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# Biodiversity of RIE campus: Plants with medicinal value

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**Abstract**
Bhubaneswar, the capital city of Odisha located in the Khurda district of Odisha, India, stands between 20°12'N to20°25'N latitude and 85°44'E to 85°55'E longitude on the western fringe of the coastal plain across the main axis of the Eastern Ghats. Regional Institute of Education (RIE), a constituent unit of National Council of Educational Research and Training, New Delhi, established in 1963 with total geographic area of about 98.4 ac (407000 sq.mt.) stands in the heart of the capital city. About 60 percent of this institute's geographical area is having wilderness. In search for medicinal plants in the wet season of 2018, about 111 plant species belong to 98 genera of 53 families having medicinal value were recorded from the campus. Due to over exploitation and loss of biodiversity, a number of medicinal plants were under serious threat. Of the plants recorded 10 1nd 101 species were found to belong to monocots and dicots respectively. Among dicot, Euphorbiaceae was the dominant family represented by 10 species. Similarly in monocot species, family Poaceae represented by 3 species were recorded. *Paderia foetida* and *Saraca asoca* fell into the Rare, Endangered and Threatened (RET) group and are very effective against various diseases. The genus *Phyllanthus* was represented as by six species. With degradation of environment because of anthropogenic activities, due care needs to be taken to conserve the biodiversity especially plants having medicinal value for sustainable use.

**Keywords:** Floral diversity, medicinal plants, ethno botany, conservation

## Introduction
Medicinal plants have been playing an essential role in the development of human culture. As a source of medicine, Medicinal plants have always been at forefront virtually all cultures of civilizations. Medicinal plants are regarded as rich resources of traditional medicines and from these plants many of the modern medicines are produced. For thousands of years medicinal plants have been used to treat health disorders, to add flavor and conserve food and to prevent diseases epidemics. The secondary metabolites produced by the plants are usually responsible for the biological characteristics of plant species used throughout the world. The microbial growth in diverse situations is controlled by plant derived products. In this review we gave general overview of the medicinal plants. According to the World Health Organization (WHO) about 65-80% of the world's population in developing countries depends essentially on plants for their primary healthcare due to poverty and lack of access to modern medicine (Awoyemi OK *et al*., 2012) [1]. Thousands of plants are used by rural and tribal communities to make crude drugs to cure various ailments. India is a highly populated country and it is difficult to provide medicine for all the people. However, the majority of the rural people use the plants as it is or their parts which are found in and around their locality as primary health care (Ramesh *et al*., 2014) [2]. Therefore, it is important to protect and restore the plants around their living place.

## Materials and Methods
### The study Area:
Bhubaneswar is located in the Khurda district of Odisha, India between 20°12'N to20°25'N latitude and 85°44'E to 85°55'E longitude on the Western fringe of the coastal plain across the main axis of the Eastern Ghats. It is situated on the South Eastern Railway line joining Howrah and Madras at a distance of 435 km South of Calcutta. The National Highway No.5 connecting Calcutta and Madras passes through Bhubaneswar. The city stands at the Western side of the "Mahanadi Delta" on the bank of river Kuakhai, a distrbutory of Mahanadi River, 30 km South-West of Cuttack city. The river Daya which has branched off from Kathojodi, flows along the South –eastern part of the city. Fig.1 (A)
Regional Institute of Education (RIE), a constituent unit of National Council of Educational

Research and Training, New Delhi, established in 1963 with total geographic area of approx. 98.4 ac (407000 sq.mt.) stands in the heart of the capital city. About 60 percent of this institute geographical area is having wilderness. The study area experiences tropical weather conditions having average annual rainfall of 1,492 mm (58.73 in) with average temperature ranging between $20^0$C and $36^0$C. Fig.1 (B)

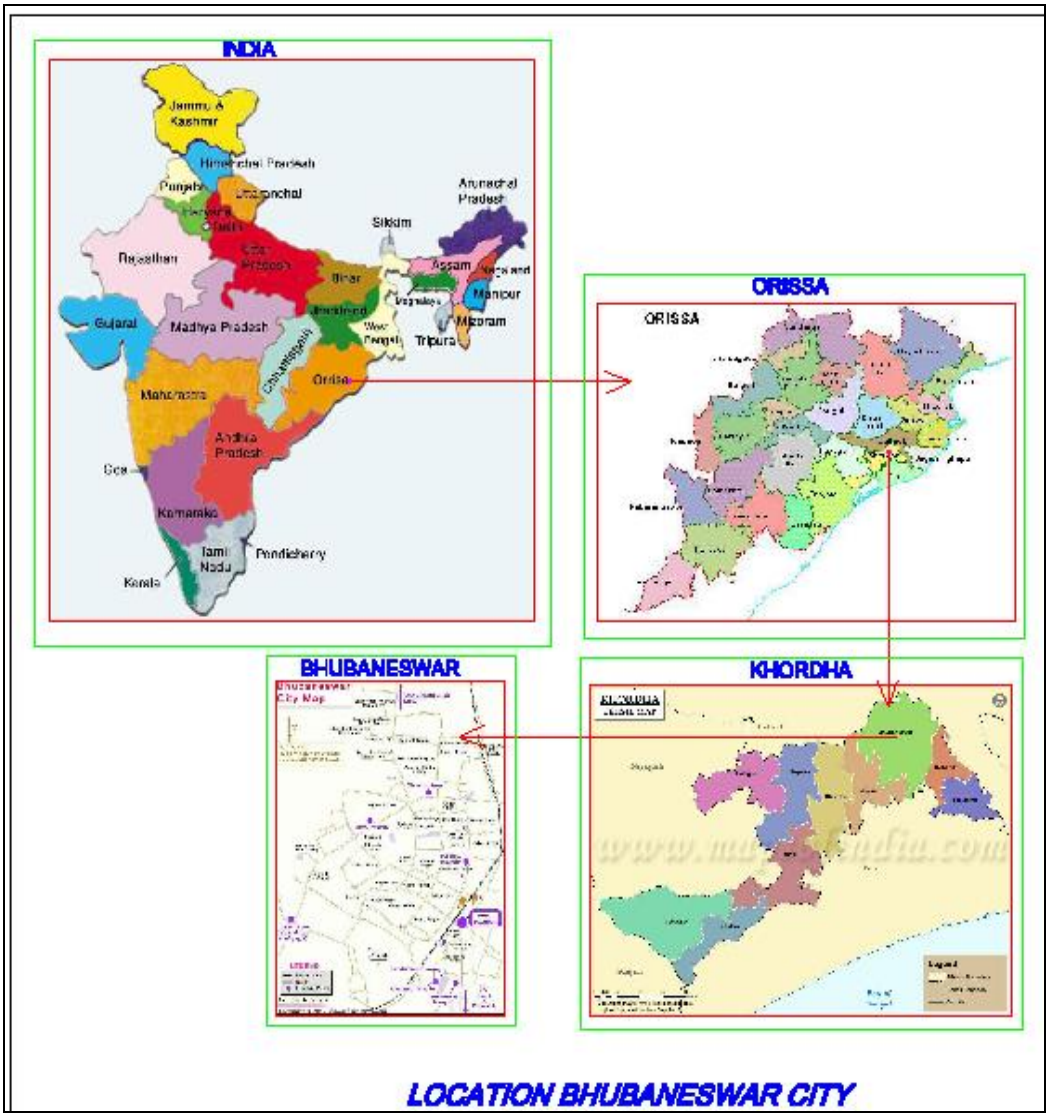


**Fig 1(A):** Map showing the location of Bhubaneswar in the state of Odisha


**Fig 1(B):** Study Area (Source: Google maps)

**Methodology**

The study was conducted during 2017-18 involving field visit, collection, of specimen, taking photographs to document the medicinal plants in the RIE campus. To facilitate the exhaustive and intensive plant specimen, the area has been divided into different zones and each zone was visited many times in different seasons during July 2017- August 2018. Plant specimen were collected in flowering and fruiting condition as with the reproductive characters it became easy for identification of the species. The specimen were identified following" The Botany of Bihar and Odisha" [3] and the "Flora of Odisha" [4]. This provisional identification is then confirmed by referring the latest available monographs. The name of the plant dealt here with has been updated in pursuance with ICBN (Tokyo Code, Grenter *et al*., 1994) [5]. However it is assumed that the most of the name cited are corrected. All the plant species collected during the present study are housed in the pigeon hole Almiraha of Herbarium of Department of Botany, R.I.E, Bhubaneswar Fig. 3(B).

**Results and Discussion**

A total number of 111 plant species were reported belonging to 98 genera of 53 families from the RIE Campus, Bhubaneswar. Of these monocots were represented by 10 species belonging to seven genera and eight families, while dicots contributed by 101 species belonging to 104 genera and 45 families. The collection embraces as many as 51 herbs, 8 shrubs, 43 Trees, and 9 climbers. (Table-1, Table-2, Fig. 2, Fig. 3(A).

**Table 1:** List of Medicinal plant species and their uses recorded from the RIE Campus.

| Sl. No | Plant name | Common name | Habit | Family | Plant parts used | Disease for which used |
|---|---|---|---|---|---|---|
| 1. | *Abutilon indicum* (L.) Sweet | Pedi-Pedika | S | Malvaceae | Root, Leaves, Seeds | Piles, Dysuria, Toothache |
| 2. | *Acalypha indica* L. | Khokhali | H | Euphorbiaceae | Whole plant | Cough, Scabies, Bronchitis |
| 3. | *Acacia nilotica* (L.) Willd. SSP. Indica (Benth) | Babul | T | Mimosaceae | Bark, Gum | Diarrhoea, Dysentry, Diabetics, Astringent |
| 4. | *Achyranthes aspera* L. | Apamaranga | H | Amranthaceae | Root | Cough, Asthma, Bronchitis |
| 5. | *Aegle marmelos* (L.) Corr. | Bela | T | Rutaceae | Fruit, leaves and root | Constipation, Indigestion, Fever, Cough, Piles, Filarisis |
| 6. | *Aerva lanata* (L.) Juss. | Paunsia | H | Amaranthaceae | Whole plant | Boils, Cough, Diabetes, Lithiasis, Ulcers, Rheumatic, Swelling |
| 7. | *Ageratum conyzoides* L. | Dengsingi | H | Asteraceae | Whole plant | Uterine haemorrhage, Rhinitis, Sinusitis, Inflammation |
| 8. | *Alstonia scholaris* (L.) R.Br. | Chatiana | T | Apocynaceae | Bark, Leaves, Fruit | Diarrhoea, Asthma, Cardiac troubles |
| 9. | *Anacardium occidentale* L. | Kaju badam | T | Anacardiaceae | Leaves, Bark | Preventing hair loss, Snake bite, Skin disease, Dysentery |
| 10. | *Andrographis paniculata* (Burm.f.) Wall. ex Nees | Bhui nimba | H | Acanthaceae | Whole plant | Dysentery, Fever, Tonsillitis, Hypertension, Snake bite |
| 11. | *Annona reticulate* L. | Ramphal | T | Annonaceae | Root, Bark, Stem, Fruit, Seed | Diarrhoea, Indigestion |
| 12. | *Annona squamosa* L. | Saripha/ Ata | T | Annonaceae | Root,Leaves, Bark, Fruit | Mental depression, Spinal disorder, Anaemia |
| 13. | *Argemone mexicana* L. | Odosamari | H | Papaveraceae | Root, seeds | Juandice, Leprosy, Conjunctivitis |
| 14. | *Argyreia nervosa* (Burm.f.) Boj. | Mundanoi | C | Convolvulaceae | Root, Leaves, Seed | Anorexia, Colie, Piles, Synovitis, Cerebral disorder, Cardiac problem |
| 15. | *Aristolochia indica* L. | Iswara mula | T | Aristolochiaceae | Root, Stem, Leaves | Ulcer, Inflammation, Colic, Cough, Leukoderma |
| 16. | *Artocarpus heterophyllus* Lam. | Panasa | T | Moraceae | Root, Pulp, Fruit, Seed | Phyringitis, Fever, Boils, Wounds, Skin diseases |
| 17. | *Asparagus racemosus* Willd. | Satabari | C | Liliaceae | Entire plant | Rheumatism, Gastritis, Menorrhagea, Eye diseases |
| 18. | *Azadirachta indica* A. Juss. | Nimba | T | Meliaceae | Bark, Leaves, Flower, Fruit, Seed | Eczema, Scabies, Ring worm |
| 19. | *Bauhinia variegate* L. | Kanchana | T | Caesalpiniaceae | Bark, Root, Bud | Skin diseases, Cough, Leprosy, Diabetes |
| 20. | *Boerhavia diffusa* L. | Puruni | H | Nyctaginaceae | Whole plant | Lecorrhoea, Cardiac trouble, Jaundice, Constipation, General debility |
| 21. | *Bombax ceiba* L. | Simuli | T | Bombacaceae | Root, prickles, seed, bark, young fruit, gum, leaves and flower | Menorrhagia, Urinary jdisorder, Fever, Abdominal disorder |
| 22. | *Borassus flabellifer* L. | Tala | | Arecaceae | Roots, leaves, inflorescences and fruit | Burning sensation, Colic, Constipation |
| 23. | *Butea monosperma* (Lam.) Taub. | Palasha | T | Fabaceae | Bark, leaves, flowers, seeds and gum | Anorexia, Dyspepsia, Diarrhoea, Intestinal worms |
| 24. | *Calotropis gigantean* R.Br. | Dhala arakha | S | Asclepiadaceae | Whole plant | Scabies, Acne, Pimples |
| 25. | *Capparis zeylanica* L. | Kantikapali | S | Capparaceae | Root, Bark, Leaves | Skin troubles |

| Sl. No | Plant name | Common name | Habit | Family | Plant parts used | Disease for which used |
|---|---|---|---|---|---|---|
| 26. | *Cassia fistula* L. | Sunari | T | Caesalpiniaceae | Fruit, leaves, bark and root | Tuberculous glands, Constipation, Diabetes, Burning sensation |
| 27. | *Chenopodium album* L. | Bathua | H | Chenopodiaceae | Entire plant | Peptic ulcer, Helminthiasis, Eye disorders, Seminal weakness |
| 28. | *Cissus quadrangular* L. | Hadavanga | H | Vitaceae | Whole plant | Anorexia, Colic, Leprosy, Skin disease, Tumers, Eye disorders |
| 29. | *Cleome viscosa* L. | Bana sorisa | H | Capparaceae | Leaves and seeds | Fever, Diarrhoea, Worm infestation, Dyspepsia, Cardiace disorders |
| 30. | *Clerodendrum viscosum* Vent. | Sweta bhaunarmala | S | Verbenaceae | Root and leaves | Tumour, leprosy, Skin disease, Cough, Bronchitis |
| 31. | *Clitoria ternatea* L. | Aparajita | C | Fabaceae | Roots, leaves and seeds | Opthalmopathy tubercular glands, Helminthiasis, Elephantasis, Otalgia |
| 32. | *Coccinea grandis* (L.) Voigt. | Kunduri | C | Cucurbitaceae | Leaf | Vomiting, Uterine discharges, Leprosy, Jaundice, Cough |
| 33. | *Cocos nucifera* L. | Nadia | T | Arecaceae | Root, Fruit | Rheumatism, Back pain, Difficult pregnancy, Stomachache |
| 34. | *Costus speciosus* (Koenig) Sm. | Kudha | H | Zingiberaceae | Rhizome | Erache, Bile disorders, Urinary disorders |
| 35. | *Curcuma longa* L. | Haladi | H | Zingiberaceae | Rhizome | Hepatitis, Jaundice, Menstrual disorder, Duodenal ulcer |
| 36. | *Cynodon dactylon* (L.) Pers. | duba | H | Poaceae | All parts | Conjunctivitis, Wounds, Leprosy, Skin disease |
| 37. | *Cyperus rotundus* L. var. *rotundus* Kern. | Mutha | H | Cyperaceae | Tuber | Leprosy, Malaria fever, Diarrhoea, Wounds, Ulcers |
| 38. | *Dalbergia sissoo* Roxb. | Sisso | T | Fabaceae | Roots, leaves, bark and heartwood | Gonorrhoea, Menorrhagia, Colic, Piles, Burning Sensation |
| 39. | *Delonix regia* (Boj. Ex Hook) Raf. | Krushnachuda | T | Caesalpiniaceae | Stem wood, Bark, Leaves | Diabetes, Reduces blood sugar level, Anti inflammation |
| 40. | *Dillenia indica* L. | Ou | T | Dilleniaceae | Fruit | Antidiabetic, Laxative |
| 41. | *Dioscrorea pentaphylla* L. | Banaalu | C | Dioscoreaceae | Tubers | Syphillis, Dysentery, Piles, Aphrodisic, Worm infestation |
| 42. | *Eclipta prostrate* (L.) L. | Keshadura | H | Asteraceae | Root, Leaves | Promote hair growth, Leucorrhoea, Eruption, Graying of hair |
| 43. | *Euphorbia hirta* L. | | | Euphorbiaceae | Aerial parts | Conjunctivities, Cough, Asthma, Dysentery, Warts |
| 44. | *Evolvulus alsinoides* (L.) L. | Bichhamalia | H | Convolvulaceae | Whole plant | Fever, Loss of memory, Nervous debility, Syphillis, Weakness |
| 45. | *Ficus benghalensis* L. | Bara | T | Moraceae | Bark, aerial root, leaves, fruits and latex | Rheumatism, Acidity, Stomach disorders, Lumbago, Diarrhoea, Diabetes, Vomitting, Urinary disorders |
| 46. | *Ficus hispida* L.f. | Dimiri | T | Moraceae | Fruit | Jaundice, Leukoderma, Piles, Wounds, Haemorrhoea |
| 47. | *Ficus religiosa* L. | Usta | T | Moraceae | Leaves, seeds, bark, fruits, tender shoots and latex | Constipation, Ulcers, Wouds, skin and lungs disease, Asthma |
| 48. | *Gmelina arborea* Roxb. | Gambari | T | Verbenaceae | Root, Leaves, fruit, and bark | Stomachache, Galactogouge, Laxative, Antihelminthic |
| 49. | *Heliotropium indicum* L. | Hatisundha | H | Boraginaceae | Leaves | Ring worm, Rheumatism, Ulcer Would, Gonorrhoea |
| 50. | *Hemidesmus indicus* (L.) R.Br. | AantaMul | H | Asclepiadaceae | Roots, leaves, stem and latex | Rheumatism, Urinary trouble, Skin disease, Diabetes Dysurea |
| 51. | *Ipomoea aquatica* Forssk. | kalamasaga | C | Convolvulaceae | Entire plant | Blood sugar lowering effect |
| 52. | Jatropha gossypifolia Linn. | Nali baigaba | S | Euphorbiaceae | Leaves, bark, Seeds | Boils, carbuncles, Emetic Purgative |
| 53. | *Justicia adhatoda* L. | Basanga | S | Acanthaceae | Leaf, Bark | Cough, Asthma, Bronchitis, Malarial fever |
| 54. | *Lawsonia inermis* L. | Manjuati | S | Lythraceae | Leaves, Bark | Necrotic, Purgative, Astringent, Stimulant |
| 55. | *Leucas aspera* (Willd.) Link | Gaisa | H | Lamiaceae | Leaves, Flower | Cattarah in children, Chronic skin infection, Dysmennoroea |
| 56. | *Leucas cephalotes* (Roth.) Spreng. | Guma | H | Lamiaceae | Plant | Filariasis, Inflammation, Antioxidant, Liver ailment, Diabetes |
| 57. | *Limonia acidissima* L. | Kaintha | | Rutaceae | Whole Plant | Indigestion, Filaria, Asthma, Piles, Liver sore |
| 58. | *Ludwigia prostrate* Roxb. | Latkera | Herb | Onagraceae | Plant | Dyspepsia, Dropsy, Cough, Cervical adenitis, Fever |
| 59. | *Mallotus phillippensis* (Lam.) Muell. | Sinduri | S | Euphorbiaceae | Stem, Leaves, Seed | Cough, Renal disorder, Ring worm, Herpes, Scabies, Wound ulcer |

| Sl. No | Plant name | Common name | Habit | Family | Plant parts used | Disease for which used |
|---|---|---|---|---|---|---|
| 60. | *Mangifera indical* L. | Amba | T | Anacardiaceae | Leaves | Dysentery, Diabetes, Asthma |
| 61. | *Marsilea minuta* L. | Sunsunia saga | C | Marsiliaceae | Entire plant | Diarrhoea, Cough Bronchitis, Leprosy |
| 62. | *Melia azedarach* L. | Maha nimba | T | Meliaceae | All parts | Ascariasis, Vaginal infection, Trichomoniases |
| 63. | *Michelia champaca* L. | Champa | T | Magnoliaceae | Root, Leaves, bark, Flower, Seeds, Fruit | Brain disorder, Syphillis, Gonorrhoea, Dysmenorrhoea, Helminthiasis |
| 64. | *Mimosa pudica* L. | Lajakuli | H | Mimosaceae | Root,Stem, Leaves, Flowers, Fruit | Syphllis, Stomach worm, Urinary infection, Leprosy, Insomnia |
| 65. | *Mirabilis jalapa* L. | Rangini | H | Nyctaginaceae | Root, Leaves | Diuretic, Purgative, Would healing |
| 66. | *Momordica charantia* L. | Kalara | C | Cucurbitaceae | Leaves | Diabetes, Hypertension, Dysentery, Malignant ulcer, Leprosy |
| 67. | *Moringa oleifera* Lam. | Sajana | T | Moringaceae | Root and leaves | Rheumatism, Cardiac problem, Scurvey, Circulatory, Stimulant |
| 68. | *Nelumbo nucifera* Gaertn. | Padma | H | Nymphaeaceae | Rhizome | Neuoasthenia, Spermatorrhoea, Metrorrhhoea, Liver diseases |
| 69. | *Neolamarckia cadamba* (Roxb.) Bosser. | Kadamba | T | Rubiaceae | Leaves, bark | Wounds and bruises, Rheumatic Headache, Liver diseases |
| 70. | *Nerium oleander* L. | Karabira | T | Apocynaceae | Leaves, Root | Opthalmia, Ring worm, Scabies, Copius Lacrimation, Leprosy |
| 71. | *Nyctanthes arbor-tristis* L. | Gangasiuli | T | Oleaceae | Leaves, flowers and seeds | Bile fever, Malarial fever, Cold, Cough, Rheumatism |
| 72. | *Nymphaea nouchali* Burm.f. | Nali Kain | H | Nymphaeaceae | Rhizome, Tuber | Diarrhoea, Dermatopathy, Cardiac disorders |
| 73. | *Ocimum basilicum* L. | Kapur Kranti | H | Lamiaceae | Whole plant | Cold, Cough, Fever, Ring worm, Cancer, Stress, Asthma, Diabetes |
| 74. | *Ocimum gratissimum* L. | Rama tulasi | S | Lamiaceae | Whole plant | Headache, Sun stroke, Influenza |
| 75. | *Ocimum sanctum* L. | Tulasi | H | Lamiaceae | Whole plant | Asthma, Vomiting, Hiccup, Lumbago, Verminosis |
| 76. | *Paederia foetida* L. | Pasaruni | H | Rubiaceae | Fresh leaves | Rheumatism, Bacillary dysentery, Dysuria, Gastrititis, Dyspepsia |
| 77. | *Phoenix sylvestris* (L.) Roxb. | Khajuri | T | Arecaceae | Root, Fruit, Heart wood | Burning sensation, Fever, Cardiac debility, Gastropathy |
| 78. | *Phyllanthus acidus* (L.) Skeels. | Narakoli | T | Euphorbiaceae | Root, Leaves, Seed | Poultice, Lumbago, Rheumatism, Purgative |
| 79. | *Phyllanthus emblica* L. | Amla | T | Euphorbiaceae | Root bark, bark, leaves and fruits | Eye diseases, Indigestion, Piles, Diabetes, Polyuria, Dental carries |
| 80. | *Phyllanthus fraternus* Webster | Bhuin aenla | H | Euphorbiaceae | Root, Stem, Leaves | Viral hepatitis, Oedema, Dysentery |
| 81. | *Phyllanthus reticulatus* Poir. | Jajanga | S | Euphorbiaceae | Whole plant | Stomach disorder in cows, Burn, Skin infection, Obesity, Gastropathy |
| 82. | *Phyllanthus niruri* L. | Bhuiamla | H | Euphorbiaceae | Root, Stem, Leaves | Jaundice, Dysentery, Stomachic |
| 83. | *Phyllanthus virgatus* Forst. f. | Bhui aenla | H | Euphorbiaceae | Fruit | Diarrhoea, Dysentery, Gastropathy, Scabies, Ulcers |
| 84. | *Piper longum* L. | Pipali | H | Piperaceae | Rot, Fruit | Gynaec problems, Diarrhoea, Indigestion, Jaundice, Asthma, Fever, Cough, Sinusitis |
| 85. | *Plumeria rubra* L. | Katha champa | T | Apocynaceae | Whole plant | Cough, Constipation, Acute enteritis, Dysentery, Haemophilia |
| 86. | *Pongamia pinnata* (L.) Pierre. | Karanjo | T | Fabaceae | Root, Bark, Leaves, Seed | Antihelminthic, Earache, Whooping cough, Hydrocele, piles |
| 87. | *Psidium guajava* L. | Pijuli | T | Myrtaceae | Root, Bark, Leaves, Fruit | Diarrhoea, Dysentery, Cough, Stomachache, Bleeding gum, Constipation |
| 88. | *Quisqualis indica* L. | Madhumalati | C | Combretaceae | Root, Leaves, Seed | Diarrhoea, Liver, Antihelminthic |
| 89. | *Rauwolfia serpentine* (L.) Benth.ex. Kurz. | Patala garuda | H | Aaapocynaceae | Root | Snakebite, High B.P., Scorpion sting |
| 90. | *Ricinus communis* L. | Jadda | H | Euphorbiaceae | Seeds and leaves | Skin diseases, Inflamation, Constipation |
| 91. | *Saccharum officinarum* L. | Akau | H | Poaceae | Stemm, Root | Sore eyes and throat |
| 92. | *Santalum album* L. | Chandana | T | Santalaceae | Heart wood | Skin disease, Jaundice, Cough, Gastric irritability, Menorrhoea, Leucorrhoea, General debility |
| 93. | Saraca asoca (Roxb.) de wilde | Oshoka | T | Caesalpiniaceae | Bark, Flower | menorrhagia, leucorrhoea, bleeding hemorrhoids, dysfunctional uterine bleeding |
| 94. | *Semecarpus anacardium* L.f. | Nut tree | T | Anacardiaceae | Fruit, Seed | Leprosy, Nervous debility, Rheumatism, Epilepsy, Psoriasis, Diabetes, Tumours |
| 95. | *Sesamum orientale* L. | Rasi | H | Pedaliaceae | Leaves, Seed | Ophthalmic and Cutaneous complaints |

| Sl. No | Plant name | Common name | Habit | Family | Plant parts used | Disease for which used |
|---|---|---|---|---|---|---|
| 96. | *Sida acuta* Burm.f. | Bajarmuli | H | Malvaceae | Root and leaves | Diabetes, Toothache, Ulcer, Piles |
| 97. | *Sida cordifolia* L. | Bisiripi | H | Malvaceae | Root, Leaves, Bark, seeds | Urinary troubles, Sciatica, Dysentery, Facial paralysis |
| 98. | *Streblus asper* Lour. | Sahada | T | Moraceae | Root, bark, latex, leaves | Ulcers, Sinusitis, Elephantiasis, Sore heals, Boils, Haemorrholds, Syphllis |
| 99. | *Strychnos nux-vomica* L. | Kochila | T | Loganiaceae | Bark, leaves and seeds | Cholera, Asthma, Anaemia, Malarial Fever, Paralysis, Stomachache |
| 100. | *Syzygium cumini* (L.) Skeels. | Jamukoli | T | Myrtaceae | Leaves, Bark, Fruit, Seed | Diabetes, Diarrhoea, Leucorrhoea, Oedema |
| 101. | *Tamarindus indica* L. | Tentuli | T | Caesalpiniaceae | Fruit | Hyper-acidity, Leucorrhoea, Oedema |
| 102. | *Tectona grandis* L.f. | Saguan | T | Verbenaceae | Whole plant | Arthiritis, Leukoderma, Leprosy, Dysentery, Piles, Eczema, Ring worm |
| 103. | *Tephrosia purpurea* (L.) Pers. | Soroponkha | H | Fabaceae | Root, Leaves | Dysmenorrhoea, Chronic fever, Anaemia, Gingivitis, Pimples, Elephantasis, Boils |
| 104. | *Terminalia arjuna* (Roxb. ex DC.) Wight | Arjuna | T | Combretaceae | Bark | Heat disease, Diarrhoea, Cough, Diabetes, Leucorrhoea |
| 105. | *Terminalia bellirica* (Gaertn.) Roxb. | Bahada | T | Combretaceae | Seed | Anaemia, Leukodermia, Constipation, Dyspepsia, Greyness of hair |
| 106. | *Tinospora cordifolia* (Willd.) Hook.f. | Guluchi lata | C | Menispermaceae | Whole plant | Flatulence, Stomachalgia, Chronic fever, Jaundice, Seminal weakness, Diabetes |
| 107. | *Tridax procumbens* L. | Bisalya karani | H | Asteraceae | Aerial parts | Gonorrhoea, Gleet, Rheumatoid arthiritis, Skin disease |
| 108. | *Vetiveria zizannioides* (L.) Nash. | Bena | H | Poaceae | Root | Burning sensation, Ulcers, Vomiting, Cough, Asthma, Gout, Lumbago |
| 109. | *Vitex negundo* L. | Begunia | S | Verbenaceae | Root, Leaves | Rheumatism, Dyspepsia, Catarrh, Headache, Piles |
| 110. | *Zingiber officinale* Rosc. | Adda | H | Zingiberaceae | Rhizome | Cough, Cold, Flatulence, Colic Hiccup, Anorxia, Piles, Dysuria, Vomitting. |
| 111. | *Ziziphus mauritiana* Lam. | barakoli | S | Rhamnaceae | Root, Bark, Leaves, Fruits | Swelling of bone, Chest trouble, Vomitting, Diarrhoea, Abdominal pain |

H= Herb, S= Shrub T= Tree C= Climber

**Table 2:** List of division-wise distribution of Medicinal plants present in RIE Campus

| Plant group | No. of Families | No. of Genera | No. of Species |
|---|---|---|---|
| Dicotyledons | 45 | 104 | 101 |
| Monocotyledons | 08 | 07 | 08 |

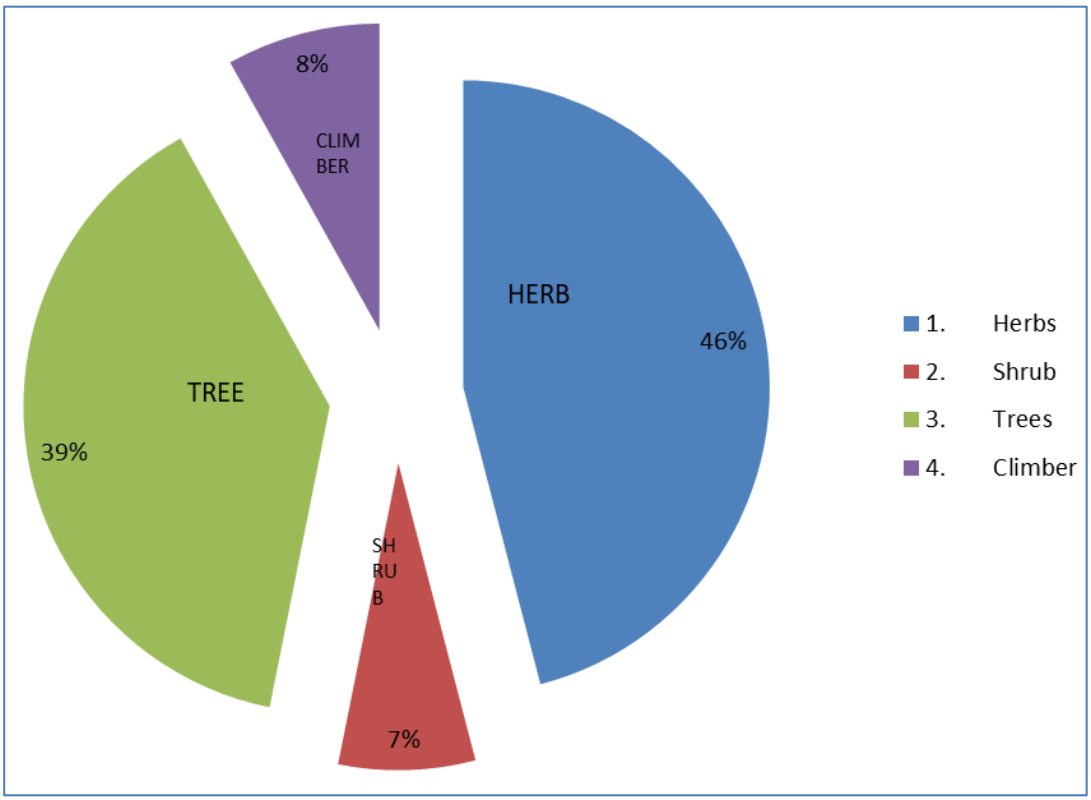


**Fig 2:** Diversity of plant species by habitat

A B C

D E F

**Fig 3(A):** Flowers and fruits of *Melia azedarach* L., (B) Flowers of *Paederia foetida* L. (C) Flowers and leaves of Saraca asoca (Roxb.) de wilde, (D) Fruits of *Terminalia bellirica* (Gaertn.) Roxb., (E) Fruits of *Phyllanthus emblica* L., (F) Flowers of *Rauwolfia serpentine* (L.) Benth.ex. Kurz.

**Fig 3(B):** Preparation of Herbarium sheets

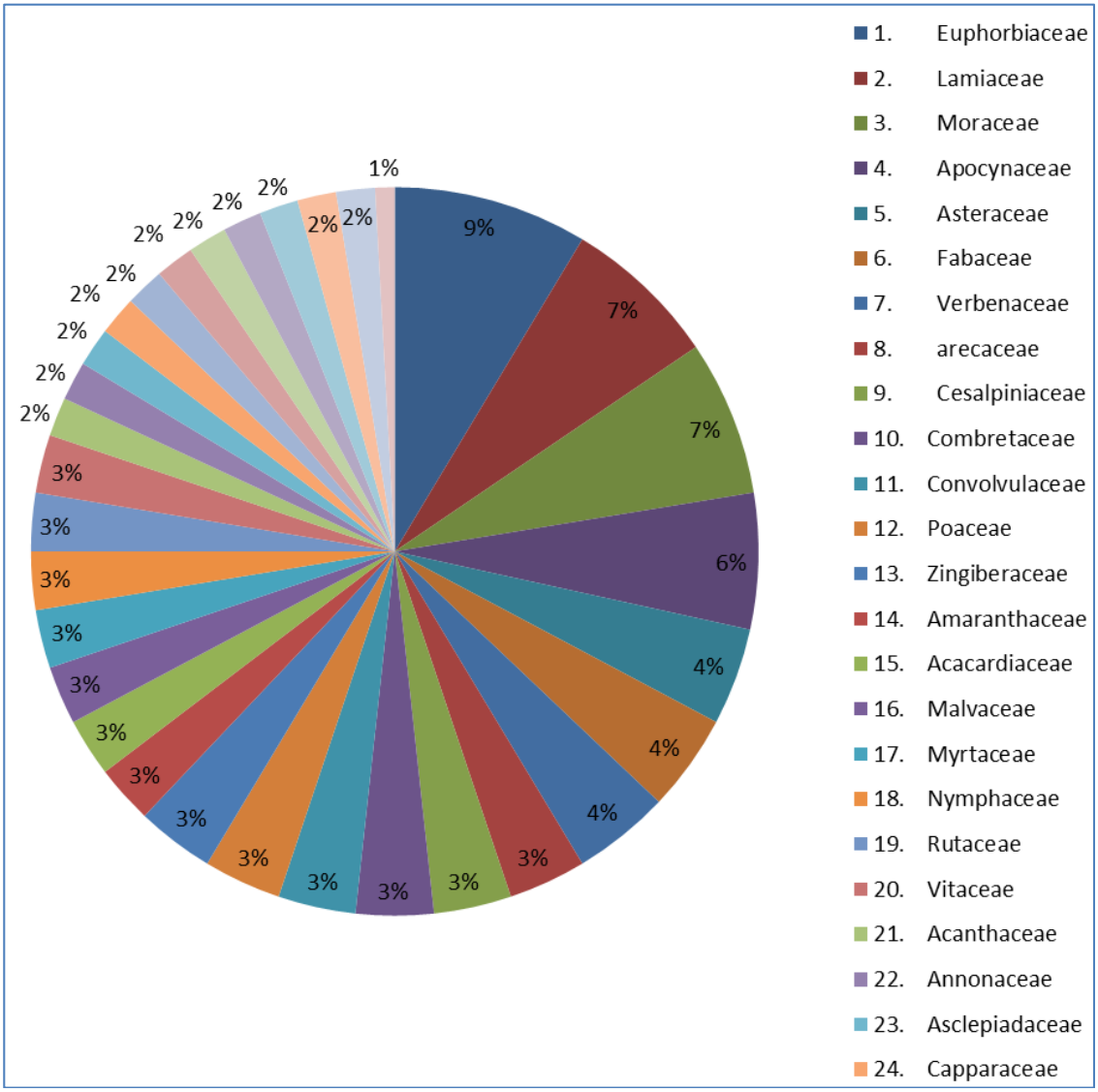


**Fig 4:** Family-wise distribution of medicinal plant species (in %) recorded in RIE Campus, Bhubaneswar

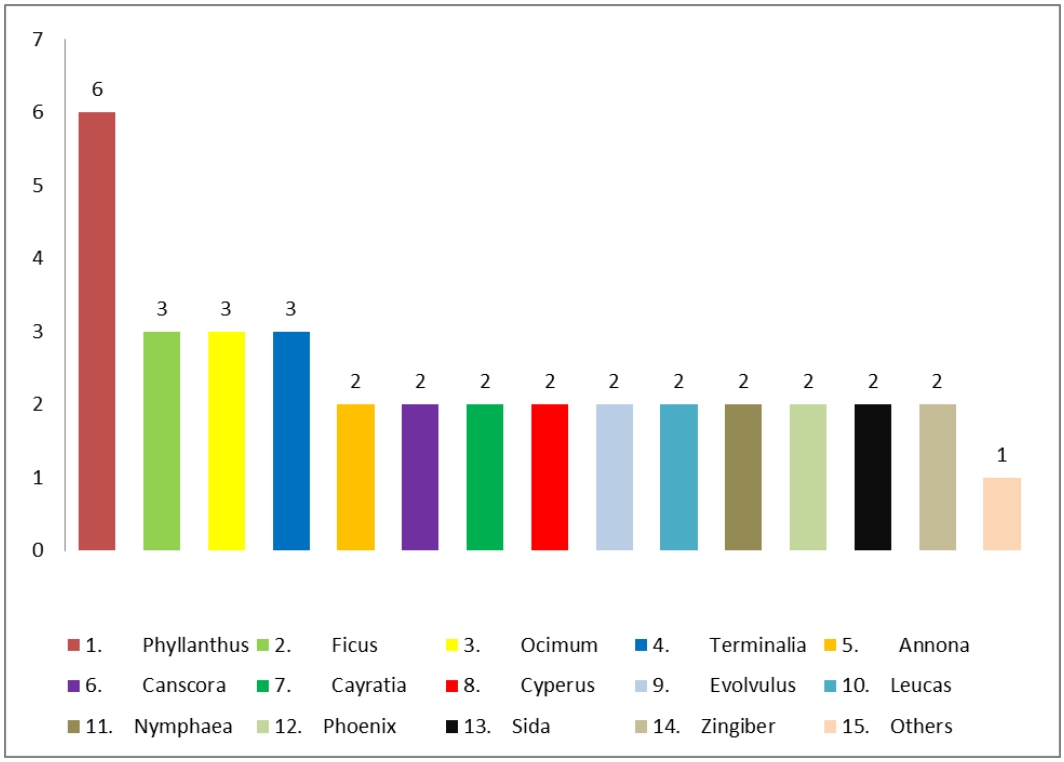


**Fig 5:** Genus-wise Distribution of Medicinal Plants recorded in RIE Campus, Bhubaneswar

## Discussion

The Floristic composition shows that the vegetation of Medicinal plants includes as many as 51 herbs, 8 shrubs, 43 Trees, and 9 climbers. The plant parts used and disease for which used were recorded in Table-1 and compared with the research work published by Satapathy, K.B. (2015) [6] for Jajpur district of Odisha. In 2011, 72 medicinal plants had been identified in the RIE campus by previous workers (Kumar S. *et al*., 2011) [7]. Euphorbiaceae (10) followed by Lamiaceae (5) was the most dominant families among economically important plant species recorded (Fig.4). Genera wise *Phyllanthus* followed by *Ficus, Ocimum*, *Terminalia* were the dominant genera in the present study (Fig.5**)**. From the study area, 4 plants species were found to be vulnerable, Endangered and critically endangered. Table-3 highlights these species along with their Botanical name, family, local name and IUCN status. It is critical to conserve these medicinal plants locally if not globally. This may be through in-situ or ex-situ conservation methods for preserving the biodiversity of the state of Odisha. In suit conservation method should be implemented to conserve the medicinal plant resources in their natural habitat.

**Table 3:** List of Endangered, Vulnerable Medicinal species recorded in RIE Campus.

| Sl. No. | Botanical Name | Common Name | Family | IUCN Status |
|---|---|---|---|---|
| 1. | *Paederia foetida* L. | Pasaruni | Rubiaceae | Endangered |
| 2. | *Piper longum* L. | Pipali | Piperaceae | Endangered |
| 3. | *Rauwolfia serpentine* (L.) Benth. Ex Kurz. | Patala garuda | Apocynaceae | Critically Endangered |
| 4. | *Saraca asoca* (Roxb.) de Wilde | Oshoka | Caeslpiniaceae | Vulnerable |

## Conclusion

Urbanization has increased tremendously over the last 60 years around the world, with the result that more than 50 percent of the world population now live in cities. Increasing urbanization has serious consequences for the environment, as it fragments and changes natural habitats and alters environmental conditions. Therefore, there is a need for more exploration and awareness of research with the aim of conserving urban floras. The use of local floras as primary medical resources and traditional practices of plant-based medico-foods are still alive in the modern urban areas such as smart city (Bhubaneswar) of the State of Odisha, India. The present study illustrates to what extent urban communities may depend on various plants to meet their needs and to cure various diseases and disorders by means of traditional medicines. Regional Institute of Education (NCERT), Bhubaneswar, Odisha, highlights the uses of these plants by the local inhabitants for healthcare and the students of the institute for the study of Ethnobotany, Medicinal importance and conservation Appropriate conservation planning is therefore required to conserve these useful floras and to maintain biodiversity in this urban area, which underpins traditional knowledge.

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