

ENVIRONMENTAL AUDIT REPORT
of
Jaywant Shikshan Prasarak Mandal's,
RAJARSHI SHAHU COLLEGE OF PHARMACY & RESEARCH,
Tathawade, Pune 411 033



Year: 2021-22

Prepared by:

ENGRESS SERVICES

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MAHARASHTRA ENERGY DEVELOPMENT AGENCY

Maharashtra Energy Development Agency
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ECN/2022-23/CR-43/1709 10th May, 2022

**CERTIFICATE OF REGISTRATION
FOR CLASS 'A'**


We hereby certify that, the firm having following particulars is registered with **MAHARASHTRA ENERGY DEVELOPMENT AGENCY (MEDA)** under given category as "Energy Planner & Energy Auditor" in Maharashtra for Energy Conservation Programme of MEDA.

Name and Address of the firm : M/s Engress Services
Yashshree, 26, Nirmal Bag Society,
Near Mukhtangan English School,
Parvati, Pune – 411 009.

Registration Category : *Empanelled Consultant for Energy Conservation Programme for Class 'A'*

Registration Number : *MEDA/ECN/2022-23/Class A/EA-32.*

- Energy Conservation Programme intends to identify areas where wasteful use of energy occurs and to evaluate the scope for Energy Conservation and take concrete steps to achieve the evaluated energy savings.
- MEDA reserves the right to visit at any time without giving prior information to verify quarterly activities performed by the firm and canceling the registration, if the information is found incorrect.
- This empanelment is valid till **09th May, 2024** from the date of registration, to carry out energy audits under the Energy Conservation Programme
- The Director General, MEDA reserves the right to cancel the registration at any time without assigning any reasons thereof.


General Manager (EC)



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Near Mukhtangan English School, Parvati, Pune 411 009
Tel: 09890444795 Email: engress123@gmail.com

Ref: ES/RSCOPR/21-22/03

Date: 18/6/2022

CERTIFICATE

This is to certify that we have conducted Environmental Audit at Jaywant Shikshan Prasarak Mandal's Rajarshi Shahu College of Pharmacy & Research, Tathawade, Pune 411 033, in the Year 2021-22.

The College has adopted following Environment Friendly Practices:

- Usage of Energy Efficient LED Light Fitting
- Usage of BEE STAR Rated Energy Efficient Equipment
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp
- Segregation of Waste at source
- Installation of Vermi Composting Plant
- Implementation of Rain Water Harvesting Project
- Tree Plantation in the campus
- Creation of Awareness on Plastic Free Initiative, by Display of Posters

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,

A Y Mehendale,
Certified Energy Auditor
EA-8192

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ACKNOWLEDGEMENT

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We are thankful to all staff members for helping us during the field study.

EXECUTIVE SUMMARY

1. Jaywant Shikshan Prasarak Mandal's Rajarshi College of Pharmacy & Research, Tathawade, Pune consumes Energy in the form of **Electrical Energy**; used for various Electrical Equipment, office & other facilities.

2. Pollution due to College Activities:

- **Air Pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste
- **Liquid Waste:** Human liquid waste

3. Present Energy Consumption & CO₂ Emission:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	48771	44
2	Maximum	4986	4
3	Minimum	3260	3
4	Average	4064	4

4. Various initiatives taken for Energy Conservation:

- Usage of Energy Efficient BEE STAR Rated Equipment
- Usage of Energy Efficient LED Lighting
- Maximum Usage of Day Lighting
- Installation of Roof Top Solar PV Plant of Capacity 10 kWp.

5. Usage of Renewable Energy & CO₂ Emission Reduction:

- The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.
- The Electrical Energy generated in 21-22 is **12000 kWh**.
- Reduction in CO₂ Emissions in 2021-22 works out to be **10.8 MT**.

6. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	99	79	82
2	Minimum	90	48	52

7. Indoor Comfort Conditions:

No	Parameter/Value	Temperature , °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	32.1	40	241	48
2	Minimum	31.7	36.9	111	39

8. Waste Management:

8.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized Agency for further action.

8.2 Organic Waste Management:

The College has installed a Vermi Composting Plant and the organic Waste is composted in the Plant, which is further used in the own garden.

8.3 E Waste Management:

The E-Waste is disposed of through Authorized Agency.

9. Rain Water Harvesting:

The College has installed the Rainwater harvesting project; the rain water falling on the terrace is collected and is used for increasing the underground water table.

10. Eco Friendly Initiatives:

- Internal Tree Plantation & Medicinal Plant Garden
- Display of Posters on Plastic Ban

11. Assumptions:

1. **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere
2. Average Energy generated by Solar PV Plant in a Day: **4 kWh/kWp**
3. Annual Solar Energy Generation Days: **300 Nos.**

12. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar Energy generation: www.solarrooftop.gov.in
- For Various Indoor Air Parameters: www.ishrae.com
- For AQI & Water Quality Standards: www.cpcb.com

ABBREVIATIONS

Kg	: Kilo Gram
MSEDCL	: Maharashtra State Distribution Company Limited
MT	: Metric Ton
kWh	: kilo-Watt Hour
LPD	: Liters per Day
LED	: Light Emitting Diode
AQI	: Air Quality Index
PM-2.5	: Particulate Matter of Size 2.5 Micron
PM-10	: Particulate Matter of Size 10 Micron
CPCB	: Central Pollution Control Board
ISHRAE	: The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I

INTRODUCTION

1.1 Important Definitions:

1.1.1 Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are complied with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment"

1.1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

1.1.4. Relevant Environmental Laws in India: Table No-1:

1927	The Indian Forest Act
1972	The Wildlife Protection Act
1974	The Water (Prevention and Control of Pollution) Act
1977	The Water (Prevention & Control of Pollution) Cess Act
1980	The Forest (Conservation) Act
1981	The Air (Prevention and Control of Pollution) Act
1986	The Environment Protection Act
1991	The Public Liability Insurance Act
2002	The Biological Diversity Act
2010	The National Green Tribunal Act

1.1.5. Some Important Environmental Rules in India: Table No-2:

1989	Hazardous Waste (Management and Handling) Rules
1989	Manufacture, Storage and Import of Hazardous Chemical Rules
2000	Municipal Solid Waste (Management and Handling) Rules
1998	The Biomedical Waste (Management and Handling) Rules
1999	The Environment (Siting for Industrial Projects) Rules
2000	Noise Pollution (Regulation and Control) Rules
2000	Ozone Depleting Substances (Regulation and Control) Rules
2011	E-waste (Management and Handling) Rules
2011	National Green Tribunal (Practices and Procedure) Rules
2011	Plastic Waste (Management and Handling) Rules

1.1.6 National Environmental Plans & Policy Documents: Table No-3:

1.	National Forest Policy, 1988
2.	National Water Policy, 2002
3.	National Environment Policy or NEP (2006)
4.	National Conservation Strategy and Policy Statement on Environment and Development, 1992
5.	Policy Statement for Abatement of Pollution (1992)
6.	National Action Plan on Climate Change
7.	Vision Statement on Environment and Human Health
8.	Technology Vision 2030 (The Energy Research Institute)
9.	Addressing Energy Security and Climate Change (MoEF and Bureau of Energy Efficiency)
10.	The Road to Copenhagen; India's Position on Climate Change Issues (MoEF)

1.2 Objectives:

1. To study Resource Consumption & CO₂ Emissions
2. To Study CO₂ Emission Reduction
3. To study Indoor Air Quality Parameters
4. To study Indoor Comfort Condition Parameters
5. To Study of Waste Management
6. To Study of Rain Water Harvesting
7. To Study of Eco Friendly Initiatives

1.3 General Details of College: Table No 4:

No	Head	Particulars
1	Name of Institution	Jaywant Shikshan Prasarak Mandal's Rajarshi Shahu College of Pharmacy & Research,
2	Address	Tathawade, Pune 411 033
3	Affiliation	Savitribai Phule Pune University

1.4 Google Earth Image:



College Campus

CHAPTER-II

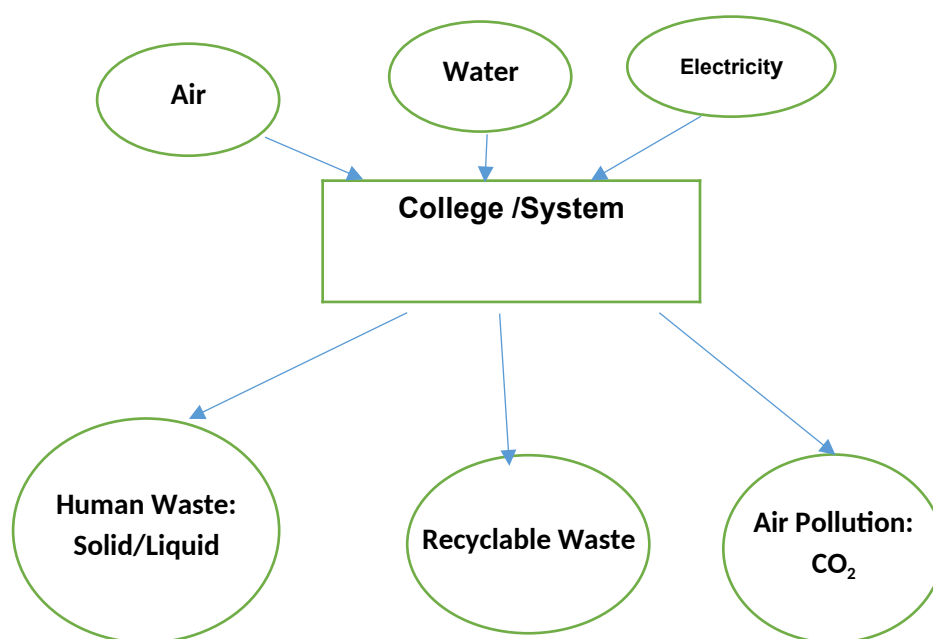
STUDY OF RECORCE CONSUMPTION & CO₂ EMISSION

The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.

Chart No 1: Representation of College as System & Study of Resources & Waste



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy are as under

- 1 kWh of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Table No 5: Study of Consumption of Electrical Energy & CO₂ Emissions: 21-22:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	3727	3.35
2	May-21	3278	2.95
3	Jun-21	3260	2.93
4	Jul-21	3454	3.11
5	Aug-21	3845	3.46
6	Sep-21	3947	3.55
7	Oct-21	4845	4.36
8	Nov-21	4986	4.49

9	Dec-21	3985	3.59
10	Jan-22	4125	3.71
11	Feb-22	4532	4.08
12	Mar-22	4787	4.31
13	Total	48771	44
14	Maximum	4986	4
15	Minimum	3260	3
16	Average	4064	4

Chart No 2: Month wise CO₂ Emissions:

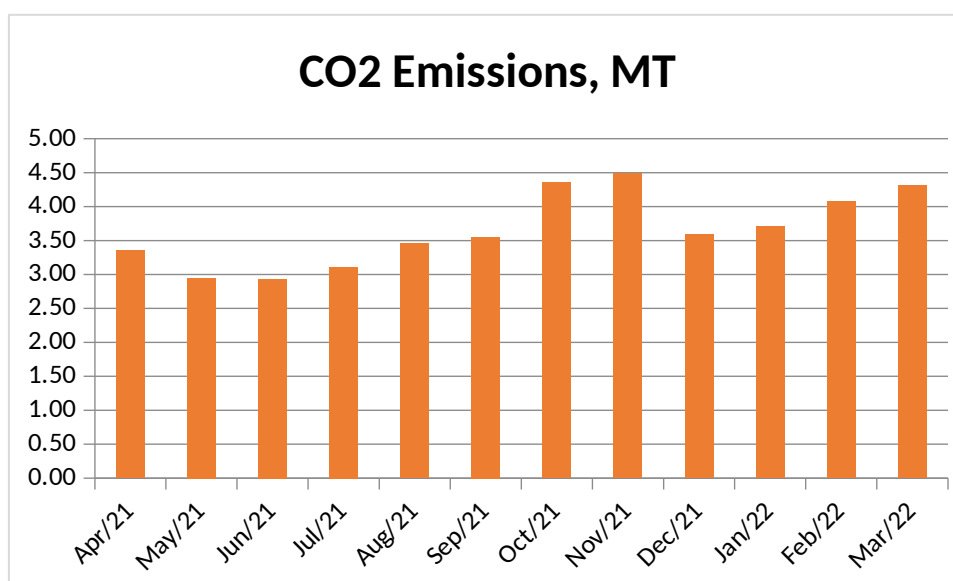


Table No 6: Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	48771	44
2	Maximum	4986	4
3	Minimum	3260	3
4	Average	4064	4

CHAPTER III

STUDY OF CO₂ EMISSION REDUCTION

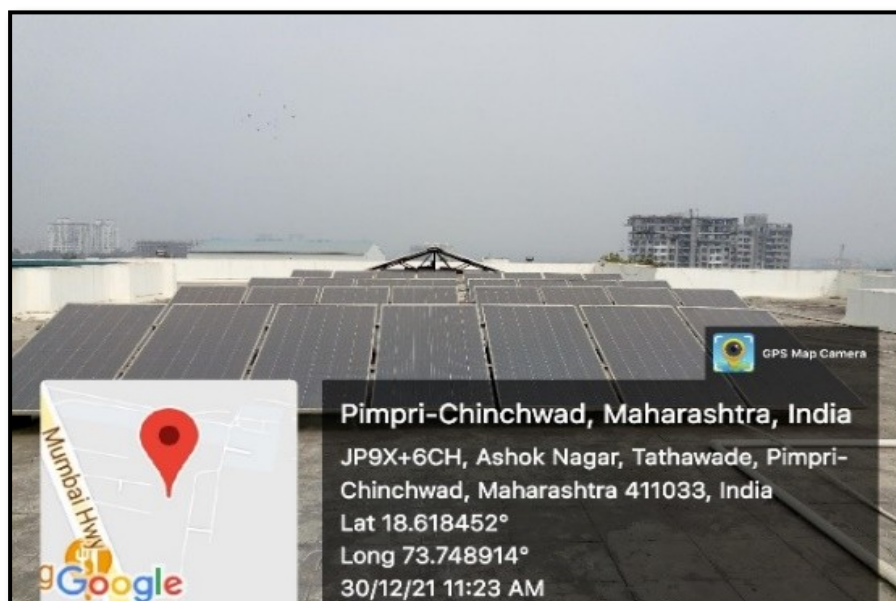
The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof TOP Solar PV Plant.

Table No 7: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22	12000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO₂ Saved by Solar PV Plant =(4)*(5) /1000	10.8	MT of CO₂

Photograph of Roof Top Solar PV Plant:



CHAPTER IV

STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Rapid urbanization and industrialization has added other elements/compounds to the pure air and thus caused the increase in pollution. In order to prevent, control and abate air pollution, the Air (Prevention and Control of Pollution) Act was enacted in 1981.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 'air pollution' has been defined as **'the presence in the atmosphere of any air pollutant.'**

As per Section 2(a) of Air (Prevention and control of pollution) Act, 1981 'air pollutant' has been defined as **'any solid, liquid or gaseous substance [(including noise)] present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment**

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population. As the AQI increases, it means that a large percentage of the population will experience severe adverse health effects. The measurement of the **AQI** requires an **air monitor** and an **air pollutant** concentration over a specified **averaging period**.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10micron

Table No 8: Indoor Air Quality Parameters:

No	Location	AQI	PM-2.5	PM-10
	Ground Floor			
1	Principal Cabin	95	52	57
2	Admin Office	94	50	54
3	Pharmaceutics III	90	48	52

	First Floor			
5	Library	96	59	67
6	Pharmaceutical analysis Lab	94	68	72
7	Preparation Room	95	70	68
8	Sick Room	97	68	70
	Second Floor			
9	Faculty Room	94	50	54
10	Boys Common Room	95	70	68
11	Class Room	99	79	82
12	Pharmacology Lab	92	68	78
	Maximum	99	79	82
	Minimum	90	48	52

CHAPTER V STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit.

The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 9: Study of Indoor Comfort Condition Parameters:

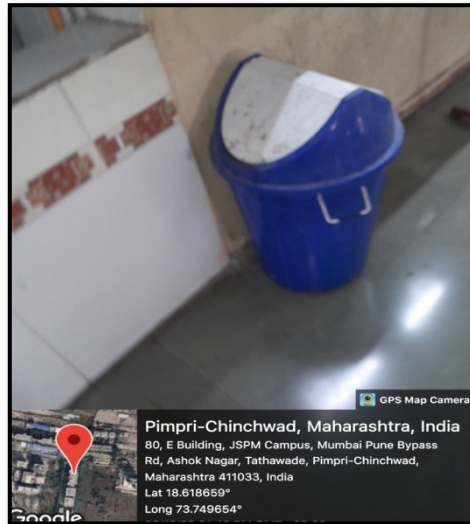
No	Location	Temperature, oC	Humidity, %	Lux Level	Noise Level, dB
	Ground Floor				
1	Principal Cabin	31.9	38	127	40
2	Admin Office	32.1	37.5	129	41
3	Pharmaceutics III	32	37.6	139	47
	First Floor				
5	Library	32.1	37.4	145	45
6	Pharmaceutical analysis Lab	32	37.5	154	47
7	Preparation Room	31.8	36.9	165	48
8	Sick Room	32	37.1	119	39
	Second Floor				
9	Faculty Room	31.7	37	111	45
10	Boys Common Room	31.9	37.2	126	46
11	Class Room	32	37	241	48
12	Pharmacology Lab	32.1	40	125	43
	Maximum	32.1	40	241	48
	Minimum	31.7	36.9	111	39

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized Agency for further action.

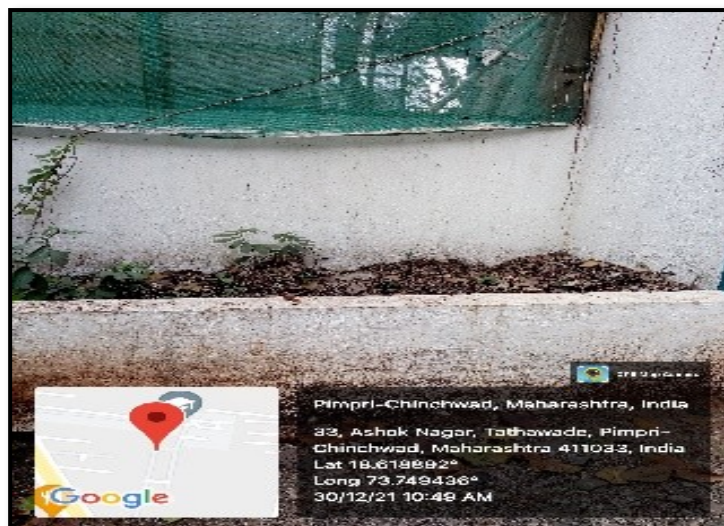
Photograph of Waste Collection Bin:



6.2 Organic Waste Management:

The Organic Waste like leafy waste is composted in a Vermi composting Plant.

Photograph of Vermi Composting Plant:



6.3 E Waste Management:

The E-Waste is disposed of through Authorized Agency.

CHAPTER-VII STUDY OF RAIN WATER HARVESTING

The College has installed the Rainwater harvesting project; the rain water falling on the terrace is collected and is used for increasing the underground water table.

Photograph of Rain water Harvesting Pipe Section:

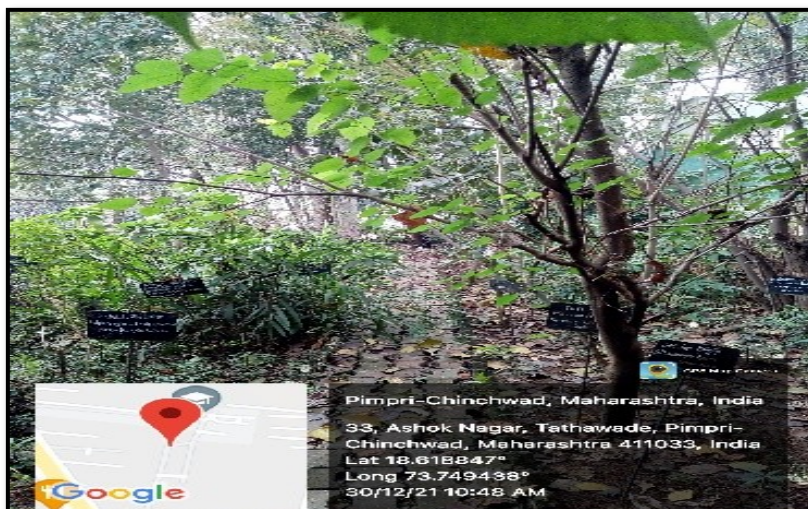


**CHAPTER-VIII
STUDY OF ENVIRONMENT FRIENDLY INITIATIVES**

8.1 Internal Tree Plantation:

The College has internal tree plantation as well as medicinal plant garden in the campus.

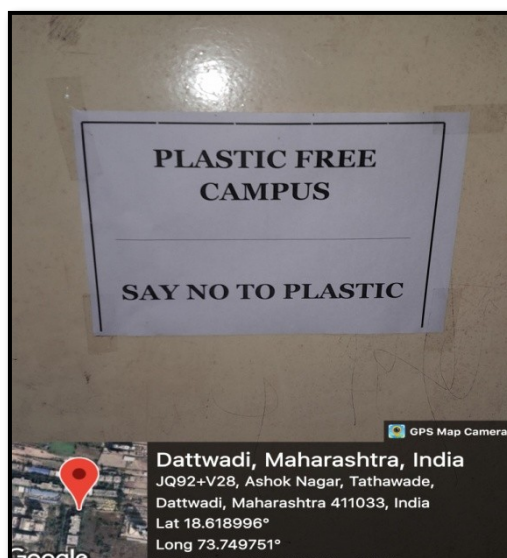
Photograph of Tree plantation:



8.2 Creation of Awareness about Plastic Free Campus:

The College has displayed posters emphasizing on importance of Plastic Free Campus.

Photograph of Poster on Plastic Ban:



ANNEXURE-I:

VARIOUS AIR QUALITY, WATER QUALITY, NOISE & INDOOR COMFORT STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

2. Recommended Water Quality Standards:

No	Designated Best Use	Criteria
1	Drinking Water Source without conventional Treatment but after disinfection	pH between 6.5 to 8.5 Dissolved Oxygen 6 mg/l or more
2	Drinking water source after conventional treatment and disinfection	pH between 6 to 9 Dissolved Oxygen 4 mg/l or more
3	Outdoor Bathing (Organized)	pH between 6.5 to 8.5 Dissolved Oxygen 5 mg/l or more
4	Controlled Waste Disposal	pH between 6 to 8.5

3. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

4. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33°C
2	Humidity	Less Than 70%

GREEN AUDIT REPORT

of

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Engress Services, Pune

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Page 23



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ASSOCHAM GEM Certified Professional: GEM: 22/788

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7. Green & Sustainable Initiatives

- Maintenance of good Internal Road
- Internal Tree Plantation & Medicinal Plant Garden
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- Display of Posters on Plastic Ban

8. Assumptions:

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9. References:

- For CO₂ Emissions: www.tatapower.com
- For Roof Top Solar Energy generation: www.solarrooftop.gov.in

ABBREVIATIONS

BEE	Bureau of Energy Efficiency
kWh	Kilo Watt Hour
LPD	Liters Per Day
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity

CHAPTER-I

INTRODUCTION

1.1 Objectives:

8. To study present Energy Consumption
9. To Study CO₂ emissions
10. To study usage of Renewable Energy
11. Study of Waste Management
12. Study of Rain Water Harvesting
13. Study of Green & Sustainable Practices

1.2 General Details of College: Table No 1:

No	Head	Particulars
1	Name of Institution	Jayawant Shikshan Prasarak Mandal's Rajarshi Shahu College of Pharmacy & Research,
2	Address	Tathawade, Pune 411 033
3	Affiliation	Savitribai Phule Pune University

1.3 Google Earth Image:



CHAPTER-II

STUDY OF PRESENT ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills

Table No 2: Electrical Bill Analysis- 2021-22:

No	Month	Energy Purchased, kWh
1	Apr-21	3727
2	May-21	3278
3	Jun-21	3260
4	Jul-21	3454
5	Aug-21	3845
6	Sep-21	3947
7	Oct-21	4845
8	Nov-21	4986
9	Dec-21	3985
10	Jan-22	4125
11	Feb-22	4532
12	Mar-22	4787
13	Total	48771
14	Maximum	4986
15	Minimum	3260
16	Average	4064

Chart No 1: Variation in Monthly Energy Consumption:

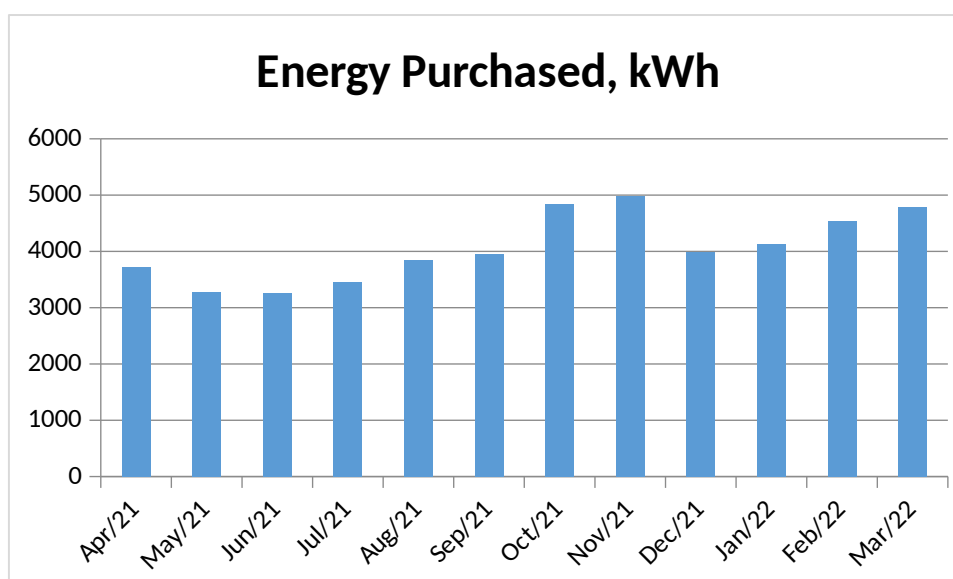


Table No 3: Important Parameters:

No	Parameter/	Energy
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	Variation	Consumed, kWh
1	Total	48771
2	Maximum	4986
3	Minimum	3260
4	Average	4064

CHAPTER III

STUDY OF CARBON FOOTPRINTING

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy are as under

- **1 kWh** of Electrical Energy releases **0.9 Kg of CO₂** into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 4: Month wise CO₂ Emissions:

No	Month	Energy Purchased, kWh	CO ₂ Emissions, MT
1	Apr-21	3727	3.35
2	May-21	3278	2.95
3	Jun-21	3260	2.93
4	Jul-21	3454	3.11
5	Aug-21	3845	3.46
6	Sep-21	3947	3.55
7	Oct-21	4845	4.36
8	Nov-21	4986	4.49
9	Dec-21	3985	3.59
10	Jan-22	4125	3.71
11	Feb-22	4532	4.08
12	Mar-22	4787	4.31
13	Total	48771	44
14	Maximum	4986	4
15	Minimum	3260	3
16	Average	4064	4

Chart No 2: Month wise CO₂Emissions:

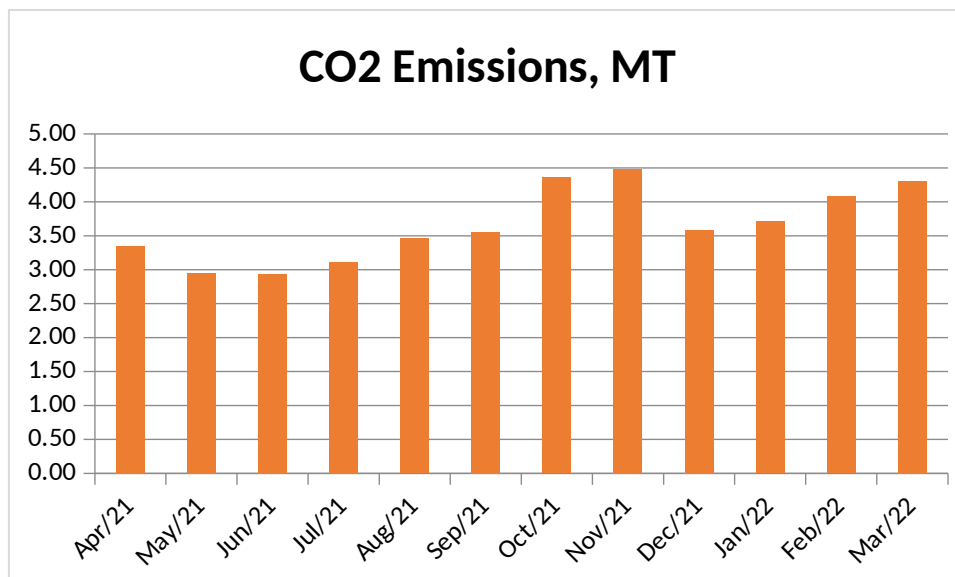


Table No 5: Variation in Important Parameters:

No	Parameter/ Value	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Total	48771	44
2	Maximum	4986	4
3	Minimum	3260	3
4	Average	4064	4

CHAPTER IV

STUDY OF USAGE OF RENEWABLE ENERGY

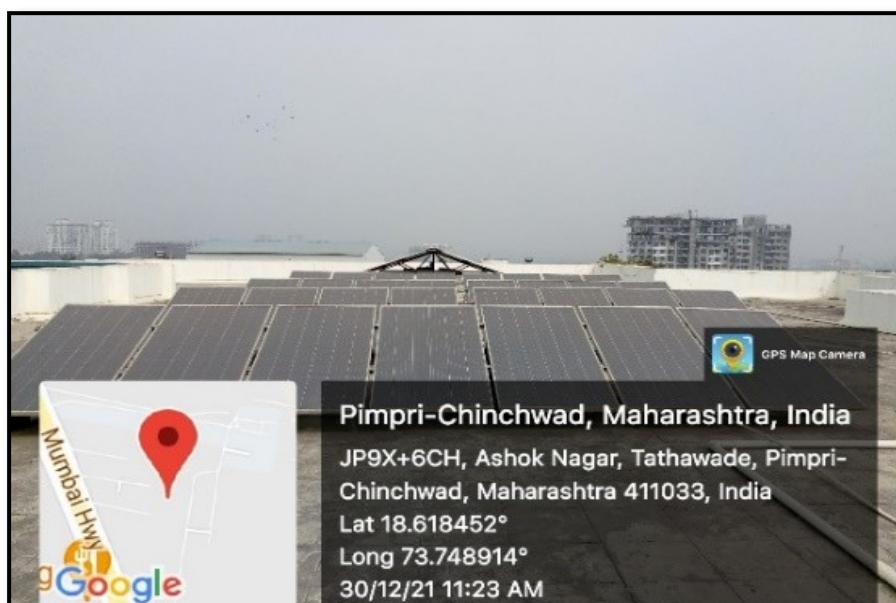
The College has installed Roof Top Solar PV Plant of Capacity **10 kWp**.

In the following Table, we compute the Annual Reduction in CO₂ Emissions due to installation of Roof Top Solar PV Plant.

Table No 6: Computation of Annual Reduction in CO₂ Emissions:

No	Particulars	Value	Unit
1	Installed Capacity of Roof Top Solar PV Plant Capacity	10	kWp
2	Energy Generated in per kWp	4	4 kWh/kWp
3	Annual Solar Energy generation Days	300	Nos
4	Energy Generated in the Year: 21-22	12000	kWh
5	1 kWh of Electrical Energy saves	0.9	Kg/kWh
6	Qty of CO₂ Saved by Solar PV Plant = (4)*(5) /1000	10.8	MT of CO₂

Photograph of Roof Top Solar PV Plant:



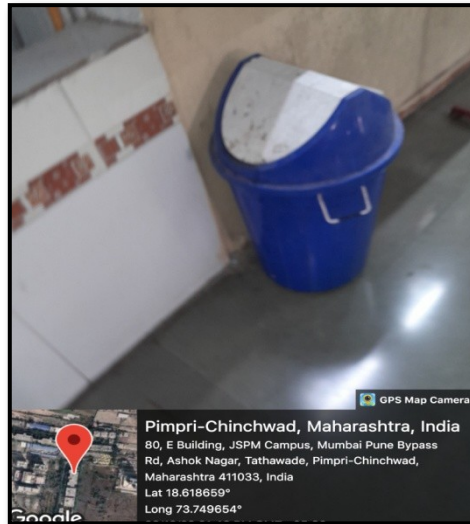
CHAPTER V

STUDY OF WASTE MANAGEMENT

5.1 Segregation of Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source and is handed over to Authorized Agency for further action.

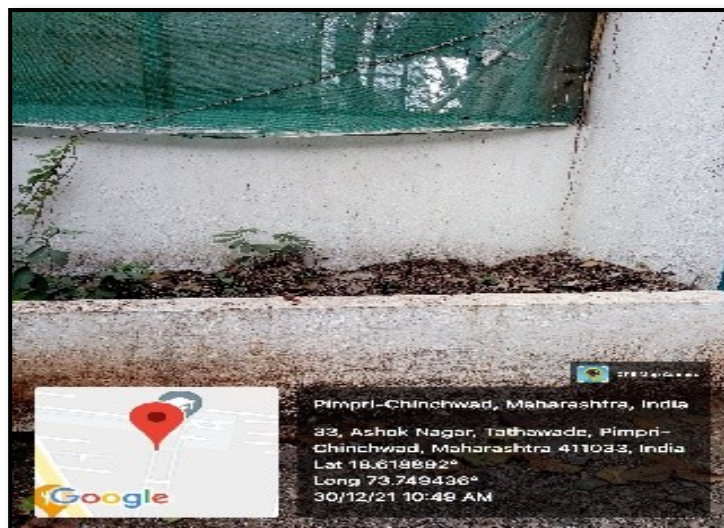
Photograph of Waste Collection Bin:



5.2 Organic Waste Management:

The Organic Waste like leafy waste is composted in a Vermi composting Plant.

Photograph of Vermi Composting Plant:



5.3 E Waste Management:

The E-Waste is disposed of through Authorized Agency.

CHAPTER-VI

STUDY OF RAIN WATER HARVESTING

The College has installed the Rainwater harvesting project; the rain water falling on the terrace is collected and is used for increasing the underground water table.

Photograph of Rain water Harvesting Pipe Section:



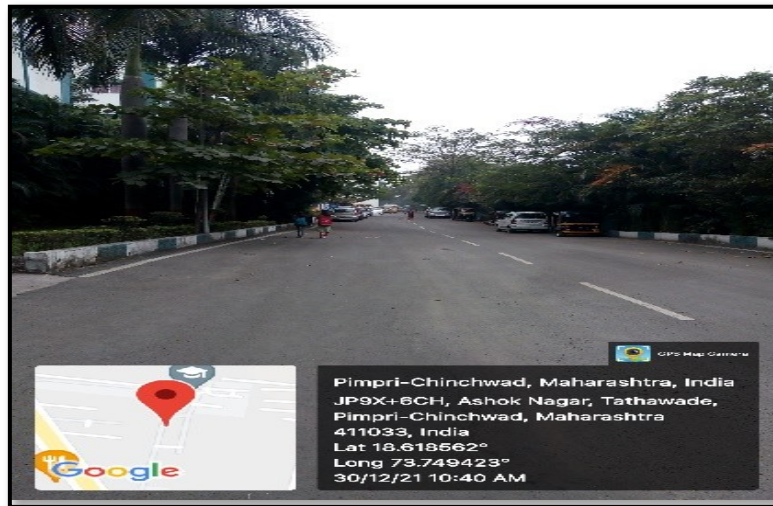
CHAPTER-VII

STUDY OF GREEN & SUSTAINABLE PRACTICES

7.1 Pedestrian Friendly Roads:

The College has well maintained internal road to facilitate the easy movement of the students within the campus.

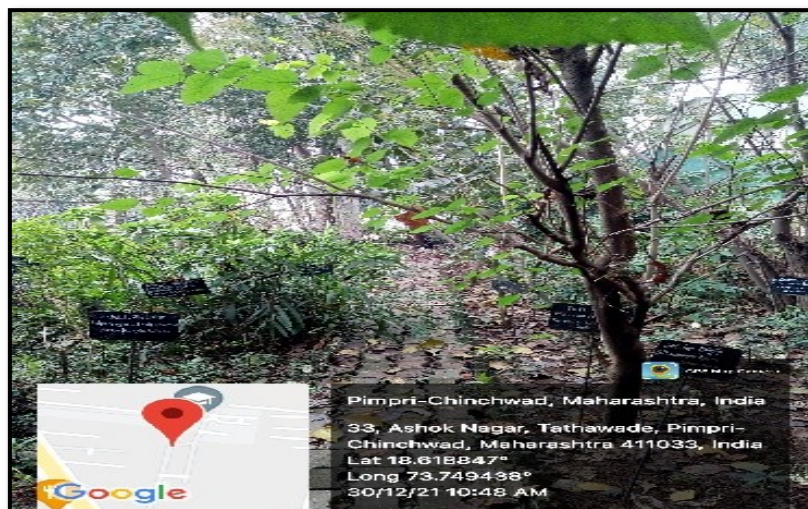
Photograph of Internal Road:



7.2 Internal Tree Plantation:

The College has internal tree plantation as well as medicinal plant garden in the campus.

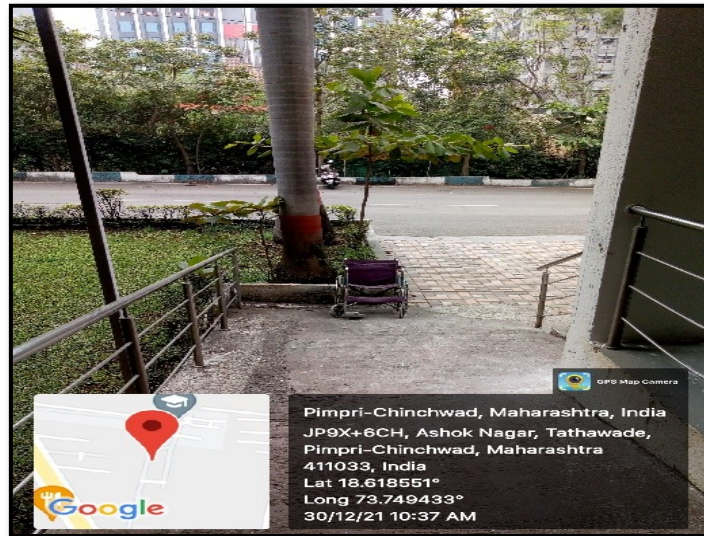
Photograph of Tree plantation:



7.3 Provision of Ramp:

For easy movement of Divyangjan, the College has made provision of Ramp at the main entrance.

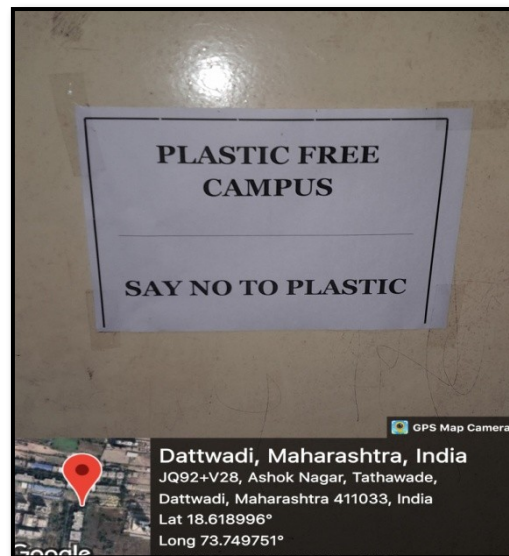
Photograph of Ramp:



7.4 Creation of Awareness about Plastic Free Campus:






The College has displayed posters emphasizing on importance of Plastic Free Campus.







Photograph of Poster on Plastic Ban:








ANNEXURE-1:






LIST OF MEDICINAL PLANTS IN THE CAMPUS:**List of Medicinal Plants in the campus:**






Sr. No.	Common Name	Botanical Name	Chemical Constituent	Medicinal Uses	Plants photo
<u>ROW- A</u>					
A1	Tulsi tulaSaI	<i>Ocimum sanctum</i> Labiatae	Eugenol, nerol, α -selinene, α and β -pinene, Camphor, carvacrol, Cineole	Expectorant, bronchitis, Stomachic, Carminative, Stimulant, Flavouring agent	
A2	Brahma Kamal ba`mh kmaL	<i>Saussurea obvallata</i> Asteraceae	Alkaloids, glycosides	Hepatoprotective, intestinal ailments, cough/cold and urinary tract problems. antiseptic	
A3	Adulsa AaDuLs aa	<i>Adhatoda vasica</i> Acantheceae	Vasicine , Quinazoline alkaloid	Antitussive	
A4	Ghaytal Qaayapa t	<i>Agave sisilana</i> Asparagaceae	Isoflavonoid, alkaloids, coumarin and vitamins B1, B2, C, D and K, and provitamin A.	Ulcers, stomach inflammation, tuberculosis, jaundice, syphilis and menstrual problems	
A5	Black Nirgundi inargau MDI	<i>Vitex nirgundo</i> Verbaniceae	p-hydroxybenzoic acid and D-Fructose	Muscle relaxant, pain relieving, anti mosquito, anti anxiety, anti asthma	




A6	Kadamb kdMba	<i>Neolamarckia kadamba</i> Rubiaceae	Indole alkaloids, terpenoids, sapogenins, saponins, Terpenes.	Ornamental	
A7	Khus Ksa	<i>Vetiver zizanoid</i> Poaceae	Vetiverol, furfurol, a and b-vetivone, vetivene and vetivenylvetiven ate	Rheumatism, arthritis, gout, muscular aches, dryness and cracking of skin.	
A8	Inulin nauilana	<i>Chamaecostus cuspidatus</i> Compositae	Ascorbic acid, α -tocopherol, β - carotene, Amino acid	Anti-Diabetes, Hypolipidemic	
A9	White Jaswand paMZra jaasvaM d	<i>Hibiscus arnottianus</i> Malvaceae	Mucilage & Tannins, anthocyanins and proanthocyanidi ns	Ornamental, Dipression, Hair care Preparations	
A10	Red Jaswand laala jaasvaM d	<i>Hibiscus rosasinensis</i> Malvaceae	Anthocyanins, citric, malic and tartaric acids and unique hydroxycitric acid	Ornamental, Iron deficiencies skin & hair care Preparations	
A11	Dressinia	<i>Dracaena eclipta</i> Asparagaceae	glyceroglycolipi d	ornamental	


A1 2	Kanher knhor	<i>Nerium indicum</i> Apocynaceae	Glycoside, scopoline	Ornamental, Anti-cancer	
A1 3	Galfemia gaurma r	<i>Galphimia glauca</i> Malpighiaceae	galphimine A to galphimine E	Hayfever, anxiety asthma, bloody diarrhea, fever, seizures	
A1 4	Khair KOr	<i>Senegalia catechu</i> Fabaceae	Catechutannic acid, catechin	Sore throats , diarrhoea	
A1 5	Ficus Mbar	<i>Ficus benjamina</i> Moraceae	chlorogenic <i>p</i> - coumaric ,feruli c acids	antimicrobial, antinociceptive, antipyretic, hypotensive, anti-dysentery	
A1 6	White Chanfa paMZra caafa	<i>Plumieria scop</i> Apocyanaceae	Iridoids (fulvoplumierin, allamcin and allamandin)	Purgative, cure of Itching Cytotoxic activity	







Sr. No.	Common Name	Botanical Name	Chemical Constituent	Uses	Plants photo
<u>ROW B</u>					





B1	Rose gaulaaba	<i>Rosa damascene</i> Rosaceae	Geraniol, β damascenone, β damascone, β ionone, rose oxide	Antibacterial, antiseptic, and anti- inflammatory, reduces asthma, dehydration, , dermatitis, eczema.	
B2	Sadaphuli sadafulaI	<i>Catharanth us roseus</i> Apocyanac eae	Vincristin, vinblastin	Anticancer	
B3	Curry leave kDIp%ta	<i>Murraya koenigii</i> Rutaceae	Mahanimbine, girinimbine, koenimbine, isomahanine	Anti diabetic, hair growth preparations	
B4	Tuti tutI	<i>Morus alba</i> Moraceae	Kuwanon G, Albanol A, Moracin M,	Hypolipidemic, Antihyperglycemi c, antioxidant, antibacterial, Dental care	
B5	Furfuria	<i>Tephrosia elongata</i> Fabaceae	Tephrosin, diguelin, isotephrosin,rote none(rotenoid), phytosterols,	Diuretic, bronchitis, wounds healing, boils, pimples, asthma, hepatoprotective	



B6	Jambhul jaaMbauL	<i>Syzygium cumini</i> Myrtaceae	Aconitine is an diterpene alkaloid Vitamins, Minerals, Fat and protein	Diabetes, digestive ailments	
B7	Clove lavaMga	<i>Eugenia caryophyllu s</i> Myrtaceae	Eugenol	Dental analgesic, spice	
B8	Cinnamon dalaicanaI	<i>Cinnamomu m zeylenicum</i> Lauraceae	Cinnamyl acetate, trans- abergamotene, caryophyllene oxide, Vitamin A, Vitamin C	Carminative , morning sickness, diarrhea, antifungal, cough & cold	
B9	Kachnar kcanaar	<i>Bauhinia lobules</i> Fabaceae	Terpenoids, flavonoids- kaempferol, ombuin, lupeol, and betasitosterol	Leprosy, intestinal worms, anti-bacterial, anti-fungal, antimalarial, haemorrhoids	
B10	Mogara maaogara	<i>Jasminum sambac</i> Oleaceae	sambacoside A, sambacolingosid e A, 7,11- dimethyloleoside , molihuaside D,	anti-depressant, antiseptic, vasodialatory effect, aphrodisiac, expectorant, anti-spasmodic	



B11	Moha maaoha	<i>Madhuca longifolia</i> Sapotaceae	Flavonoids, Triterpene, Sterol, Resin, Ascorbic acid	Rheumatoid arthritis, cholera, paralysis, snake- bite, tonsillitis, influenza & piles	
B12	Neembu inaMbau	<i>Citrus limon</i> Rutaceae	Pectin, Vitamin- C	Rich source of vitamin C which prevents scurvy, the peel is used as a source of pectine, facial & hair cleanser	
B13	Nilgiri inalagaIrI	<i>Eucalyptus globules</i> Myrtaceae	Eucalyptol(1,8- cineol), α - pinene, pinocarveol, α - pinene,	Antibacterial, antifungal, analgesic, anti- inflammatory, antioxidative, antiviral	







Sr. No.	Commo n Name	Botanical Name	Chemical Constituent	Uses	Plants photo
<u>Row C</u>					
C1	Morpank hi maaorpM KI	<i>Thuja occidentalis</i> Cupressacea e	Thujone,	Cleansers in hair preparations, insecticides, lini ment, Preparation of room sprays and soft soaps, disinfectant.	





C2	Ajwain Aaovaa	<i>Trachyspermum ammi</i> Apiaceae	Thymol, terpinene, cymene	Carminative, flatulence	
C3	Galfemia maQauna aiSanaI	<i>Galphimia glauca</i> Malpighiaceae	Galphimine A to galphimine E	Hayfever, anxiety asthma, bloody diarrhea, fever & seizures	
C4	Aswagan dha AaSvaga MQaa	<i>Withania somnifera</i> Solanaceae	Widanoloids, steroidal lactones	Arthritis, anxiety	
C5	Adulsa AaDuLsa a	<i>Adhatoda vasica</i> Acanthaceae	Vasicine, a quinazoline alkaloid	Antitussive	
C6	Ilaychi ivalaayac aI	<i>Elettaria cardamomum</i> Zingiberaceae	α-terpineol , myrcene , limonene , menthone , β-phellandrene , 1,8-cineol , sabinene & heptane	Carminative, flavouring agent	
C7	Gavati Chaha	<i>Cymbopogon</i>	Cymbopogian	Pesticide and a preservative	

	gaavaTI caafa	<i>flexusus</i> Apocyanace ae			
C8	Nirgundi inargauM DI	<i>Vitex nirgundo</i> Verbaniceae	p- hydroxybenzoi c acid and D-Fructose	Muscle relaxant, pain relieving, anti mosquito, anti anxiety, anti asthma	
C9	Mogara maaogara	<i>Jasminum sambac</i> Oleaceae	sambacoside A, sambacolingos ide A, 7,11- dimethyloleosi de	Anti-depressant, antiseptic, vasodialatoryeffe ct, aphrodisiac, expectorant, anti-spasmodic	
C1 0	Aritha irza	<i>Sapindus delavayi</i> Sapindaceae	Saponins	Soaps and shampoos ,Folk medicine, Insecticide	
C1 1	Khus Ksa	<i>Vetiver zizanoid</i> Poaceae	Vetiverol, furfurol, a and b-vetivone, vetivene and vetivenyl vetivenate	Rheumatism, arthritis, gout, muscular aches, dryness & Cracking of skin.	

C1 2	Mango AaMbaa	<i>Mangifera indica</i> Anacardiaceae	Xanthonoid-Mangiferin, Carotenoid-Provit. A, β-Carotene, Lutein Catechin & Tannins	Leaves used for diabetes, Improves eye health, Fight heat stroke	
C1 3	Pimpal ipMpL	<i>Ficus religiosa</i> Moraceae	Flavonoids, quercetin, campesterol	Epilepsy, diabetes, asthma	

Sr. No.	Common Name	Botanical Name	Chemical Constituent	Uses	Plants photo
Row D					
D1	Gulvel gauLvaola	<i>Tinospora cordifolia</i> Menispermaceae	Diterpenes, Tinosporasidepalmatin, Berberine, cordifolioside A&B	Antipyretic, Anticancer, Antiulcer, Immunostimulant, Antihepatitis, Antioxidant, Hypoglycaemic	
D2	Mix spice lavaMga	<i>Syzygium aromaticum</i> Myrtaceae	Flavonoid seugenin, kaempferol, Rhamnetin, and eugenitin, stigmasterol, and	Antioxidant, Antiseptic, local anesthetic, anti-inflammatory, rub-efacient, carminative	

			campesterol		
D3	Mehendi maohM dI	<i>Lawsonia inermis</i> Lythraceae	Lawsone, mannitol, tannic acid, flavanoid, terpenoid & steroid	Rheumatic and arthritic pains, jaundice, various skin disorders	
D4	Chanfa caafa	<i>Plumieria obtus</i> Apocyanaceae	Iridoids (fulvoplumierin , allamcin and allamandin)	Purgative, cure of Itching, Cytotoxic activity	
D5	Kamini kaimana I	<i>Murraya Paniculata</i> Rutaceae	Coumarins, phenols, terpenoids to flavonoids	Stimulant and astringent, diarrhoea and dysentery	
D6 & D7	Neembu inaMba u	<i>Citrus limon</i> Rutaceae	Pectin, Vitamin-C	Vitamin C source , antioxidant	
D8	Vekhan d vaoKM D	<i>Acorus calamus</i> Araceae	Acorone	Relieve flatulence, Mild diuretic	
D9	Panfuti panafuT I	<i>Bryophyllum pinnatum</i> Crassulaceae	Bersaldegenin- 3-acetate and bryophillin C	Cardiac disease. Treatment of a cough, asthma, cold with candy sugar. treat high blood pressure	

D1 0	Jambhul jaaMba uL	<i>Syzygium cumini</i> Myrtaceae	Aconitine is an diterpene alkaloid Vitamins,	To control diabetes., digestive ailments	
D1 1	Cinnam on dalaican aI	<i>Cinnamomum zeylenicum</i> Lauraceae	Cinnamyl acetate, trans- α -bergamotene, caryophyllene oxide, Vitamin A, Vitamin C	Carminative , morning sickness, diarrhea, antifungal, cough & cold	
D1 2	Prajkta pairjaat	<i>Nyctanthes arbortristis</i> Oleaceae	D-mannitol, β -sitosterol, flavanol glycosides, astragalin, nicotiflorin	Antianthelmentic, Arthritis	
D1 3	Neem naIma	<i>Azadiracta indica</i> Meliaceae	Azoderone, Nimbin, Nimbidin	Antibacterial, Natural pesticide	
D1 4	Babul baaBau L	<i>Acacia arabica</i> Leguminoseae	Arabin	Demulsant, Emulsifying agent	