

# Plant resource in New Alipore College, Kolkata with focus on selected medicinal plants

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## Abstract

A survey on the floral resource at New Alipore College campus was made with emphasis on selected medicinal plants like *Asparagus racemosus*, *Cymbopogon citratus*, *Ocimum sanctum* and *Catharanthus roseus* or *Vinca rosea*. New Alipore college located at Kolkata, India possesses a green campus with a good vegetation cover including a medicinal plant garden. This paper highlights the diverse vegetation cover with a specific study conducted on four plants with immense medicinal properties. The four medicinal plants growing abundantly at New Alipore College campus were selected on the basis of their profound therapeutic applications as well as easy availability to the stakeholders of New Alipore college. In future the study will not only provide an useful account of plants with the ability to act as useful bio resources but also help in constructive urban development endeavours aiming for a sustainable ecological campus environment.

**Keywords:** Bio resources, College campus, Flora, Medicinal plants.

## INTRODUCTION

New Alipore College is a well renowned co-educational undergraduate college located in the heart of South Kolkata, West Bengal, India. The college was established in 1963 and is affiliated with the University of Calcutta. This affiliated college sprawls over a campus of 1 acre and is geographically located at L Block, New Alipore (22.5248°N and 88.3312° E). The college is present at an average elevation of 14 metres (46 feet) and is bordered by the following roads - AJC Bose Road to the north, D L Khan Road to the East, Diamond Harbour Road to the West and Alipore Avenue to the South.



A survey was performed to gain knowledge about the floral biodiversity of New Alipore college campus. Based on the knowledge obtained, a related data sheet was created on each species along with their scientific and local names, habit, habitat and description. The investigation recorded a total of about 40 species belonging to the family Acanthaceae, Acoraceae, Apiaceae, Apocynaceae, Asparagaceae, Commelinaceae, Crassulaceae, Fabaceae, lamiaceae, Lythraceae, Malvaceae, Mimosaceae, Musaceae, Papilionaceae, Poaceae, Polypodiaceae, Rubiaceae, Solanaceae, Scrophulariaceae, Vitaceae, Xanthorrhoeaceae and Zingiberaceae.

An attempt was also made to assimilate and congregate the botanical, phytochemical, ethnomedicinal, pharmacological and toxicological information on selected four plants namely *Ocimum sanctum* (laminaceae), *Cymbopogon citratus* (Poaceae), *Asparagus racemosus* (Asparagaceae) and *Catharanthus roseus* (Apocynaceae) possessing immense therapeutic value, growing abundantly on campus soil. The plants were selected based on their availability, life cycle and potentiality.

*Ocimum sanctum* (Tulsi) belonging to family Lamiaceae is endemic to the Indian subcontinent, China, and Southeast Asia. *Ocimum sanctum* has various therapeutic properties such as antistress, antiseptic, analgesic, anti-inflammatory, antimicrobial, immunomodulatory, hypoglycemic, hypotensive, cardioprotective and antioxidant.

*Cymbopogon citrates* (lemon grass) is a tropical aromatic perennial tall grass with rhizomes and densely tufted fibrous root belonging to the family Poaceae. It is a tall, clumped perennial grass growing to a height of 1 m. It is widely known as lemongrass or citronella but due to its distribution, it has several names. *Cymbopogon* originated from the Greek word “kymbe - pogon” meaning boat-beard (due to its flower spike configuration) and citratus (Latin) means lemon-scented leaves. *Cymbopogon sp.* is popularly used by the ethnic Indian tribes to treat many ailments including nervous and gastrointestinal disorders, fever and hypertension (V. Srivatsava et al.,2013).

*Asparagus racemosus* Willd. Oberm. (commonly known as Satawar, Satamuli, Satavari) are perennial plants belonging to family Asparagaceae. The plant grow wildly in India's temperate, tropical, and subtropical regions. *Asparagus sp.* evidently possesses laxative, diuretic, contraceptive, hypoglycemic, antihypertensive, hypocholesterolemic, CNS, and antioxidant effects and acts as a good source of Vitamin A and Vitamin E. *Asparagus sp.* also shows widespread therapeutic application as it is used in the treatment of neuritis, rheumatism and cancer (Bopana N. and Saxena S., 2007)

*Catharanthus roseus* (Apocynaceae) commonly known as *Vinca rosea*, *Ammocellis rosa*, and *Lochnera rosea* contains more than 70 types of chemicals compounds considered to have mainly anticancerous function among other potentially therapeutic effects ( J. Mishra and N. Verma, 2017)

## MATERIAL AND METHODS

An intensive field study was made on the New Alipore College campus during the period of January to December. The study funded by New Alipore College Research grant also focused on four plants including *Ocimum sanctum* (laminaceae), *Cymbopogon citratus* (Poaceae), *Asparagus racemosus* (Asparagaceae) and *Catharanthus roseus* (Apocynaceae) said to possess high therapeutic value.

### I. Organoleptic study

Evaluation of crude samples of four selected plants based on study of morphological characters.

### II. Quantitative biochemical assay

#### **Sample Preparation: -**

Fresh and healthy leaves, *Asparagus racemosus* (Asparagaceae), *Catharanthus roseus* (Apocynaceae) *Cymbopogon citratus* (Poaceae) and *Ocimum sanctum* (Lamiaceae) were collected from college premises for the study. The required part was washed, air-dried at room temperature (28°C) for 7 days, after which it was ground to uniform powder. The dry powder obtained was stored at - 20°C for different biochemical analysis.

#### **Sample extraction:**

Fresh samples of plants were collected and their moisture contents were analysed by the method of AOAC (Official method of analysis of AOAC international, 1997). Sample extraction was done by modifying the method of Leong and Shui, (2002) The extraction was done by using a vortex mixer for 60 seconds. The mixture was filtered and the filtrate was collected for FRAP, ABTS, DPPH, and total phenolic content assay by spectrophotometer.

#### **Ferric reducing antioxidant power (FRAP) assay:**

The FRAP was assessed according to Benzie and Strain (1999). Briefly, 6 ml of working FRAP reagent prepared daily was mixed with 20 - 100 µl of the extract. The absorbance is measured spectrophotometrically at 593 nm after 30-min incubation at 37°C. Increase in Absorbance were calculated as FRAP values by comparing with standard curves prepared with vitamin C (0 - 15 µg), and recorded as mg vitamin C equivalent per gram of fresh weight. In FRAP assay, the ferric (Fe (III)-TPTZ) complex undergoes reduction to form a

coloured ferrous (Fe) II-TPTZ) complex at low pH). Increasing absorbance indicates increase in the reductive ability.

#### ABTS radical cation decolorization assay:

The ABTS method of (Re et al.,1999) was modified and applied for the study. ABTS radical cation (ABTS<sup>+</sup>) was produced by reacting 7 mM ABTS stock solution with 2.45 mM potassium persulphate (final concentration) and allowing the mixture to stand in the dark at room temperature for 12 - 16 hours before use. The ABTS<sup>+</sup> solution was diluted with deionized water and 95 % ethanol (1:1) to an absorbance of 0.70 (+ 0.02) at 734 nm. The extract (20-100µl) was mixed with 6 ml of diluted ABTS<sup>+</sup> solution. The decrease of absorbance was recorded at 1 min after mixing. Absorbance decreases were calculated as ABTS values by comparing with standard curves created by vitamin C (0 - 20 µg), and the results were reported as mg vitamin C equivalent per gram of fresh weight.

#### DPPH free radical scavenging activity:

The method of (Brand-Williams and Cuelier, 1995) was used with some modifications. DPPH radical solution (0.8 mM) in 95% ethanol was prepared. The extract (100- 1000µl) was diluted to 5.4 ml by deionized water and 95 % ethanol (1:1) before 0.6 ml of the DPPH solution was added and mixed. The decrease of absorbance was recorded at 1 min after mixing. Absorbance decreases were calculated as DPPH values by comparing with standard curves created by vitamin C (0 - 40 µg), and the results were reported as mg vitamin C equivalent per gram of fresh weight.

#### Statistical analysis

All the experiments were carried out in triplicate. Experimental results are expressed as mean ± standard deviation (SD) of three parallel measurements.

## RESULTS

### ➤ A comprehensive account of floral biodiversity at New Alipore College

Some common and few rare medicinal plants are grown in the 'MEDICINAL PLANT GARDEN' at New Alipore College. Plants like *Ocimum sanctum*, *Catharanthus roseus*, *Asparagus racemosus*, *Cymbopogon citratus*, *Andrographis paniculata*, *Rouvolfia serpentina*, *Bacopa monneria* etc. though show optimal growth in different edaphic and environmental conditions are however, being successfully reared and bred in New Alipore college campus.

#### List of Plants growing abundantly at New Alipore College campus: -

| Sl.No. | Scientific Name             | Family        | Common therapeutic value  |
|--------|-----------------------------|---------------|---|
| 1      | <i>Nerium odorum</i>        | Apocynaceae   | Used to treat epilepsy, leprosy, malaria.   |
| 2      | <i>Heliconia rostrata</i>   | Musaceae      | Used to cure jaundice, intestinal pain and hypertension.  |
| 3      | <i>Mimosa pudica</i>        | Mimosaceae    | Used to treat cancer, diabetes, hepatitis, obesity and urinary infections.                                |
| 4      | <i>Centella asiatica</i>    | Apiaceae      | Used to heal wounds, improve mental clarity, and treat skin conditions such as leprosy and psoriasis.     |
| 5      | <i>Tradescantia pallida</i> | Commelinaceae | Acts as antioxidant, antibacterial, anti-inflammatory, apoptotic, antifungal, antiviral, analgesic agent. |

|    |                                |               |   |
|----|--------------------------------|---------------|---|
| 6  | <i>Costus speciosus</i>        | Zingiberaceae | Used in the treatment of asthma, fungal diseases, rheumatism, diabetes, hepatoprotective disorders.   |
| 7  | <i>Crotalaria juncea</i>       | Papilionaceae | Used to treat anaemia, cancer, typhoid, wounds and cuts, rheumatism, flatulence, earaches infections, hydrophobia, and skin diseases like impetigo and psoriasis  |
| 8  | <i>Cymbopogon citratus</i>     | Poaceae       | Used to treat high cholesterol, gingivitis, thrush cancer, rheumatism, nervous and gastrointestinal disturbances, meningitis, pneumonia, impetigo, cellulitis, folliculitis, food poisoning.                                      |
| 9  | <i>Justicia simplex</i>        | Acanthaceae   | Used as expectorant, antispasmodic and in the treatment of cold, cough, asthma, tuberculosis, anaemia, epilepsy, kidney infection, respiratory ailments.  |
| 10 | <i>Hygrophyla spinosa</i>      | Acanthaceae   | Used in treatment of rheumatism, jaundice, inflammation, pain, hepatic obstruction, gout, bacterial infection.  |
| 11 | <i>Adhatoda vasica</i>         | Acanthaceae   | Used to treat high blood pressure, mental disorders, insomnia, leprosy, snake bites and hypertension.   |
| 12 | <i>Andrographis paniculata</i> | Acanthaceae   | Used to treat common cold, chronic fever, malaria and intermittent fever, inflammation, bronchitis, skin diseases, intestinal worm, dyspepsia osteoarthritis, and ulcerative colitis.   |
| 13 | <i>Asparagus racemosus</i>     | Asparagaceae  | Used to treat diarrhoea and dysentery, nervous disorders, infertility, dyspepsia, tumors, inflammation, rheumatism and chronic gout, hematuria, hemorrhoids, headache, backache, stomach pain, sores, neuropathy and hepatopathy. |
| 14 | <i>Ureria picta</i>            | Fabaceae      | Used in treatment of cancer, urinary infections like gonorrhoea, malaria, snake bite, infections, hypertension, spermatorrhoea, bleeding piles, bone fracture, sore throat, cough, fever, inflammation, asthma.                   |
| 15 | <i>Ecbolium linneanum</i>      | Acanthaceae   | Used to treat sores, ulcers, jaundice, gonorrhoea menorrhagia, diabetes, gout, rheumatism.  |
| 16 | <i>Physalis minima</i>         | Solanaceae    | Used to treat ear ache, hypertension, indigestion, inflammations kidney stones, ascites, constipation, leprosy, cancer, diabetes, snake-poison, inflammation, and Scorpion-sting.   |
| 17 | <i>Datura metel</i>            | Solanaceae    | Used to treat glaucoma, motion sickness, nausea, dizziness, jaundice, diabetes, cancer, ulcers, inflammation, wounds, abscesses,  |

|    |                             |                  |   |
|----|-----------------------------|------------------|---|
|    |                             |                  | arthritis, gout, asthma, convulsion, skin disorders, piles, and Parkinson disease.  |
| 18 | <i>Rhoeo discolor</i>       | Commelinaceae    | Used to treat superficial mycoses, cancer, fever, bronchitis, coughs, colds, and dysentery.   |
| 19 | <i>Ocimum sanctum</i>       | Lamiaceae        | Used to treat bacterial infections, cough & cold, influenza, anxiety, stress, diabetes, high cholesterol, bronchitis, helminthiasis, ulcer, inflammation, ophthalmia, cardiopathy, ringworm, skin diseases, pyrexia, cancer, and rheumatism.                                      |
| 20 | <i>Wedelia trilobata</i>    | Asteraceae       | Used to treat dermatological disorders, bronchitis, abdominal pain, inflammation, muscle cramp, rheumatism, stubborn wounds, common cold, cough, hepatitis, indigestion, infections, tuberculosis, diabetes, jaundice, hypertension, and cancer.                                  |
| 21 | <i>Bryophyllum pinnata</i>  | Crassulaceae     | Used to treat inflammatory disorders, sores, boils, burns, ulcers, insect bites, eye infections, fever, headache, stomach pain, gastritis, kidney stones, hypertension, skin disorders, cancer, pulmonary infections and rheumatoid arthritis.                                    |
| 22 | <i>Aloe vera</i>            | Xanthorrhoeaceae | Used to treat high blood pressure, inflammations, skin injuries (eczema, psoriasis, acne, dermatitis, ulcers, insect bites), genital herpes, microbial infections, digestive problems, constipation, diabetes, rheumatism, cancer   |
| 23 | <i>Allamanda cathartica</i> | Apocynaceae      | Used in curing dysentery, abscesses, diabetes, hypertension, malaria, splenomegaly, jaundice, rheumatism, hepatitis, cirrhosis of the liver with ascites, swelling and pain in the pharynx.   |
| 24 | <i>Ixora coccinea</i>       | Rubiaceae        | Used to treat hiccups, fever, loss of appetite, nausea, eczema, chronic ulcers, bronchitis, diarrhoea and dysentery, hepatic disorder, cancer, microbial infection, antioxidant, pain, inflammation, gonorrhoea and menstrual irregularities                                      |
| 25 | <i>Vinca rosea</i>          | Apocynaceae      | Used to treat stomach disorders, hypertension, muscle pain, depression of the central nervous system, asthma, inflammation, malaria, angiogenesis, brain imbalance, dysentery, ocular inflammation, high blood pressure, stroke, diabetes, hemorrhage, insect stings and cancers. |
| 26 | <i>Lawsonia inermis</i>     | Lythraceae       | Used to treat fever, smallpox, burns, ulcers, bronchitis, lumbago, hemicrania, leukoderma, scabies, ophthalmic infections, amoebic  |

|    |                             |                  |  |
|----|-----------------------------|------------------|--|
|    |                             |                  | dysentery, diabetes, cancer, enlarged spleen, headache, jaundice, and other skin conditions.   |
| 27 | <i>Malachra capitata</i>    | Malvaceae        | Used to treat inflammation, nasal obstruction, leishmaniasis, malaria, childbirth, kidney disorders, fever, respiratory tract diseases, diarrhoea, asthma, impotency, boils, wounds, leprosy, pimples and many other skin diseases   |
| 28 | <i>Leonurus sibiricus</i>   | Lamiaceae        | Used to treat menstrual irregularities, amenorrhoea, oedema, kidney complaints, kidney stones, eczema, abscesses, malaria, hypertension, myocardial ischemia, muscular cramps, headache, epilepsy, chest infections, constipation, spider and snake bites.                               |
| 29 | <i>Leucus aspera</i>        | Lamiaceae        | Used to treat snake bite, nasal congestion and headache, coughs, colds, painful swelling, psoriasis and chronic skin eruption.   |
| 30 | <i>Ruellia tuberosa</i>     | Acanthaceae      | Used in treatment of high blood pressure, hypertension, joint pains, muscle strain bladder stone, renal illness, diabetes, bronchitis, gonorrhoea, and syphilis.   |
| 31 | <i>Rauwolfia serpentina</i> | Apocynaceae      | Used to treat cardiovascular diseases, diabetes, malaria, cancer, high blood pressure (hypertension), acne, boils, eczema, psychotic disorders, anxiety, constipation, helminthiasis, wound, piles, insomnia, cholera, fever, eye diseases, bacterial infections, snake and insect bites |
| 32 | <i>Bacopa monnieri</i>      | Scrophulariaceae | Used to treat neurosis, hypertension, anxiety, epilepsy, asthma, leprosy, tuberculosis, skin diseases, insomnia, epilepsy, dementia, amnesia, Parkinson's disease (PD), schizophrenia, Alzheimer's disease (AD), and epileptic seizures.   |
| 33 | <i>Sida rhombifolia</i>     | Malvaceae        | Used to cure headaches, boils, cramps, rheumatism, toothache, allergies, fatigue, common cold, fever, bronchitis, ulcer, diarrhoea, dysentery, malaria, gastrointestinal dysentery, fevers, asthma, endocrine related infertility and inflammation.                                      |
| 34 | <i>Eclipta prostrata</i>    | Asteraceae       | Used to treat wounds, hair loss, hepatic and renal diseases, hepatitis, itching, hemoptysis, bleeding, hematuria, diarrhea, diphtheria, respiratory disorders, skin diseases, fever, diabetes and dermatitis.  |
| 35 | <i>Clitoria ternatea</i>    | Fabaceae         | Used to treat indigestion, constipation, fever, arthritis, sore throat, arthritis, skin diseases, insect bites, asthma, burning sensation, ascites,  |

|    |                               |               |   |
|----|-------------------------------|---------------|---|
|    |                               |               | inflammation, leucoderma, leprosy, hemicrania, amentia, liver, and intestinal problems  |
| 36 | <i>Hibiscus rosa sinensis</i> | Malvaceae     | Used to treat menstrual conditions, such as amenorrhea and dysmenorrhea, constipation, diarrhoea, pain, hemorrhage hypertension, cholesterol production, wounds, inflammation, fever and coughs, inflammatory disorders, including blenorhea, asthmatic bronchitis, and oral mucosa irritation diabetes, hair loss and cancer progression |
| 37 | <i>Curcuma longa</i>          | Zingiberaceae | Used to treat biliary disorders, sprains and swellings caused by injury , cancer, anorexia, cough, acne, inflammation, joint pain, asthma, eczema, acute allergies, worms, gallstones, flatulence, arthritis, joint disorders, colitis, liver obstruction diabetic wounds, hepatic disorder and jaundice.                                 |
| 38 | <i>Vitis quadrangularis</i>   | Vitaceae      | Used to treat diabetes, obesity, high cholesterol, bone fractures, joint pain, low bone mass allergies, cancer, stomach upset, painful menstrual periods and asthma.  |
| 39 | <i>Acorus calamus</i>         | Acoraceae     | Used to treat neurological, gastrointestinal, respiratory, metabolic, kidney, and liver disorders.  |
| 40 | <i>Nephrolepis cordifolia</i> | Polypodiaceae | Used to cure cough, fever, diarrhea, skin diseases, bleeding of wounds, menstrual disorders, cancer, diabetes, rheumatism, cutaneous disorders, gastric ulcers renal, liver and skin disorder.  |

**Morphological study of selected plants****I. *Asparagus racemosus* Willd. Oberm.**

*Asparagus racemosus* Willd. Oberm. is a sturdy, creeping, herbaceous perennial looking like delicate woody shrub (Obermeyer, 1983)

| Characteristics                              | Description                              |
|--|--|
| Species                                      | <i>Asparagus racemosus</i> Willd. Oberm. |
| Family                                       | Asparagaceae                             |
| Colour of roots                              | Brown                                    |
| Stem form                                    | Straight                                 |
| Stem cross section                           | Round                                    |
| Colour of stem                               | Green                                    |
| Presence or absence of spines                | Present                                  |
| Types of spines (hard/soft)                  | Hard                                     |
| Shape of spines (pointed/curved)             | Pointed                                  |
| Place of spines                              | Below the node                           |
| Branches                                     | Thin, pin-needle like                    |
| Cladode shape (flat/curved)                  | Curved needle like                       |
| Cladode colour                               | Light green                              |
| Cladode arrangement                          | Alternate                                |
| Flower colour White Yellow                   | White                                    |
| Fragrance of flower (fragrant/ non-fragrant) | Fragrant                                 |
| Time of flowering                            | June-July                                |
| Fruiting                                     | September                                |
| Fruit type                                   | Berries                                  |
| Colour of berries                            | Purplish Black                           |

## II. *Catharanthus roseus* (L.) G. Don

*Catharanthus roseus* (L.) G. Don (*Vinca rosea*, Madagascar periwinkle) belongs to the family Apocynaceae.

| Characteristics                             | Description                            |
|---|--|
| Species                                     | <i>Catharanthus roseus</i> (L.) G. Don |
| Family                                      | Apocynaceae                            |
| Colour of roots                             | Brown                                  |
| Stem form                                   | Straight                               |
| Stem cross section                          | Cylindrical                            |
| Colour of stem                              | Reddish Green                          |
| Presence or absence of spines               | Absent                                 |
| Leaf  | Simple, petiolate                      |
| Colour of leaf                              | Green                                  |
| Inflorescence                               | Cymose                                 |
| Flower                                      | Pink, pedicillate                      |
| Fragrance of flower (fragrant/non-fragrant) | Fragrant                               |
| Time of flowering                           | All round year                         |
| Fruiting                                    | All round year                         |
| Fruit type                                  | Pair of elongated follicles            |
| Colour of fruit                             | Green                                  |

## III. *Cymbopogon citrates* (DC) Stapf

*Cymbopogon citrates* (DC) Stapf (Lemon grass) is a tropical perennial plant which yields aromatic oil.

| Characteristics               | Description                                    |
|-------------------------------|--|
| Species                       | <i>Cymbopogon citrates</i> (DC) Stapf          |
| Family                        | Poaceae  |
| Colour of roots               | Brown  |
| Stem form                     | Pseudostem of compact overlapping leaf sheaths |
| Stem cross section            | Cylindrical                                    |
| Colour of stem                | Reddish Green                                  |
| Presence or absence of spines | Absent   |
| Leaf                          | Simple, petiolate                              |
| Colour of leaf                | Bright bluish Green                            |

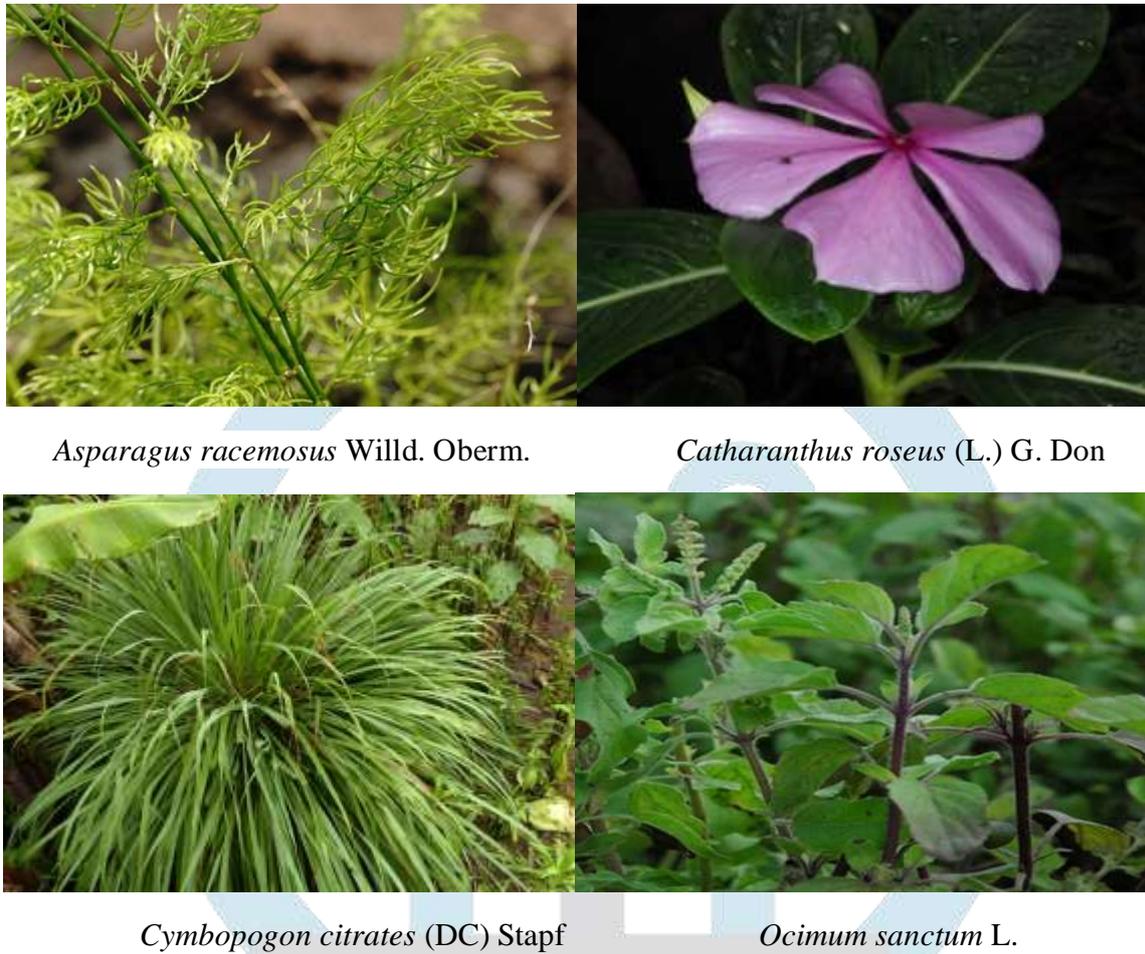
|  |   |
|--|---|
| Fragrance of leaf (fragrant/ non-fragrant)   | Citrus Fragrant   |
| Inflorescence                                | Partial (Paired racemes of spikelet subtended by spathes) |
| Flower                                       | Rare, panicles  |
| Fragrance of flower (fragrant/ non-fragrant) | Fragrant  |
| Time of flowering                            | All round year  |
| Fruiting                                     | All round year  |

#### IV. *Ocimum sanctum* L.

*Ocimum sanctum* L. Syn *Ocimum tenuiflorum* L belonging to the Lamiaceae family is a popular culinary herb with immense medicinal property.

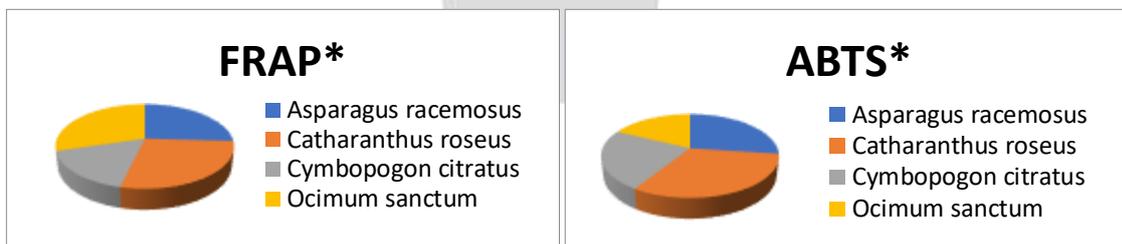
| Characteristics                              | Description              |
|--|--------------------------|
| Species                                      | <i>Ocimum sanctum</i> L. |
| Family                                       | Labiatae                 |
| Colour of roots                              | 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               |

**Figure 1: Pictorial representation of selected plants with medicinal value.**

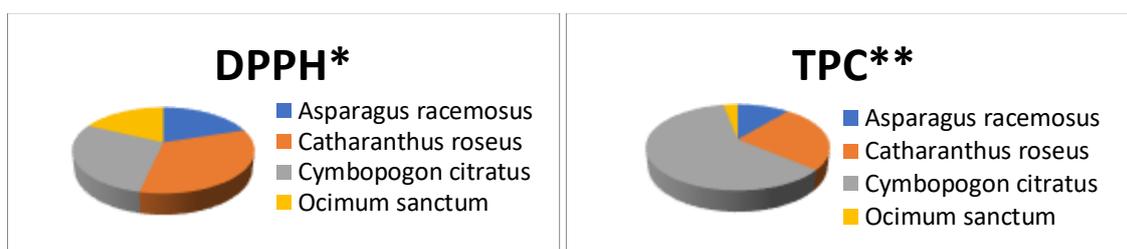


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**Figure2: Graphical representation of Antioxidant status of selected plants with medicinal value.**



\* mg Vitamin C equivalent / g fresh weight.



\* mg Vitamin C equivalent / g fresh weight. \*\* mg Gallic acid equivalent / g fresh weight.

## DISCUSSION

To enrich ecosystem within the campuses, a floristic survey and documentation of plant species across New Alipore College was carried out. The purpose of the study is to elicit information on the medicinal plants which grows naturally in and around New Alipore area especially on our college campus.

The field investigation at New Alipore College campus recorded a total of about forty species belonging to the family Acanthaceae, Acoraceae, Apiaceae, Apocynaceae, Asparagaceae, Commelinaceae, Crassulaceae, Fabaceae, lamiaceae, Lythraceae, Malvaceae, Mimosaceae, Musaceae, Papilionaceae, Poaceae, Polypodiaceae, Rubiaceae, Solanaceae, Scrophulariaceae, Vitaceae, Xanthorrhoeaceae and Zingiberaceae.

Oxidative stress is an inequity among the reactive oxygen species (ROS) formation and permeate ability to eliminate ROS. DNA, RNA, fatty tissues, vitamins, carotenoids and proteins are extremely harmful to all living cells, including microorganisms (Bhattacharjee, S., 2005). FRAP is a simple direct test for measuring antioxidant capacity with plant extracts (Benzie I.F.F. and Strain J.J.,1996). Reducing power is frequently associated with the presence of reductants, which function as antioxidants by donating an atom of hydrogen to break the chains of free radicals. ABTS and DPPH assays are based on the reduction of ABTS (Re et al.,1999) and DPPH free radicals (Sharma O.P., Bhat T.K., 2009) of samples. The ABTS assay is regarded as an assay for both decolourization and antioxidant scavenging. The findings showed variable ABTS scavenging action, collaborating other researches.

Medicinal plants are the life source to human civilization. The future planning for marketing of seedlings of important medicinal plants will start from the garden. This move will not only support the study of species diversity, but also assess the risks of invasive species, carbon sequestration, groundwater management, and air quality. The data can also be used to develop practical management on replacement of existing species with a view towards eco-friendly sustainable urban development of the college.

## CONCLUSION

Today, antioxidant properties of many plants have become a vast interest due to their possible uses as natural additives to substitute synthetic ones. The results obtained also showed that the crude extract of selected plants contain antioxidant compounds which can scavenge different reactive oxygen species (ROS) and free radicals under in vitro conditions. In future, such comprehensive studies can be used to provide data on available bio resource of natural antioxidants for health benefits present on a campus which will further foster mindfulness through economically viable and ecologically sustainable endeavours.

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## CONFLICT OF INTEREST

The author declares no conflict of interest.

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