CSIR-SUMMER RESEARCH TRAINING PROGRAM(CSIR-SRTP)2020 ONLINE

Course Completion Requirement (to Obtain Training Certificate)

INSTRUCTIONS

1. **Mentees should submit the following summary sheet along with the final project report.**
2. **The project summary (ANNEXURE I) must be limited to 2000 words plus a maximum number of 6 figures, tables and schemes together. The total report should be within 6 pages in Times New Roman font with 12 font size and 1.5 spacing.**
3. **Projects involving survey works should be submitted along with the data from the survey form, questionnaire and/or consent form as "ANNEXURE V".**
4. **Feedback form must be submitted as "ANNEXURE VI" along with the final report.**
5. **"Self Evaluation Sheet" (ANNEXURE VII) and "Mentor's Recommendation" (ANNEXURE VIII) must be submitted along with the final report.**

Name of the mentee	Name of the mentor	Project no. and summary of the project	Summary of selected five Eminent Scientist Lecture	Lectures attended	SRTP videos watched by the Mentee
Suraj Kumar Modi	Dr. Ruchi yadav	(Annexure I)	(Annexure II)	(Annexure III)	(Annexure IV)

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ANNEXURE I

Project summary

1. **Title:** Biodegradation Of Plastic

2. **Background:**

Synthetic plastic has been one of the major concerns to science and natural environment due to having the least degradation properties. Every year 25 million tons of synthetic plastic are being accumulated in the ocean coats and global environment. The use of plastic especially polyethene is growing day by day. About 64% of total synthetic plastic are being used in enormous Quantity in daily life because of its easy availability, cheaper and convenient to use.

The extensive use of plastics, lack of waste management, and casual community behavior towards their proper disposal pose a significant threat to the environment. This has raised growing concerns among various stakeholders to devise policies and innovative strategies for plastic waste management, use of biodegradable polymers especially in packaging, and educating people for their proper disposal. Current polymer degradation strategies rely on chemical, thermal, photo, and biological procedures. In the presence of proper waste management strategies coupled with industrially controlled biodegradation facilities, the use of biodegradable plastics for some applications such as packaging or health industry is a promising and attractive option for economic, environmental, and health benefits. This review highlights the classification of plastics with special emphasis on biodegradable plastics and their rational use, the identified mechanisms of plastic biodegradation, the microorganisms involved in biodegradation, and the current insights into the research on biodegradable plastics. The review has also identified the research gaps in plastic biodegradation followed by future research directions. Globally research is going on at broad scale to resolve this major environmental problem.

Various study and research has been done and published lots of research papers at national and international level as well.

3. **Objectives:**

So here my objective is to find the novel method for degradation of synthetic plastic especially polyethene (PET) in to low molecularweight biodegradable and non-toxic product using genetically modified recombinant microorganism**.** My target microorganism is gram negative bacteria *moroxella* and *pseudomonas* (degradation rate 20.54%) and *Ideonella sakaiensis*. (1) *Ideonella sakaiensis* has potential to damaged PET film extensively and almost completely degraded in sapn of 6 weeks at 30ºC.

4. Methodology:

1. Identification of target microorganisms from suitable location including different plastic dump areas
2. Isolation of microbes and quantification of genomic DNA using Polymerase Reaction (PCR)
3. Based on 16s rRNA, the genomic similarity can be found between *Ideonella sakaiensis and moroxella* (bacteria) microbial species using appropriate bioinformatics tools like BLAST.
4. The identified genomic similarity of targeted species can undergo for protein BLAST in order to study and analyzing their protein products for example genes coding for PETase enzyme properties which can help in understanding polythene degradation under aseptic condition.
5. Isolation of the gene of interest (having similarities at Translational level) and amplify them using PCR
6. Introduce them in E.coi or appropriate vector and transfer in to host organism that is *moroxella* and *Ideonella sakaiensis*.
7. Culture them under suitable medium and make enough population for further action.
8. Now introduce them on agar plate having plastic thin film (polyether terephthalate)
9. Observe them at regular interval (start observing from day 3, and till 4 – 6 months).
10. Observe if there is any change including rapid accumulation, biofilm formation or any other visible change on plastic film
11. And compare the action of genetically modified species with respect to normal one.
12. If any improved result finds like rapid degradation or quick action occur, we can go further same experiment to do same at large scale.

Above same protocol can be followed and check the functional similarity by following species too gram negative bacteria* *moroxella* and *pseudomonas* and two species of fungi* *Aspergillus glaucus and Aspergillus niger.*

* Using this Biodegradation of polythene bags and plastic cups has been analyzed after 2, 4, 6 and 9 months of incubation in Indian mangrove soil, were significant. The microbial species associated with degrading materials.

1. Main Findings:

In this project my ultimate target is to find the gene(s) coding for the enzymes PETase, hydrolase, tannase and MHETase in my target organism and create a genetically modified recombinant microorganism for biodegradation of polythene. And studying, analyzing how efficient genetically modified organism works in degradation.

2. Conclusion:

Biodegradable plastic is an innovative means of solving the plastic disposal problem from the standpoint of development of new materials. In general, plastics are water-insoluble, thermo-elastic polymeric materials. Biodegradability of plastics is affected by both their chemical and physical properties. Beside the covalent forces of polymer molecules, various kinds of weak forces (*i.e.,* hydrogen bond forces, van der Waals forces, columbic forces, etc.) among macromolecular chains affect not only the formation of polymer aggregates, but also the structure and physical properties and function (reactivity) of the polymer aggregates. The biodegradation mechanisms of plastics as shown in this review can be applied to biomass that is composed of polymeric materials (*i.e.,* cellulose, hemicellulose, lignin, chitin, silk fibroin, etc.).

Lipolytic enzymes such as lipase and esterase can hydrolyze not only fatty acid esters and triglycerides, but also aliphatic polyesters. We can understand that lipolytic enzyme has an important role in the degradation of natural aliphatic polyesters such as cutin, suberin and esteroid in the natural environment and animal digestive tract. However, it is not certain whether human body produces any aliphatic polyesters or not.

3. Future perspectives:

If we get success in finding the method and mechanism of biodegradation of plastic then it would be a kind of revolutionary era and it would solve one of the major current concern of environment. It would save several lives on earth as well as in ocean. Finding of Biodegradation mechanism would bring a new source of income also and definitely it will open the opportunity of unemployment and will contribute economy at large scale. Most important successful finding would help in making environment free of plastic.

References:

1. Shosuke Yoshida, Ka zumi Hiraga, Toshihiko Takehana, Ikuo Taniguchi, Hironao Yamaji, Yasuhito Maeda, Kiyotsuna Toyohara, Kenji Miyamoto, Yoshiharu Kimura, Kohei Oda (2016). A bacterium that degrades and assimilates poly(ethylene terephthalate) Science 1196- 1199

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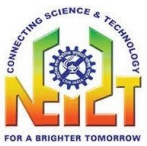


ANNEXURE IVI

Summary of selected five Eminent Scientist Lectures

1. Title of Lecture:

"Food, Nutrition, Tradition and Immunity COVID-19"

Summary: (Within 200 words)
Good nutrition is an important part of leading a healthy lifestyle. Combined with physical activity, your diet can help you to reach and maintain a healthy weight, reduce your risk of chronic diseases (like heart disease and cancer), and promote your overall health. Empowering the youth and generally all people with the importance of diet, nutrition and healthy lifestyle will be one of the prime realizations by oneself, which equip the people with knowledge to avoid all most maximum health issues, doctors and medicine. The link between good nutrition and healthy weight, reduced chronic disease risk, and overall health is too important to ignore. Nutrients play very important role in boosting immunity. Nutrients work in various ways including antioxidant to protect healthy cells, complement the immune system to fight from pathogens. Covid-19 is very good example while talking about the nutrients complementing the immune system. In the pandemic of covid-19 it has been seen that particular areas are more affected while others are less this is because the life style, diets are comparatively healthier and better.

2. Title of Lecture:

RAISING ISSUE OF GENDER EQUALITY IN STEM CAREERS

Summary: (Within 200 words)
“There is no chance for the welfare of the world unless the condition of woman is improved. It is not possible the condition of woman is improved. It is not possible for a bird to fly on only one wing.”
Gender equality is one of the social constructed terms which create a kind of division based on gander and lead to unequal distribution of resource. It acts at individual level as well as institutional level. It creates oppression for women. Gender acts within intersectional framework of power which includes class, religion, and ethnicity and so on. Gender inequality can be seen in its various faces which include mortality inequality, natality inequality, basic facility inequality, special opportunity inequality, professional inequality, ownership inequality and house hold inequality. According to UN statistics women own only 1% of the world’s wealth and 10% of the world’s income. Taking childcare and house work in to consideration; women do 70% of the world’s work. Worldwide women on average earn 30% less than men, even doing the same job. And India has been ranked 112th among 153 countries in the annual Global Gender Gap Index for 2020, published by world Economic Forum

3. Title of Lecture:

TRANSFORMING INDIA BY ENCOURAGING AND ESTABLISHING MSME UNITS

Summary: (Within 200 words)

Micro, Small and Medium Enterprises (MSME) sector has emerged as a highly vibrant and dynamic sector of the Indian economy over the last five decades. There is no doubt that the MSME sector plays a significant role in the Indian economy. A catalyst for socio-economic transformation of the country, the sector is critical in meeting the national objectives of generating employment, reducing poverty and discouraging rural-urban migration. The MSME sector in India is essential to achieving the targeted growth rate of our nation. This sector nurtures budding entrepreneurs and incubates innovation at its most rudimentary level. A growth in the MSME sector not only ensures industrialization in backward areas, but also indicates a more equitable Gini coefficient. With the country moving towards a more inclusive growth agenda, a robust MSME sector can accelerate the growth rate, as they do not necessitate huge investments while simultaneously acting as ancillary units to larger industries. Hence, for the growth of the manufacturing sector in the country, there is a need to focus on the MSME sector. Albeit the sector has shown impressive potential, it also faces a number of challenges to its growth story.

4. Title of Lecture:

INTEGRATION OF RESEARCH IN SCIENCE EDUCATION

Summary: (Within 200 words)

Science is built up of facts as a house is of stones, but a collection of facts is no more a science than a pile of stones is a house. Science is both a body of knowledge that represents current understanding of natural systems and the process whereby that body of knowledge has been established and is being continually extended, refined, and revised. Both elements are essential: one cannot make progress in science without an understanding of both. Likewise, in learning science one must come to understand both the body of knowledge and the process by which this knowledge is established, extended, refined, and revised. The various perspectives on science—alluded to above and described below—differ mainly with respect to the process of science, rather than its product. The body of knowledge includes specific facts integrated and articulated into highly developed and well-tested theories. These theories, in turn, can explain bodies of data and predict outcomes of experiments. This strand focuses attention on students' understanding of science as a way of knowing: the nature of scientific knowledge, the nature of theory and evidence in science, and the sources for, justification of, and certainty of scientific knowledge. It also includes students' reflection on the status of their own knowledge.

5. Title of Lecture:

SCIENCE OF CLIMATE CHANGE

Summary: (Within 200 words)

Earth's climate system forms by interaction of five different components including atmosphere, hydrosphere, lithosphere, cryo-sphere and biosphere. Life exists nearly everywhere on the earth because the climate is favorable. Introduction of unwanted factors on any components of earth system lead to change in its native and natural condition. These changes can be occurred due to internal causes or external causes or both. The external causes comprise variations in the intensity of solar irradiance, in the orbital parameter of the (eccentricity of the orbit, axial procession and obliquity of the ecliptic and in the rate of rotation of the earth. And the internal causes include natural variability (variation in atmospheric composition due to volcanic eruptions, long term changes of tectonic factors such as continental drift, mountain-building processes, polar wandering etc.), Anthropogenic (Human) activity (variation in atmospheric composition (mixing rations of CO_2 and ozone, aerosol loading etc) due to human activity, variations of the land surface due to land use deforestation, desertification etc).

ANNEXURE III

Summary of selected five Lectures/Classes attended

1. Title of Lecture:

INTERNET OF THINGS (IOT)

Summary: (Within 200 words)

The Internet of Things (IoT) is the network of physical objects or electronics, software, "things" embedded with sensors, and network connectivity, which enables these objects to collect and exchange data. These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. The Internet of Things (IoT), also sometimes referred to as the Internet of Everything (IoE), consists of all the web-enabled devices that collect, send and act on data they acquire from their surrounding environments using embedded sensors, processors and communication hardware. These devices, often called "connected" or "smart" devices, can sometimes talk to other related devices, a process called machine-to-machine (M2M) communication, and act on the information they get from one another. Humans can interact with the gadgets to set them up, give them instructions or access the data, but the devices do most of the work on their own without human intervention. Their existence has been made possible by all the tiny mobile components that are available these days, as well as the always online nature of our home and business works.

2. Title of Lecture:

IR SPECTROSCOPY

Summary: (Within 200 words)

IR spectroscopy is the study of interaction between infrared radiations and matter. Infrared radiations refers broadly to that part of electromagnetic spectrum between visible and microwave region. Therefore the IR spectroscopy is also called as “vibrational-rotational spectroscopy.” The principle of IR spectroscopy is related to the vibrational and rotational energy of a molecule. There are 3 main processes by which a molecule can absorb radiation, each of these route involve an increase of energy which is proportional to the light absorbed. i. First route occurs when absorption of radiation leads to a higher rotational energy level in a rotational transition. ii. Second occurs when absorption of radiation leads to a higher vibrational energy level in a vibrational transition. iii. Third occurs when absorption of radiation leads to a higher electronic energy level in its electronic transitions. Applications of IR spectroscopy include identification of an organic compound from its fingerprint region by comparing the sample spectrum with the known spectrum of the compound. For E.g. spectrum of n-hexanal. Qualitative determination of functional groups. The presence or absence of absorption bands help in predicting the presence of certain functional group in the compound.

3. Title of Lecture:

APPLICATION OF BIOINFORMATICS IN MOLECULAR BIOLOGY AND CURRENT RESEARCHES

Summary: (Within 200 words)

The branch of science concerned with information and information flow in biological systems, esp. the use of computational methods in genetics and genomics. Bioinformatics is the use of information technology in biotechnology for the data storage, data warehousing and analyzing the DNA sequences. Providing researchers with better access to analysis and computing tools in order to advance understanding of our genetic legacy and its role in health and disease. Bioinformatics intends to find new approaches to deal with the volume and complexity of data. Bioinformatics is being used in following fields:

Gene therapy; mutations are easily detected and quantified through next-generation sequencing technology in a heterogeneous sample thus a cost effective precision medicine, "right drug at right dose to the right patient at the right time" can be administered. Development of new algorithms (mathematical formulas) and statistics with which to assess relationships among members of large data sets, such as methods to locate a gene within a sequence, predict protein structure and/or function, and cluster protein sequences into families of related sequences. Analysis and interpretation of various kinds of data including, nucleotides and amino acid sequences, protein domains, and protein structures can be done with the help bioinformatic tools.

4. Title of Lecture:

Basics of crystallization and its application

Summary: (Within 200 words)

Crystallization can be defined as the solidification of a liquid substance into a highly structured solid whose atoms or molecules are placed in a well-defined three dimensional crystal lattice. Methods of crystallization includes Solvent evaporation, Slow cooling, Solvent/non-solvent diffusion 4.Vapor diffusion , Sublimation etc. Factors affecting Nucleation are following..

1. Presence of another substance in the mother liquor: Sodium chloride crystallized from aqueous solutions produces cubic crystals. If sodium chloride is crystallized from a solution containing a small amount of urea, the crystals obtained will have octahedral faces. Both types of crystals belong to the cubic crystal form but differ in habit.
2. Solvent: Griseofulvin crystallized out from acetone has different crystal habit than when crystallized from benzene or chloroform.
3. Method of crystallization Acicular or needle-like crystals are produced when the solution is cooled very slowly. Fluffy and small crystals are produced when the solution is cooled very fast. During crystallization the solution may become contaminated with dust, particles from container etc. Nucleation may be initiated from these foreign particles also.

5. Title of Lecture:

INTRODUCTION TO CLAY CHEMISTRY

Summary: (Within 200 words)

Clays play an important part in large number of industries starting from paper, paints, cosmetics, building materials. “The term "clay" refers to a naturally occurring material composed¬ primarily of fine-grained minerals, which is generally plastic at appropriate water contents and will harden when dried or fired”. Clays have a complex mineralogy and chemistry and they are essentially¬ composed of microcrystalline particles of minerals, referred to as the clay minerals. Clay minerals are hydrous silicates containing aluminum, potassium and¬ some other cations (Na, Mg). Clays may be plastic and non-plastic materials. Clay is a naturally occurring material composed primarily of fine grained minerals, which shows plasticity through a variable range of water content and which can be hardened when dried or fired. Because of size it requires special technique for study. These include X-ray diffraction, electron diffraction and various spectroscopic methods Clay mineral are usually ultra fine grained normally considered to be less than 2µm in size on standard particle classification. The upper limit of clay size is 4µm. chemically, clay minerals are hydrous aluminium phyllosilicates, and sometimes they occur with variable amounts of calcium, magnesium, iron, sodium and potassium.

ANNEXURE IV

Summary of selected five SRTP videos

1. **Title of Video**
   GEL PERMEATION CHROMOTOGRAPHY

   Summary: (Within 150 words)
   This technique was developed by Lathe and Ruthven in 1955 and is also known as size exclusion chromatography. It works on the principle of difference in the molecular weight or size of compounds. The use of this technique is about the molecular weight determination and it's distribution. Larger the size of the molecule lesser the retention time required for the elution. There are two phase: mobile phase and stationary phase. For the analysis, the column packed with porous beads is used. In this lecture, the model Agilent 1260 infinity is explained. In this technique, the samples are loaded with a syringe into the equipment and mobile phase is used. UV detector is used for the detection purpose. The result of analysis is detected through the chromogram plot using the retention time as s factor for the elution.

2. **Title of Video:**
   NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY

   Summary: (Within 150 words)
   Nuclear Magnetic Resonance (NMR) spectroscopy is an analytical technique used in quality control and research for determining the content and purity of a sample as well as its molecular structure. This technique exploits the magnetic properties of nuclei. It determines the physical and chemical properties of atoms or the molecules in which they are contained. The principle behind NMR is that many nuclei have spin and all nuclei are electrically charged. If an external magnetic field is applied, an energy transfer is possible between the base energy to a higher energy level (generally a single energy gap). The energy transfer takes place at a wavelength that corresponds to radio frequencies and when the spin returns to its base level, energy is emitted at the same frequency. The signal that matches this transfer is measured in many ways and processed in order to yield an NMR spectrum for the nucleus concerned.

3. **Title of Video:**
   SOLID PHASE PEPTIDE SYNTHESIZER

   Summary: (Within 150 words)
   This is one of the biochemical used for the synthesis of peptides, deoxyribonucleic acid (DNA), and other molecules that need to be synthesized in a certain alignment. Chemistry solid-phase synthesis is a method in which molecules are bound on a bead and synthesized step-by-step in a reactant solution; compared [with] normal synthesis in a liquid state, it is easier to remove excess reactant or byproduct

from the product. Solid phase synthesis was invented by Bruce Merrifield in 1963 and became very quickly the routine tool for preparation of peptides and later small proteins and earned him the Nobel Prize in 1984. Solid phase synthesis consists of assembling amino acids from the C-terminal to the N-terminal. SPPS allows efficient removal of excess reagents and soluble byproducts after each reaction cycle because the peptide remains anchored to an insoluble solid resin support. Resins commonly used are composed of polystyrene.
Solid-phase peptide synthesis involves only a limited number of undesirable components—by-products.. Acidolytic cleavage yields a crude product containing both the desired peptide and impurities, such as deletion peptides, truncated peptides, incompletely deprotected peptides, modified peptides, scavengers, and by-products derived from the cleaved protecting groups.

4. Title of Video:

CONFOCAL MICROSCOPY

Summary: (Within 150 words)

A confocal microscope creates sharp images of a specimen that would appear otherwise blurred with the conventional microscope –this is achieved by excluding most of the light from the specimen, but not from the microscope's focal plane. In confocal microscopy, a series of thin slices of the specimen is assembled to generate a 3- dimensional image. Confocal microscopy is unique because it can rapidly produce images of cellular morphology without the need to process the tissue (i.e., without freezing, sectioning and staining).Because the source of image contrast is not due to exogenous stains, confocal images appear different than those from tissue that has been histologically processed and stained. A confocal microscope images have refractive index variation within the epithelial and stromal compartments of the tissue. These refractive index variations are due to the chemical variations within the tissue. Structures that backscatter more light appear brighter than less scattering structures.

5. Title of Video:

EMISSION SPECTROSCOPY

Summary: (Within 150 words)

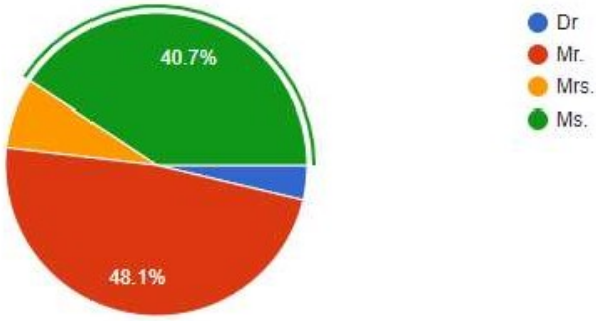
Emission spectroscopy is a spectroscopic technique which examines the wavelengths of photons emitted by atoms or molecules during their transition from an excited state to a lower energy state. Luminescence is the emission of light from any substance, and occurs from electronically excited states. The emission rates of phosphorescence are slow (10^3 to 100 per sec.), so that phosphorescence lifetimes are typically milliseconds to seconds. Fluorescence is much more widely used for chemical analysis than phosphorescence. Fluorescence spectroscopy is a type of electromagnetic spectroscopy which analyzes fluorescence from a sample. It involves using a beam of light, usually ultraviolet light, that excites the electrons in molecules of certain compounds and causes them to emit light of a lower energy, typically, but not necessarily, visible light. This shift to longer wavelength is called the Stokes shift. Devices that measure fluorescence are called fluorometers or fluorimeters.

ANNEXURE V

Survey forms, questionnaires and/or consent form

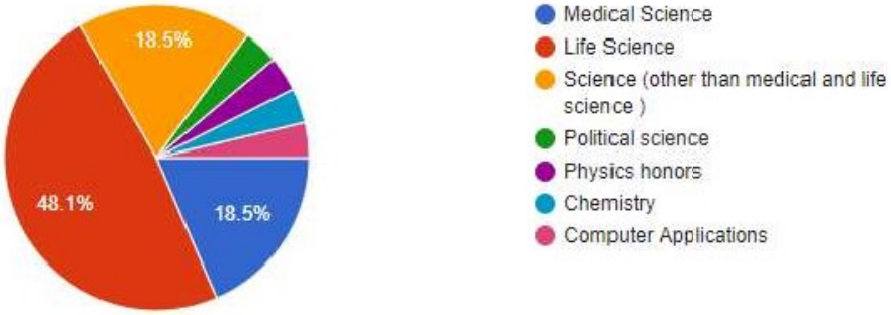
Title

27 responses



Stream Of Education

27 responses



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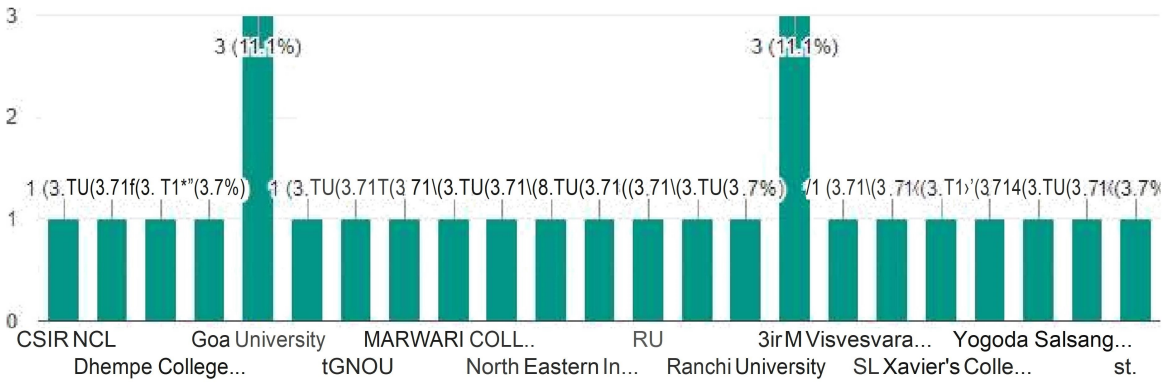
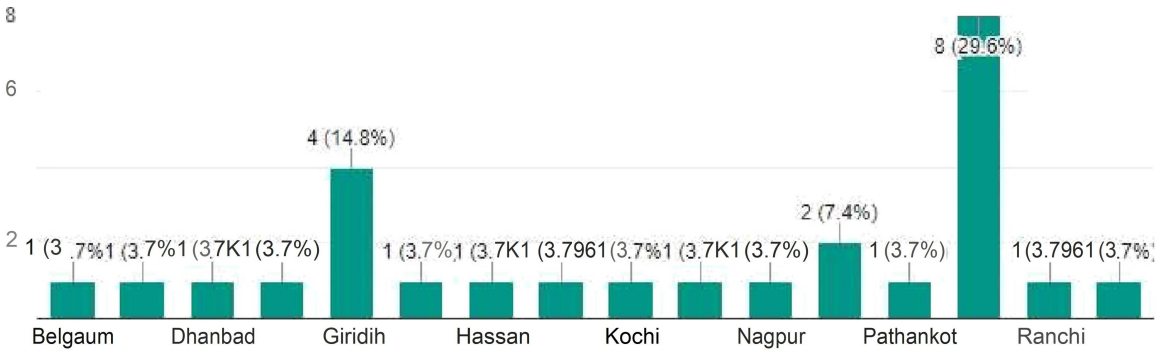
Organization/Institute Name

27 responses



Residential District

27 responses



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Residential State

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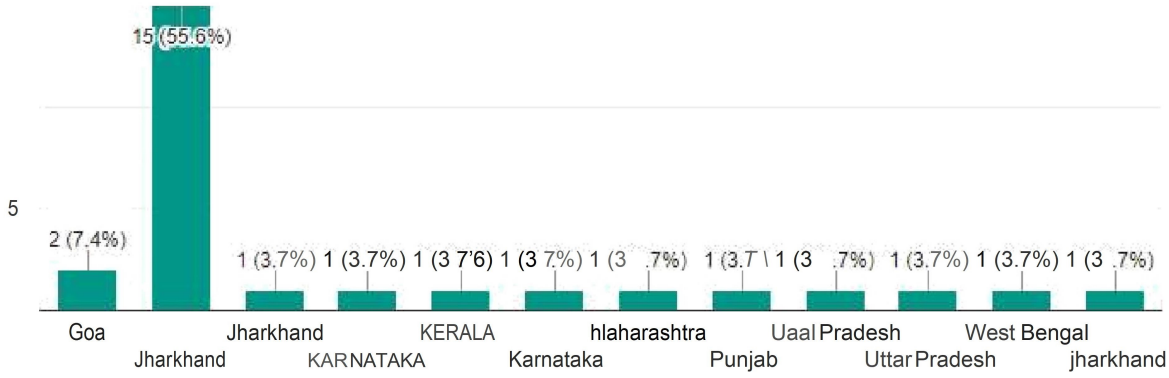
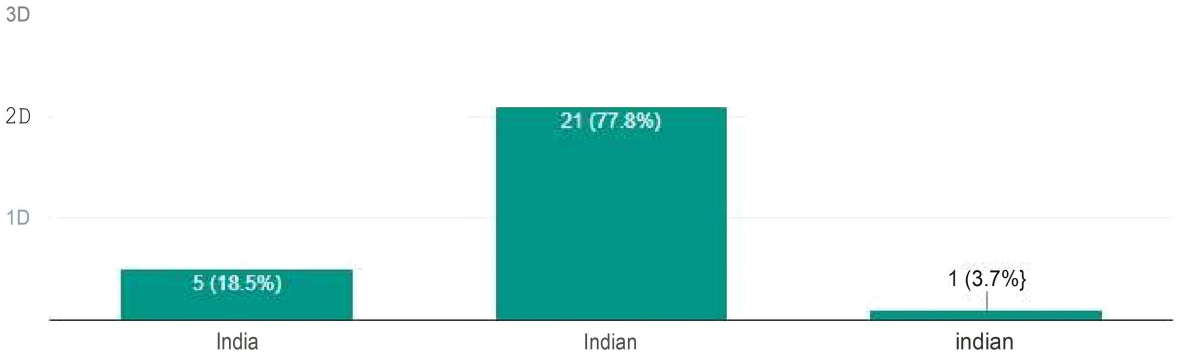


Nationality

27 responses



Residential status

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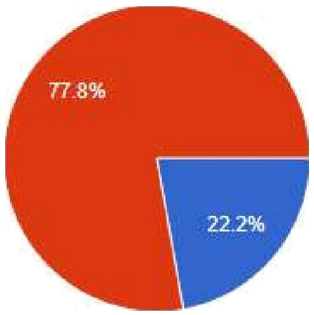

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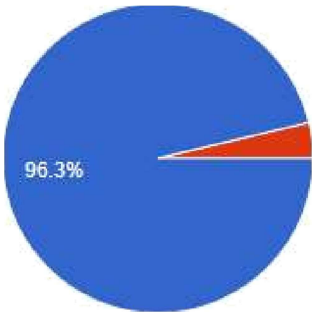
Plastic pollution has been one of tne largest concern for our environment ?

2* res gon s es



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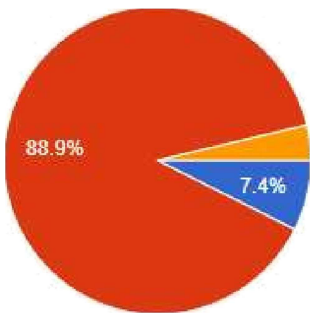
Do you think increment in synthetic plastic produc tion is good for our environment

27 responses



Yes
No
Maybe

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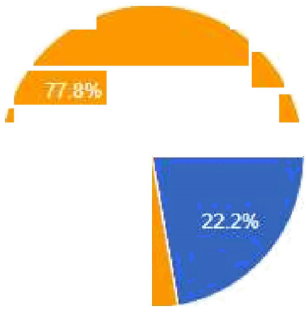
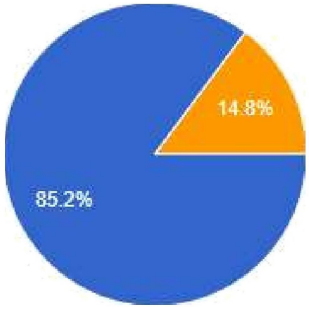
As per your knowledge which of the following life get m ost affected Irons plastic pollution ? resp cnses



@ Ocean life
@ terrestrial life
@ all are equals' afiec^ed
Can't zany anY:hing

In \'aur op inion. synthetic plastic should be banned globally

27 responses



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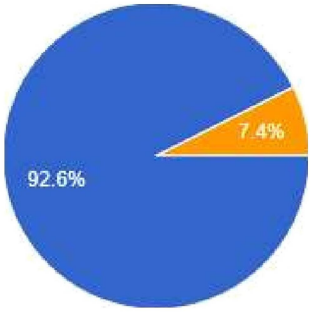
Would you like to see further research work or solution far 6io-deg radat fan of syntnetic Plastic ?

27 responses



Yes
No
may be

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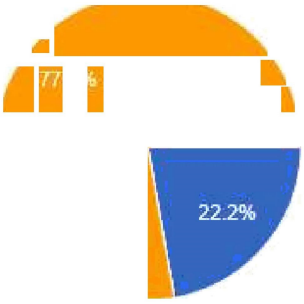
Do \'ou think finding a complete mechanism for "bio-degradation of Pla5tic" would be a g reat innovation in field of sc ience?

27 responses

Yes o/fcozrse
No
lJa,be

As per your xnov•/ledge which of the following life get m ost affected frown plastic pollution

27 responses



@ Ocean life
@ terrestrial life
?› all are equal:, affec!ed
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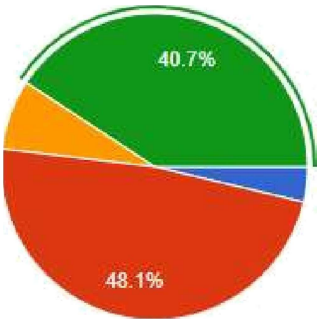
Title

17 responses



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hrs

11s

ANNEXURE VI

Feedback Form

1. How is the CSIR-SRTP program?

CSIR-SRTP programmee is really good innovation in field of science and technology where students get opportunity from different streams to pursue some productive work to acquire and improve knowledge. Best part of this great innovation and initiative is students can join globally from their home. It's very good idea to share experiences and knowledge among teachers, scientist and students. I believe this type of programmee should be continued so that students like me can have this great opportunity.

2. How are you benefited from SRTP?

I really feel fortunate for being part of SRTP 2020. I personally appreciate the type of programmee initiated by CSIR. It gave me opportunities to improve my knowledge by attending various lectures, doing different assignment related to my topic as well as the topic which should be discussed at present time. Listening many eminent scientists and leading professor really motivated me to work hard, learnt to believe in your dreams and most important it gives me positivity to my wings, so I can fly towards my goals with more strength and more belief.

3. Rate the SRTP videos and live demonstration in a scale of 0 to 5.

	0	1	2	3	4	5
Scale (Tick "√")					√	

4. Rate the project related lectures in a scale of 0 to 5.

Scale	0	1	2	3	4	5
(Tick "√")				√		

5. Will the experience in the SRTP be helpful in your future research career?

Yes, it will help.

6. How the multi-disciplinary approach of SRTP was beneficial for you?

It provided me opportunity to introduce with my subject of interest as well as related to my subject, so it helps me to improve my new aspects of thinking and learning skills. So probably it can be a source of future opportunity to connect different related aspects to make an integrated chain.

7. What will be your contribution towards creating a knowledge society?

I will be sharing my knowledge with youngster like me and will interact with school student 'who are tomorrow's future.

8. How was the insight of the mentor on the project?

I really appreciate my mentor I got; she is really good, humble and helpful. She was always there to help me out in every possible way. She guided me personally where it needs. First time I felt a good connectivity to my mentor, while working onine in e-platform. So I am very thankful to have guide like Dr. Ruchi ma'am.

9. Suggestions for new course content?

New course like dissertation work should be offered as CSIR offers SRTP.

10. Overall comment on the SRTP?

Its really good initiative but much more need to be improved including opportunity, connectivity, one to one interaction, easy access etc.

Name of the Mentee:
Suraj Kumar Modi

Application No:
6747694

CSIR-SUMMER RESEARCH TRAINING PROGRAM(CSIR-SRTP)2020 ONLINE

ANNEXURE VII

Mentee's Self Evaluation of Project

(Please tick "√")

Project title:

Biodegradation

Of plastic

Project no.:

13

Name of the mentor:

Dr. Ruchi Yadav

Rating	Evaluation Parameter					Remarks
	Originality	Novelty	Statement of purpose	Relevance to Indian science	Mentor's involvement	
Poor						
Good						
Very good		√				
Excellent	√					
Outstanding			√	√	√	

Name of the mentee: Suraj Kumar Modi **Application no.** 6747694

Address: 903 Bosetala, Dhapa, Science city Kolkaata 700105

E-mail:modisurajkumar1234@gmail.com **Phone no:** 7004127242

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ANNEXURE VIII

Evaluation and Recommendation of the Mentee

(Please tick "√")

Project title:

Project no.:

Name of the mentee:

Sl. No.	Rating	Evaluation Parameter				Recommendation
		Mentee's involvement	Sincerity and punctuality	Assignment completion	Originality, novelty and creativity	Grades: • S: Outstanding • A: Excellent • B: Good • C: Poor • F: Fail
1.	Poor					
2.	Good					
3.	Very good					
4.	Excellent					
5.	Outstanding					

Name of the Mentor:

---------- For office use only ----------

Recommendation by SRTP team:

Grade	S	A	B	C	F
(Tick "√")					

Expert 1 **Expert 2** **Project Coordinator**

Final approval:

Director
(CSIR-NEIST)