (Adegbegi et al., 2012).

MATERIAL AND METHODS :-

I. Organoleptic Evaluation

1. Organoleptic Evaluation

Organoleptic evaluation is a qualitative assessment of samples based on the examination of morphological and/or sensory characteristics.

II. Qualitative biochemical assay

(a)Test for alkaloids

i. Wagner's test:

A few drops of Wagner's reagent were applied to 10 ml of the plant extract. The emergence of a reddish-brown precipitate signifies the existence of alkaloids.

(b) Test for Flavonoids

i. Shinoda Test:

A pinch of magnesium turnings was added to 10 ml of extract, followed by 1-2 drops of strong hydrochloric acid. The appearance of a pink hue signified the presence of flavonoids.

ii. Lead acetate test:

A few drops of 10% lead acetate solution were added to 10 ml of the extract. The formation of a yellow precipitate also confirms the presence of flavonoids.

(c) Test for Phenols and Tannins

i. Sodium hydroxide test:

A sodium hydroxide test was conducted by preparing a solution of 5 ml of extract in 0.5 ml of 20% sulfuric acid, to which few drops of aqueous sodium hydroxide solution were added. The blue hue signifies the presence of phenols.

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ii. Ferric chloride test:

To 5 ml of the extract, 0.5 ml of 5% ferric chloride was incorporated. The manifestation of a dark bluish-black hue signifies the existence of tannins.

(d) Test for terpenoids:

i. A solution of 0.1 g of plant material in 10 ml of ethanol was prepared. Add 1 ml of acetic anhydride and a few drops of H2SO4 to it. The emergence of a pink or violet hue signifies the presence of terpenoids.

(e) Test for steroids and sterols

i. Salkowski's test:

A mixture of 5 ml of extract, 2 ml of chloroform, and an equivalent volume of concentrated sulfuric acid was prepared in a test tube. The emergence of a red upper layer and a yellow lower layer exhibiting green fluorescence indicates the presence of steroids.

(f) Test for Starch and Carbohydrates

i. Fehling's test:

Introduce 5 ml of Fehling's solution to 0.5 ml of the extract. Heat in a water bath. The emergence of a yellow or crimson precipitate signifies the presence of reducing sugars.

ii. Benedict's test:

Introduce 5 ml of Fehling's solution to 0.5 ml of the extract. Heat in a water bath. The emergence of a yellow or crimson precipitate signifies the presence of reducing sugars.

iii. Acid test

Introduce 5 ml of Fehling's solution to 0.5 ml of the extract. Heat in a water bath. The emergence of a yellow or crimson precipitate signifies the presence of reducing sugars.

(g) Test for Saponins

i. Foam test:

A diluted solution of 0.5 mg of extract was vigorously agitated in a graduated cylinder for approximately 15 minutes until foam formation was evident. The creation of 1 cm of foam proved the presence of saponins and steroids.

(h) Test for Glycosides

i. A diluted solution of 0.5 mg of extract was vigorously agitated in a graduated cylinder for approximately 15 minutes until foam formation was evident. The creation of 1 cm of foam proved the presence of saponins and steroids.

(i) Test for Protein & amino acids

i. Biuret test:

To 0.5 mg of extract, an equivalent volume of 40% NaOH solution and two drops of 1% copper sulfate solution were added. The manifestation of violet hue signifies the existence of protein.

ii. Ninhydrin test:

Add 2 drops of freshly made 0.2% ninhydrin reagent to 0.5 mg of extract. The test solution was subjected to heating. The emergence of a pink or purple hue signifies the presence of proteins, peptides, or amino acids.

Result :-

I. ORGANOLEPTIC EVALUATION

Characteristics	**Description**
Species	*Ocimum sanctum*
Family	Labiatae
Colour of roots	Brown
Stem form	Straight
Stem cross section	Cylindrical
Colour of stem	Reddish Green
Presence or absence of appendages on stem	Trichomes
Leaf	Simple, petiolate
Colour of leaf	Green
Fragrance of leaf (fragrant/ non-fragrant)	Strong aromatic fragrant
Inflorescence	Elongated Raceme
Flower	Purplish
Fragrance of flower (fragrant/ non-fragrant)	Fragrant
Time of flowering	All round year
Fruiting	All round year

Fruit type	Nutlets
Colour of fruits	Pale brown

Characteristics	**Description**
Species	Cymbopogon citratus
Family	Poaceae
Colour of roots	Brown
Stem form	Pseudostem of compact overlapping leaf sheaths
Stem cross section	Cylindrical
Colour of stem	Reddish Green
Presence/absence of spines	Absent
Leaf	Simple, petiolate
Colour of leaf	Bright bluish Green
Fragrance of leaf (fragrant/ non-fragrant)	Citrus Fragrant
Inflorescence	Partial (Paired racemes of spikelet subtended by spathes)
Flower	Rare, panicles
Fragrance of flower (fragrant/ non-fragrant)	Fragrant
Time of flowering	All round year
Fruiting	All round year

II. BIOCHEMICAL EVALUATION

Table: Biochemical assay of selected plants *Ocimum sanctum* and *Cymbopogon citratus*

Assay	***Cymbopogon citratus***	***Ocimum sanctum***
Test for alkaloids	+	+
Test for Flavonoids	+	+
Test for Phenols and Tannins	+	+
Test for terpenoids	+	+
Test for steroids and sterols	+	+
Test for Starch and Carbohydrates	+	+
Test for Saponins	+	+

Test for Glycosides	+	+
Test for Protein & amino acids	+	+

(+) = detected. (-) = not detected.

DISCUSSION :-

Phenols are secondary metabolites which possess an aromatic ring with one or more hydroxyl groups in plants, and their hydroxyl groups give them the ability to act as scavengers and act as inhibitors of lipid peroxidation. Phenolic compounds found in plants, have been reported to have multiple biological effects including antioxidant and antibacterial activities. Previous studies performed establishes that phenolic and flavonoid contents could be correlated to their antioxidant activities. The antioxidant property has immense benefits to restrict the excessive formation of free radical during oxidative stress, the source of many degenerative diseases in living organism.

The selected plants also contain flavonoids, considered to be extremely effective free radical scavengers. Flavonoids as one of the most diverse and widespread groups of natural compounds are probably the most important natural phenolics. These compounds especially flavonols possess a broad spectrum of chemical and biological activities including radical scavenging properties.

Further, based on this study, it was found that aqueous extract of selected plants had tannin, flavonoid, and glycoside content within.

CONCLUSION

Today, antioxidant properties of many plant have become a vast interest due to their possible uses as natural additives to substitute synthetic ones. Thus, the results obtained in the present study showed that the crude extract of selected plants contains the maximum antioxidant compound which can scavenge different Reactive oxygen species (ROS) and free radicals under in vitro conditions. The present study suggests that it can be used as a good source of natural antioxidants for health benefits and the bioactive compounds are required for identifying the unknown compounds to establish their pharmacological properties.

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