

NAAC REACCREDITED - 'A' GRADE

SIES COLLEGE OF ARTS, SCIENCE AND COMMERCE, (AUTONOMOUS), SION (W), MUMBAI -400 022

NAAC SSR - CYCLE 4: 2018-2023

Metric No.7 : 7.1.3: Facilities in the institution for the management of Degradable and Non-degradable waste

| Document name | Page numbers |
|-------------------------------|--------------|
| 1. Reports & Photos (2020-21) | 2 |
| 2. Reports & Photos (2021-22) | 12 |
| 3. Reports & Photos (2022-23) | 18 |

*This criteria included in 2020-21. Therefore, the reports have been submitted from 2020-21 onwards.

This is to certify that the attached documents have been verified and found to be true.

Principal
SIES College of Arts, Science &
Commerce (Autonomous)
Sion (West), Mumbai - 400 022.

Principal

SIES COLLEGE OF ARTS, SCIENCE AND COMMERCE, (AUTONOMOUS)Sion-w, Mumbai

Report: Waste Management measures

During the year 2020-21, the campus was closed for students and teachers due to a lockdown situation. The canteen and laboratories were not functional. Hence the amount of various types of wastes generated was negligible or nil. There was no laboratory waste or canteen wet waste generated.

Following are the procedures used during normal years when the campus, canteen and labs are functional

| Sr. | Type of Waste | Method of Disposal |
|-----|--|---|
| No | | |
| 1 | Dry waste and wet waste | Separate bins are provided to collect dry and wet waste |
| 2 | Laboratory Solid waste : Broken glassware waste, Paper and Plastic waste | Segregated and disposed off in separate bin |
| 3 | Laboratory Liquid wastes | Diluted before discarding |
| 4 | Laboratory Strong acids | Neutralized before discarding |
| 5 | Laboratory Carcinogenic chemicals like Ethidium bromide | Disposed after treating it with Potassium Permanganate |
| 6 | Laboratory Bacterial cultures | Autoclaved and then disposed |
| 7 | Laboratory Biomedical wastes Blood and Blood products | Treated with dettol/savlon, taped in RED and disposed |
| 8 | Laboratory Animal waste (Fish, Prawns etc) | These are packaged and disposed immediately on the same day to avoid putrefaction. |
| 9 | E-waste | NSS and NCC units of the college regularly organise e-waste collection drive. |
| 10 | Waste Recycling | The Department of Bioanalytical Sciences is planning to implement steps for establishing a waste recycling system in the institution. |

Annexure: Photos of the waste management measures





Annexure:

Photographs duly endorsed by the Principal as COVID19 lockdown restricted the capture of geotagged images (7.1.3)











MUMBAI 400 022

AQAR - Criteria 7 - 2020-21

SIES COLLEGE OF ARTS, SCIENCE AND COMMERCE (AUTONOMOUS), SION WEST, MUMBAI - 400 022

DEPARTMENT OF BIOTECHNOLOGY

A. Title of the Seminar/Workshop/Conferences:

BARC technologies for solid waste management through biological route

B. Background:

Proper management of waste is important for building sustainable and liveable cities, but it remains a challenge for many developing countries and cities. Areas with developing economies often experience exhausted waste collection services and inadequately managed and uncontrolled dumpsites. Thus, commemorating 75th Year of India's Independence, "Azadi Ka Amrut Mahotsav", Bhabha Atomic Research Centre (BARC), Mumbai jointly organized a webinar on "BARC technologies for solid waste management through biological route" with SIES College of Arts, Science & Commerce College (Autonomous), Mumbai (Sponsored by Department of Atomic Energy (DAE), Government of India)

C. Aims/Objectives:

The webinar had three eminent speakers enlightening the audience on different waste management topics. The main objective of the webinar series was to introduce the participants to:

- 1. Biomethanation technologies for processing cow dung to Biomass waste with reference to Nisargruna technology
- 2. Food Mile/water footprint of food
- 3. Different composting technologies for biodegradable waste with reference to Rapid composting technology of BARC

D. Location:

The program was conducted using the online platform MS Teams. It was followed by a question-answer session between the resource person and participants.

E. Target audience/participants with expected number:

64 Undergraduate and postgraduate students

F. Details of Sessions:

The session was held on Saturday, 28th August 2021 between 3:00 - 5:00 pm



G. Session and names of Resource Persons:

The webinar had three independent sessions delivered by eminent speakers:

| Sr. No. | Title | Speaker & affiliation |
|---------|---|---|
| 1. | Overview of Biomethanation technologies | Dr. Sayaji Mehetre, |
| | for processing cow dung to Biomass waste | Scientific Officer F, Nuclear Agriculture |
| | with reference to Nisargruna technology | Biotechnology Division, BARC, Mumbai |
| 2. | Food Mile water footprint of food | Dr. Sachin Mandavgane, |
| | | Associate Professor, Department of |
| | | Chemical Engineering, VNIT, Nagpur |
| 3. | Overview of different composting | Dr. Darshana Salaskar, |
| | technologies for biodegradable waste with | Scientific Officer E, Nuclear Agriculture |
| | reference to Rapid composting technology | Biotechnology Division, BARC, Mumbai |
| | of BARC | |

H. Expected outcome:

The feedback of participants stated that they found the session to be immensely insightful and informative. The participants were made aware of recent topics like water foot-printing.

The program helped them to understand:

- 1. Water footprint of various commodities
- 2. Various biological technologies used for biodegrading wastes and biomass processing
- 3. Nisarguna Technology and Promoting sustainability and recycling to reduce waste

Dr. Tara Menon

28.08.2021

Co-ordinator

Department of Biotechnology

MUMBAI AUD 022

Principal
SIES College of Arts, Science &
Commerce (Autonomous)
Sion (West), Mumbai - 400 022.

Annexures 1: Detail of the Resource persons

- Dr. Sayaji Mehetre has been working as a Scientific Officer at the Nuclear Agriculture and Biotechnology Division, BARC, Mumbai since 1999. His education qualification includes a PhD in Microbiology from Mumbai University in the year 2008. He completed his Masters in Agriculture from Mahatma Phule Agriculture University, Rahuri in 1996. He was a visiting Scientist at Northern Illinois University, United States of America (USA) during the year 2011- 2012. Sir, has about 50 research papers published journals of national and international repute and he has authored popular articles in national newspapers. Also, Dr. Mehetre is an editorial board member and reviewer of many scientific Journals. He has 03 patents to his credit and has developed 08 technologies which are widely used by industries and farmers across the country. He has been acknowledged by various awards like Government of India DBT-CREST Award (2011), Department of Atomic Energy (DAE) Group achievement Award (2010 & 2015) as well as Dr. E. J. Wevai Memorial Award (1995) as a university topper.
- Dr Sachin Mandavgane is an Associate Professor and Head of Chemical Engineering Department at the Visvesvaraya National Institute of Technology, Nagpur. He obtained his B. Tech degree in chemical engineering from LIT Nagpur in year 1999 followed by a Ph. D in chemical engineering from the same institute in 2008. His research specialization includes biomass and waste utilization, bio refinery, sustainable engineering and scientific validation of traditional sciences. He has the authored around 125 publications with 2450 citation and h-index 27. He has produced 9 PhDs and has 7 patents to his credit. He has also developed an innovative process of making light weight and thermal insulating construction material using paper mill waste. His technology of making ultra-fine powder neem bio pesticide is purchased by 20+ companies till now. He has designed and commissioned a potato peel biorefinery plant which is the first of its kind globally. His process of on-farm paddy straw digestion to manure has been successfully commercialized in West UP. He also offers consultancy to industries to perform Life Cycle Assessment. Dr. Sachin is an advisor (for Innovation) to corporate houses like Merino Industries Ltd and is a coordinator of Grassroot Innovation Center. He mentors startups like Sus-Tech Solutions working in the area of sustainably issues. He also offers a course 'Innovative Design' to nurture open and inclusive innovation. He is among the first few in India to develop a credit course on 'Sustainable Engineering'.
- Dr. Darshana Salaskar joined Bhabha Atomic Research Centre in the year 1996. She completed her Masters in Biochemistry and Ph.D in Microbiology from Mumbai University. She is currently designated as Scientific Officer E in the Nuclear Agriculture and Biotechnology Division. Her area of research includes Environmental Microbiology, Bioremediation of heavy metals and waste management. She has 30 research publications, 2 book chapters and one technology on Rapid bio-composting which is published in the BARC website to her credit. She has received the Department of Atomic Energy, Group Achievement Award in the year 2017, for Excellence in Science, Engineering and Technology.



BARC technologies for solid waste management through biological route 2020-2021

Annexures 2: List of Participants

| Timestamp | Full Name |
|---------------------|----------------------------|
| 28/08/2021 17:19:49 | Randeep Nain |
| 28/08/2021 17:21:08 | Jyothika Murugan |
| 28/08/2021 17:21:23 | Bhakti Jadhav |
| 28/08/2021 17:21:24 | Jennifer Francis Nadar |
| 28/08/2021 17:21:36 | Shweta Vishwakarma |
| 28/08/2021 17:21:45 | Makardhwaj Rajendra Narkar |
| 28/08/2021 17:21:50 | Jesal Mahendra Vora |
| 28/08/2021 17:21:57 | Sharanya Shankar |
| 28/08/2021 17:21:58 | Ramsha Shaikh |
| 28/08/2021 17:22:01 | MANALI SHAILESH PRADHAN |
| 28/08/2021 17:22:06 | Rithik Naidu |
| 28/08/2021 17:22:26 | KARISHMA MANOJ ANAM |
| 28/08/2021 17:22:34 | Tamanna Timir Mandal |
| 28/08/2021 17:22:48 | Aditya Ravi Shetty |
| 28/08/2021 17:22:51 | Bushra Khan |
| 28/08/2021 17:23:02 | Mansi Rawat |
| 28/08/2021 17:23:41 | Pooja Jain |
| 28/08/2021 17:23:53 | Jemema Agnes Tripena Raj |
| 28/08/2021 17:24:11 | Mahek Jatin Parmar |
| 28/08/2021 17:24:23 | Siddharth mudliyar |
| 28/08/2021 17:24:33 | Alex Jose |
| 28/08/2021 17:24:35 | Sayli Keshav Dabhade |
| 28/08/2021 17:24:41 | Krishna Polisetti |
| 28/08/2021 17:25:00 | Niveditha Narayanan |
| 28/08/2021 17:25:02 | Chirag Mansukh Kothari |
| 28/08/2021 17:25:12 | Sheikh Ali Ahmed |
| 28/08/2021 17:25:15 | Shilpa Sivadas |
| 28/08/2021 17:25:18 | Susan Samuel Martin |
| 28/08/2021 17:25:23 | Liza Fernandes |
| 28/08/2021 17:25:23 | Kunali Ajay Ambavale |
| 28/08/2021 17:25:23 | Omkar Vijay Yadav |
| 28/08/2021 17:25:24 | Kajal Chandrajit Yadav |
| 28/08/2021 17:25:24 | Sakshi Gupta |



| 28/08/2021 17:25:26 | Grishma Pillai |
|---------------------|--------------------------------|
| | SHAIKH SIMRAN HUSSAIN |
| | Harshitha Sunder Shetty |
| 28/08/2021 17:25:35 | |
| | Harikrishna Rajendr Salla |
| 28/08/2021 17:25:48 | - |
| | Niharika Milind Rahate |
| 28/08/2021 17:25:53 | |
| 28/08/2021 17:25:59 | |
| | |
| | Bhagyashree Ramachandra Gubber |
| | Ayesha Ravindra Shedge |
| 28/08/2021 17:26:13 | |
| | Diksha Gajanan Shetti |
| 28/08/2021 17:26:58 | |
| 28/08/2021 17:26:58 | |
| | Sneha Anbalagan Dever |
| | Riddhi Vikas Mhatre |
| | Sonali Rajesh Jaiswal |
| 28/08/2021 17:27:27 | Shaikh Amaan Ansar |
| 28/08/2021 17:27:30 | Nair Haritha Ramesan |
| 28/08/2021 17:27:44 | Ankita Tharakan |
| 28/08/2021 17:27:53 | Anandita Ghorpade |
| 28/08/2021 17:28:05 | Gupta Sheetal Mahesh |
| 28/08/2021 17:28:05 | Rukmani Ramsingasan Bhagat |
| 28/08/2021 17:29:02 | Khan Yusra Mohammed Asif |
| 28/08/2021 17:29:19 | Mamta Sathaiah Yarukala |
| 28/08/2021 17:29:24 | NIKITA LAVKUSH MISHRA |
| 28/08/2021 17:30:30 | Omkar Sundeep Wakale |
| 28/08/2021 17:30:34 | Shaikh Misba Mohd Farid |
| 28/08/2021 17:30:38 | ONKAR HARIPANT KARAJGIKAR |
| 28/08/2021 17:32:29 | Manav Patel |
| 28/08/2021 17:37:13 | Neha Sandeep Gaonkar |
| 28/08/2021 17:44:33 | Vaishnavi Mahalingam |
| 1 | |



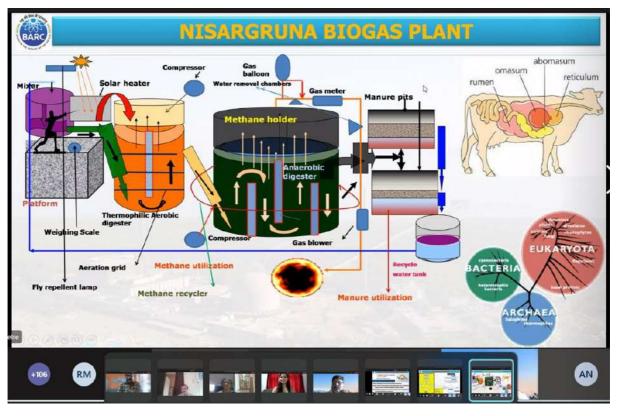
Annexures 3: Photographs of Seminar/Workshop

















Dr. Tara Menon Co-ordinator Department of Biotechnology

MUMBAI 400 022 Sion (West), Mumbai - 400 022.

28.08.2021

BARC technologies for solid waste management through biological route_2020-2021

Report: Waste Management measures

As part of our Green Initiatives and implementing measures towards Zero-waste Campus, efforts are being taken to keep the campus environmentally sustainable by staff and students. Attempts are made to reduce the consumption of water and other resources, as well as to reduce creating waste of all kinds. Canteen waste and other garden waste was being converted into compost manure in the previous years. A compost pit was in place but in 2020-2021, it could not be kept active due to the pandemic. It will be reactivated in the next academic year.

Measures are taken to reuse discarded dustbins, containers, wooden frames into useful things. Regular e-waste is disposed of from college through NGOs. Segregation of dry and wet waste is maintained. Separate dustbins are placed in prominent places to collect the same on the premises. Laboratory materials are discarded after proper segregation. For safe disposal of unused hazardous chemicals, the staff connect with industries periodically. Plastic bottles are not used to maintain an eco-friendly campus. Used/spoiled papers are shredded regularly in the premises. Efforts are made to move towards a paperless office.

The following are the waste management procedures and practices followed within the institute and laboratories.

| Sr. No | Type of Waste | Method of Disposal |
|-----------|---|---|
| 1 | Dry waste and wet waste | Separate bins are provided to collect dry and wet waste |
| 2 | Laboratory Solid waste : Broken glassware waste, Paper and Plastic waste | Segregated and disposed of in separate bins. Papers are shredded and discarded in bins and containers reused for pots and plants |
| 3 | Laboratory Liquid wastes | Diluted before discarding |
| 4 | Laboratory Strong acids | Neutralized before discarding |
| 5 | Laboratory Carcinogenic chemicals like Ethidium bromide | Disposed after treating it with Potassium Permanganate |
| 6 | Laboratory Bacterial cultures | Autoclaved and then disposed |
| 7 | Laboratory Biomedical wastes Blood and Blood products | Treated with dettol/savlon, taped in RED and disposed |
| 8 | Laboratory Animal waste (Fish, Prawns etc) | These are packaged and disposed immediately on the same day to avoid putrefaction. |
| 9 | E-waste | NSS and NCC units of the college regularly organize e- waste collection drives and they hand it over to the NGOs for further recycling. |
| 10 | Waste Recycling | The Department of Bioanalytical Sciences is planning to implement steps for establishing a waste recycling system in the institution. |



Principal
SIES Collage of Arts, Science &
Commerce (Autonomous)
Sion (West), Mumbai - 400 022,

(annexure photos below)







Broken glass waste

Paper and Plastic waste



Biomedical waste treatment with dilute dettol





Report: Waste Management

Name of the Department: Bioanalytical Sciences

Waste Management measures taken by department of Bioanalytical Sciences

• Solid Waste Management
Solid waste is segregated into a) Broken glassware waste and b) Paper and Plastic waste







• Liquid Waste Management

- a) Liquid wastes are diluted before discarding
- b) Strong acids are neutralised before discarding

• Biomedical Waste Management

- a) Biomedical samples are collected separated and not discarded along with other laboratory materials
- b) The Biomedical samples are treated with dilute Dettol before disposing them separately





15

----2021-22----



- E-waste management
 Not Applicable for Department of Bioanalytical Sciences
- Hazardous chemicals and radioactive waste management
 Not Applicable for Department of Bioanalytical Sciences
- Waste recycling system

 Department of Bioanalytical Sciences is planning to implement steps for waste recycling

Department of Biotechnology

Waste management:

Solid and Liquid: treated with disinfectant and disposed in the common waste bin

Biomedical and hazardous waste: Wrapped separately and taped in red and disposed

E waste: Disposed in the common e waste bin of the college

We do not have a waste re-recycling system

No MoUs signed with any organization with respect to the above



----2021-22----

S.I.E.S COLLEGE OF ARTS SCIENCE AND COMMERCE (AUTONOMOUS) SION (W), MUMBAI 400 022

Waste disposal in Microbiology Department

Microbiology practical's requires handling of lot of live bacterial and fungal cultures such cultures cannot be released directly into drainage as it is harmful to the environment. The department of Microbiology follows safe practice of disposal of such cultures by killing them after use at 121°C for 20min using 15psi pressure in an autoclave. These killed cultures can then be safely released in drainage.

ryhodie

Head Dept. of Microbiology



Principal Principal SIES College of Arts, Science & Commerce (Autonomous) Sion (West), Mumbai - 400 022.



SIES College of Arts, Science and Commerce (Autonomous) Sion West, Mumbai

Management of Chemical and Biomedical waste

A. Management of Chemical waste:

Source: Laboratories of following departments:

Chemistry, Biochemistry, Bioanalytical Science, Botany, Zoology, Microbiology

Type of waste:

- 1. Used chemicals including salts, acids, bases, organic solvents and organic compounds
- 2. Broken glassware, plastic, wood and metal

Practice/management:

- 1. Source reduction: Smallest quantity of the chemicals required are ordered.
- 2. Surplus chemicals are shared with other department laboratories.
- 3. Wherever possible, the scale of laboratory experiments is reduced to semimicro to micro level to ensure minimal usage. Hazardous and toxic chemicals are used to the minimum.
- 4. Hazardous chemicals are substituted with other chemicals. E.g. Benzene is substituted with toluene, xylene or d-limonene. Carbon tetrachloride may be substituted with dichloromethane.
- 5. Disposal methods depend upon the properties of each individual chemical:
- a. Hazardous and toxic chemical waste to be disposed of is collected and stored in containers of suitable types and sizes or in the original container in a special waste storage area (Satellite Accumulation Area). The waste is periodically handed over to the licensed waste management services (Udinec Pvt. Ltd.), for disposal.
- b. Non-hazardous liquid samples are diluted and discarded.
- c. Non-hazardous acidic and basic solutions are neutralized, diluted and (safely) discarded.



- d. Broken thermometers with mercury are collected in a separate container, stored in the special area for chemical waste storage and handed to licensed waste management services for disposal/reuse.
- e. Metal, wood, glass, and plastic scrap generated in laboratories is segregated and collected in separate waste bin and handed over to scrap dealers for recycling





Segregation of laboratory dry waste

B. Management of Biomedical waste

Source: Laboratories of following departments:

Biochemistry, Microbiology, DMLT, Biotechnology, Botany, Zoology

Type of waste:

- 1. Cultures/samples and growth media containing microorganisms (nonpathogenic bacteria and fungi)
- 3. Blood and blood products
- 4. Syringe and needles, autopipette tips, cotton swabs
- 5. Laboratory Animal waste (Fish, Prawns etc)

Practice/management

- 1. Test tubes, petri dishes, flasks (along with cotton plugs), auto pipette tips or any other apparatus containing microorganisms or used for handling microorganisms are autoclaved at 15psi pressure and 121 C. This sterilized glassware is then soaked in detergent and cleaned. Cleaned glassware is dried in a hot air oven at 150 C.
- 2. Glassware containing clinical samples such as blood and blood products, etc. are autoclaved before washing.



- 3. Sterilized blood and blood related products along with used syringes, needles and cotton swabs are collected in a green coloured biohazard bag and sealed. This is then handed over to the municipality for disposal. The Municipal Biohazard collection van collects the waste from college campus twice a week.
- 4. Laboratory animal waste i.e. fish and prawn waste is packaged and disposed of immediately on the same day to avoid putrefaction.







Microbiological and Biomedical waste in green bags

Principal
SIES College of Arts, Science &
Commerce (Autonomous)
Sion (West), Mumbai - 400 022.



SIES College of Arts, Science and Commerce (Autonomous)

Sion West Mumbai 400022

Department of Zoology

Laboratory Waste Disposal Report for Academic year 2022-23

| Sr. No | Type of Waste | Laboratory Waste | Method of Disposal |
|-----------|-------------------------------------|---|--|
| 1 | Liquid waste Management | Concentrated Acids | Neutralized before disposal |
| | | Other liquids | Disposed after sufficient dilution |
| 2 | Hazardous chemical waste Management | Carcinogenic chemicals like Ethidium bromide | Disposed after treating it with Potassium Permanganate |
| 3 | Biological waste management | Bacterial cultures | Autoclaved and then disposed |
| | | Animal waste (Fish, Prawns etc) | Packaged and disposed immediately on the same day to avoid putrefaction. |
| 4 | Biomedical waste Management | Blood and Blood products | Treated with dettol/savlon and disposed separately |
| 6 | Solid Waste Management | Broken glassware waste Paper and Plastic waste | Segregated and disposed in respective bins |
| 7 | E-waste management | | Not applicable to Zoology Department |

Dr. Satish Sarfare

Head, Department of Zoology

hund

Principal
SIES College of Arts, Science &
Commerce (Autonomous)
Sien (West), Mumbai - 400 022.





Solid Waste Management



-----2022-23-----



Solid Waste Management



-----2022-23-----

SIES COLLEGE OF ARTS, SCIENCE AND COMMERCE (AUTONOMOUS), SION (W)

NSS Unit

E-Waste Collection Drive Report

Name of the Event: Seminar on E-Waste and its Disposal Practices

Date: 23rd February 2023

Objective: To educate the audience about the implications of not handling E-waste properly.

No. of Participants: 36 (11 Male and 25 Female)

Methodology: Conducted offline in the Mini Auditorium of SIES College of Arts, Science and Commerce (Autonomous) in collaboration with the Value Lab. The session was delivered by a representative from Praan Vayu e-waste Awareness Foundation.

Outcome: Upon attending the seminar, volunteers learned the importance of safe E-waste collection and understood the process of its disposal.



Session on collection and management of e-waste



Name of the Event: E-Waste Collection Drive

Date: From 24th February, 2023 to present date

Objective: To collect and recycle E-waste, which is detrimental for our environment.

No. of Participants: 37 (9 Male and 28 Female)

Methodology: Conducted offline by SIES NSS UNIT in association with the Value Lab in the College premises by creating awareness among masses through a PR session. Collection boxes were kept at certain spots in the College premises where people can drop their e-waste.

Outcome: A total of about 20 kg of e-waste has been collected and the drive is in progress. All the collected waste will be handed over to Praan Vayu e-waste Awareness Foundation.



e-waste collected within the College premises

NSS Programme Officer/s Dr. Dinesh Pathak



College Seal

Principal
Dr. Uma Shankar
Principal
SIES College of Arts, Science &
Commerce (Autonomous)
Sion (West), Mumbai - 400 022.

-----2022-23-----