

# Students Group Project Report

(Departments of Botany, Chemistry, Mathematics, Physics & Zoology)

DBT Star College Scheme

2020-21



**JAMAL MOHAMED COLLEGE  
(Autonomous)**

College with Potential for Excellence  
Accredited (3<sup>rd</sup> Cycle) with 'A' Grade by NAAC

DBT Star College Scheme & DST – FIST Funded

(Affiliated to Bharathidasan University)

Tiruchirappalli – 620 020, Tamil Nadu.

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Dept.	Mentors	Title	No of Students included
	<p align="center"><b>External Mentor:</b>  <b>Dr. N. Thajuddin</b>  Professor, Dept. of Microbiology,  Coordinator, School of Life Sciences  Bharathidasan University  Tiruchirappalli-620024,  Tamil Nadu.</p>		
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Chemistry (Section A)	<p align="center"><b>External Mentor:</b>  <b>Dr. V. Violet Dhayabaran</b>  Dean of Science &amp; Associate Professor  PG and Research Department of Chemistry  Bishop Heber College (Autonomous)  Tiruchirappalli - 620017</p>		
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<b>Mathematics</b>	<b>External Mentor:</b> <b>Dr. N. Rajeswari</b> <b>Principal and Associate Professor,</b> <b>Department of Mathematics,</b> <b>Sri GVG Visalashi College for Woman</b> <b>Udumalapet-642128.</b>		
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<b>Zoology</b>	<b>External Mentor:</b> <b>Dr. (Mrs). Horne Iona Averal</b> <b>Dean of Sciences</b> <b>Associate Professor of Zoology</b> <b>Holy Cross College</b> <b>Tiruchirappalli- 620002.</b>		
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## **(i)Department of Botany**

### **Group II Title of the Project**

#### **Production of eco-friendly cleaning liquids from fruit and vegetable waste using beneficial microbes**

**Name of the Mentor** : **Dr. A. Aslam**

**Students Name** : E. Elavarasan, Reg No. 18UBO007  
A. Gobinath, Reg No. 18UBO008  
K. Gokul, Reg No. 18UBO009  
R. Gobinath, Reg No. 18UBO010  
S. Gowrisankar, Reg No. 18UBO011

#### **Abstract**

A survey of vegetable and fruit waste production from the surroundings of Jamal Mohamed College was carried out. More than five Citrus fruit juice stalls were found to continuously produce peel waste as a waste. This biological solid waste is selected as a potential source of endophytic microbes that can produce substances that have cleaning properties such as organic acids (citric acid) and aldehydes by using jaggery as a carbon source. Preparation of incubation medium using jaggery with ratio of 1:2:10 weight of jaggery fruit/vegetable waste and water. Citrus (Orange and lemon) peels were selected to be best raw materials due to their smell-less end product. The batch culture was prepared in re-useable plastic drums (30L net capacity). The culture was incubated for 60 days with aeration by stirring for removal of CO<sub>2</sub> from fermentation. After 60th day the lid was closed for 30 days in air tight manner. After 90 days the fermented liquid can be segregated into different grades by filtering dissolved degraded solids. This end product liquid was found to be rich in citric acid and acetic acid in low concentration. The end product of batch culture was 20L fermented liquid was separated into clear supernatant (to be used for personal use), intermediate turbulent liquid (to be used for surface cleaning). As a trial, soap nut paste was added as a hair conditioner pack using the clear supernatant. The overall production of clear liquid was about 8L at the cost of 150 Rupees. Further dilution and cost benefit analysis can bring out eco-friendly organic personal use and cleansing products.

### **Group III Title of the Project**

#### **Agriculture green development: Recycling of agriculture wastes through edible mushroom cultivation**

**Name of the Mentor** : **Dr. K. Mohamed Rafi**

**Students Name** : G. Gowtham, Reg No. 18UBO012  
S. Harish, Reg No. 18UBO013  
L. Jerom Savari Raj, Reg No. 18UBO014  
K. Keethai Rajan, Reg No. 18UBO015  
M. Mohamed Aathif, Reg No. 18UBO016

#### **Abstract**

The mushroom cultivation is a profitable agribusiness and oyster mushroom (*Pleurotus florida*) is an edible mushroom having excellent flavor and taste. The cultivation of mushrooms has a great potential for the production of protein rich quality food and for recycling of cellulosic agro-residues and other wastes. The effect of different temperature and humidity was tested to growth the mushroom. In this experiment the best result was observed at 35 C and 75% humidity, the number of shoot buds (pinhead) formatin is more. Out of Paddy Straw, Sugarcane bagasse, Sugarcane leaf, waste grass and Saw dust substrate, the better yield is obtained in paddy straw (bed weight 3kg/200 spawn). The total yield of the mushroom is obtained as 1560 gms.

### **Group IV Title of the Project**

#### **In vitro studies, phytochemical constituents and pharmaceutical activities of the genus *Plectranthus* – A review.**

**Name of the Mentor** : **Dr. N. Ahamed Sherif**

**Students Name** : S. Mohamed Jakariya, Reg No. 18UBO017  
A. Mohamed Nivas, Reg No. 18UBO018  
M. Mugesh Sharma, Reg No. 18UBO019  
S. Niyaskhan, Reg No. 18UBO020  
A. Nizar Ahamed, Reg No. 18UBO021

#### **Abstract**

The *Plectranthus* is an herbal genus that belongs to the family Lamiaceae and distributed all around the world with numerous ethnomedicinal significance. *Plectranthus* species has a wide range of bioactive chemical compounds such as Monoterpenoids, Sesquiterpenoids, Diterpenoids, and Phenolic. Most commonly, the abietane diterpenoids are isolated from the species of *Plectranthus*. The bioactive isolates were widely used to treat digestive, skin, infective, and respiratory problems, and several species were used as foods, flavors, and fodder. This review highlights the chemical constituents of the species present in the genus *Plectranthus* to explain their medicinal uses and further, to identify, synthesis and utilization of bioactive compounds for human welfare.



**Group V Title of the Project****Study on phytochemical properties of medicinal plants used as immunomodulatory activities  
(Interdisciplinary)****Name of the Group Mentor : Dr. B. Balaguru****Name of Department Mentors****Chemistry  
Dr. A. Jamal Abdul Nasser****Physics  
Dr. S. Shek Dhavud****Mathematics  
Dr. M. A. Rifayathali****Students Name :** N. Bhuvaneshwaran, Reg No. 18UBO006  
A. Prasanth, Reg No. 18UBO022  
K. Puthiyavan , Reg No. 18UBO024  
N. Mohamed Riyas, Reg No. 18UBO026  
P. Sakthivel , Reg No. 18UBO027  
R. Sarathkumar , Reg No. 18UBO028  
K. Dharsan, Reg No. 18UA4717  
K. Dinesh, Reg No. 18UA4718  
S. Vinothagan, Reg No. 18UPH040  
V. Yogeswaran, Reg No. 18UPH041  
A. Gokul Babu Reg.No18UMA012**Abstract**

There is a need for alternate medicinal practices during the Pandemic situation since no proper medication exists. Our Indigenous system of medicine recommends various medicinal plants, could use to cure different diseases. This knowledge would utilize to manage disease outbreaks, especially illnesses that cause the problem in immunomodulation in the human system. But due to the lack of knowledge on the medicinal plants, it is essential to identify, understand the physical and chemical properties of the medicinal plants. Hence the present study focused on the following objectives a) to enlist the medicinal plants with immunomodulatory activities. b) Document the traditional knowledge c) Physical evaluation of plants and collect information about chemical constituents of some target medicinal plants. In this present study Forty, seven plant species were listed from literature and documented sixty-five herbal practices from the traditional knowledge holders. Twelve plants were selected and studied their morphological nature, physical properties like shape, texture, odour, leaf area. The plant phytochemical properties were identified using various phytochemical and Dr.Dukes Phytochemical and Ethnobotanical Database. This project envisages some methods for the standardization of herbal drugs, which would be helpful for societal benefit. Also, this interdisciplinary project imparts knowledge to the student's different types of evaluation methods of medicinal plants.

## **Group VI Title of the Project**

### **Formulation and assessment of organic fertilizer for fenugreek seedling growth**

**Name of the Mentor** : **Dr. R. Radhakrishnan**

**Students Name** : S. Sarveswaran, Reg No. 18UBO029  
M. Satham Hussain, Reg No. 18UBO030  
M. Sathish, Reg No. 18UBO031  
R. Sriram, Reg No. 18UBO032  
K. Sugumaran, Reg No. 18UBO033

#### **Abstract**

Usage of organic fertilizers has been increasing in kitchen garden to enhance the vegetable plant growth and to prevent the diseases. The green leafy vegetable including fenugreek is an important spinach growing in the kitchen garden of India. In the present study was aimed to formulate the organic fertilizer from cow products and plant products and to study the effect of organic fertilizer on the growth of fenugreek. The cow dung, ghee, urine, milk, curd, tender coconut water, jaggery, well ripened poovan banana and water were used to formulate the organic fertilizer. The diluted organic fertilizer (30 %) was more effective to increase the seed germination and seedling growth of fenugreek than other concentrations. The result of this study suggest that the application of 30 % of organic fertilizer would be helpful to get the more yield of fenugreek.

## **Group VII Title of the Project**

### **Studies on medicinal plants for prevalent pest in paddy crop**

**Name of the Mentor** : **Dr. R. Sathish Kumar**

**Students Name** : G. Vasanth Raj, Reg No. 18UBO034  
M. Vasanth Kumar, Reg No. 18UBO035  
R. Magesh Kumar, Reg No. 18UBO036  
S. Mohamed Adham, Reg No. 18UBO037  
M. Balasekar, Reg No. 18UBO038

#### **Abstract**

Rice is the staple food for over half of the world population, over 30% of total rice is damaged by the rice pests and diseases every year around the globe, the only economical way to control these pests is using the pesticides, but these synthetic pesticides too causes many side effects to plants as well as other organisms. Chemical pesticides play crucial roles in the management of crop diseases and pests. However, excessive and irrational use of pesticides has become a major concern and obstacle to sustainable agriculture. As a result, the quality and security of agricultural products are reduced, and the ecological and environmental integrities are threatened. Recently, environment-friendly pest management measures have been introduced and adopted to manage rice insect pests and reduce the use of insecticides. We have undergone the collection of some of the major pests from the rice field around our locality and identified them as leafhopper, Rice earhead bug, Green leafhopper, Rice skipper and Spiny beetle. The plants with pesticide properties which are Azadirachta indica, Ricinus communis, Calotropis gigantea, Datura metal, Rauvolfia serpentina and Rauvolfia tetraphylla. Among these, the plants with higher pesticidal activity are allowed to dry up after the collection, crushed, powdered to obtain the extract and chemical formulations found in the extract. By experimenting the formula of Bramasthra (a traditional bio pesticide) in the rice field have found the drastical reduction of pest attack in the rice field.

## **Group I Title of the Project**

### **Phytochemical Screening and its Silver Nanoparticle Based Antibacterial activity of *Luffa cylindrica* Linn. Fruit Extract against Human Pathogenic Organisms.**

**Name of the Mentor : Dr. M. Kamaraj**

**Students Name :** J. Abdul Rahuman, Reg No.18UBO001  
M. Abdul Aziz, Reg No. 18UBO002  
A. Arun Kumar, Reg No. 18UBO004  
S. Balakumar, Reg No. 18UBO005  
B. Kingslin, Reg No. 18UBO039  
S. Siddik Raja, Reg No. 18UBO040  
M. S. Naveen Rasath, , Reg No. 18UBO041  
M. Murugesan , Reg No. 18UBO042  
A. Shiek, Reg No. 18UBO043  
P. T. Vinoth, Reg No. 18UCH083  
P. Parthibhan, Reg No. 18UCH084

#### **Abstract**

*Luffa cylindrica* Linn. belonging to family Cucurbitaceae popularly known as “Raja koshataki”, is a traditionally important plant with more medicinal properties. Phytochemical investigation of methanol extracts of the leaves and flowers of *Luffa cylindrica* Linn resulted in the identification of various chemical constituents such as alkaloids,  $\beta$  – sitosterols and amino acids. The methanol extracts of leaves and flowers of *Luffa cylindrica* were also tested against nine human pathogenic bacteria and four fungal strains by the agar-well diffusion and slant method. Based on minimum inhibitory concentration (MIC) of the present study, maximum antibacterial activity was found in flower extract of *Luffa Cylindrica*, whereas leaf extract had maximum antifungal activity. This study supports the traditional claim and usefulness of the plant in typhoid, cholera and other gram negative bacterial and staphylococcal infections.

## **(ii) Department of Chemistry - (Section A)**

### **Group I Title of the Project**

#### **Investigation of foaming capacities of different Soap**

**Name of the Mentor** : **Dr. M. Mohamed Sihabudeen**

**Students Name** : S. Abdul Basith, Reg No. 18UA4701  
M. Abubakar Siddiq, Reg No. 18UA4703  
M. Ahamed Hussain, Reg No. 18UA4704  
V.O.G. Ahamed Ijaz, Reg No. 18UA4705  
M. Ahamed Sheriff, Reg No. 18UA4706

#### **Abstract**

To investigate foaming capacity of different washing soap and effect of addition of sodium carbonate on them. Soaps and detergents are cleaning ingredients that are able to remove oil particles from surfaces because of their unique chemical properties. Soaps are created by the chemical reaction of a fatty acids with on alkali metal hydroxide. In a chemical sense soap is a salt made up of a carboxylic acid and an alkali like sodium of potassium. The cleaning action of soap and detergents is a result of thrill, ability to surround oil particles on a surface and disperse it in water.

### **Group II Title of the Project**

#### **Determination of different qualities of Milk samples**

**Name of the Mentor** : **Dr. M. Syed Ali Padusha**

**Students Name** : B. Alsheik Faris, Reg No. 18UA4707  
A. Aravintharaj, Reg No. 18UA4709  
S. Ashik Moulana, Reg No. 18UA4710  
Ashraf Samsudeen, Reg No. 18UA4711  
R. Balaji, Reg No. 18UA4714

#### **Abstract**

Milk is a commercial product consumed around the world is of different quality that depends on various conditions such as the physicochemical contents, processing methods, storage time and backing material. In this study, the physicochemical properties of three different brands such as Aavin, Arokya and Vethaa products of Tamilnadu were determined. Milk samples were tested for acidity, fat, formalin, specific gravity, solids-not-fat, soap, alcohol precipitation and Urea. The fat content of the milk samples varies from 2% to 6%. Acidity content of a quality milk normally ranges between 0.6 to 0.16 percentage, and the results obtained for the samples are 0.08, 0.12 and 0.1 respectively, which ensures the good quality of the milk samples. Most of the physicochemical properties was found to be bit higher for Vethaa milk sample while compared with other two brands, but not exceeding the consumable parameters provided by Food Safety and Standard Authority of India [FASSAI]. The other elements like formalin, starch, soap, alcohol precipitation and Urea were absent in the sample. The result revealed for the physicochemical properties of tested samples were differs slightly among the products, which may be noticeably influence their quality.

**Group III Title of the Project****A comparative study of Milks****Name of the Mentor : Dr. A. Zahir Hussain****Students Name :** S. Faisal Bin Syed Ibrahim, Reg No. 18UA4720  
R. Gokul Nantha, Reg No. 18UA4721  
V. Gokulakrishnan, Reg No. 18UA4722  
V. Hameed Rasool, Reg No. 18UA4723  
R. Hariprasath, Reg No. 18UA4724  
M. Hyrunnash Rahamathulla, Reg No. 18UA4725**Abstract**

Milk is a commercial product consumed around the world is of different quality that depends on various conditions such as the physiochemical contents, processing methods, storage time and backing material. In this study, the physicochemical properties of different brands such as Buffalo milk, Cow milk, Goat milk, Powdered milk and Soya milk products of Tamilnadu were determined. Milk samples were tested for acidity, fat, specific gravity, solids-not-fat, soap, alcohol precipitation and starch were analysed and compared to the valid standard.

**Group IV Title of the Project****Estimation of essential oil content in citrus Peel****Name of the Mentor : Dr. J. Sirajudeen****Students Name :** L. Ibrahim Maraikayar, Reg No. 18UA4726  
M. Ismail Anas, Reg No. 18UA4727  
T. Jawahar Srinath, Reg No. 18UA4728  
R. Kannan, Reg No. 18UA4729  
K. Keerthivasan, Reg No. 18UA4730  
S. Kishore, Reg No. 18UA4731**Abstract**

Essential oils are often used in aromatherapy, a form of alternative medicine that employs plant extracts to support health and well-being. To design an extraction system of essential oil from subtle lemon, orange and sweet lime. The use of essential oils as raw material in formulation of by-products allows the revitalization of industries and regional economic growth. Main parameters required for the extraction have been considered as well as, the calculation of the obtained yield. Within the system design, distillation tank measurements, condenser, essential oils separator, mechanical part of the equipment, boiler selection and the distribution of the plant are dimensioned. The procedure manuals and equipment operating manuals were prepared for each step of the process of using this various oil. They are also used as a natural scent in homemade cosmetics and high-quality natural products.

**Group V Title of the Project****Foaming capacity of various Soaps****Name of the Mentor : Dr. K. Loganathan****Students Name :** G. Logesh, Reg No. 18UA4732  
P. Madhavan, Reg No. 18UA4733  
V. Manoj, Reg No. 18UA4734  
R. Mohammed Akram, Reg No. 18UA4735  
H. Mohamed Althaf Hussain, Reg No. 18UA4736  
Mohamed Anvar, Reg No. 18UA4737**Abstract**

Soaps and detergents are cleaning ingredients that are able to remove oil particles from surfaces because of their unique chemical properties. Soaps are created by the chemical reaction of a fatty acid with alkali metal hydroxide. In a chemical sense soap is a salt made up of a carboxylic acid and an alkali like sodium or potassium. The cleansing action of soap and detergents is a result of their ability to surround oil particles on a surface and disperse it in water. The aim of the project is to investigate foaming capacity of various soaps and help the society better to understand the quality of the soaps that they use in daily life.

**Group VI Title of the Project****Detection of chemical additives in Packed Foods (edible sun flower oil)****Name of the Mentor : Dr. M. Anwar Sathiq****Students Name :** A. Mohamed Ashik, Reg No. 18UA4738  
J. Mohammed Bahath, Reg No. 18UA4739  
S. Mohamed Bayasdeen, Reg No. 18UA4740  
S M. Mohammed Faisal, Reg No. 18UA4741  
M. Mohamed Faizal, Reg No. 18UA4742  
A. Mohammad Faseehudeen, Reg No. 18UA4743**Abstract**

The six samples of refined sunflower brands oils were obtained from a local market. The aim of this study was to determine the sterol content and degree of fatty acid unsaturation (acid value and saponification value) in edible refined sunflower oils. In the present scenario of nutrition science, the role of fats and oils in human nutrition and their health is found to be very effective. It is now also known that fats and oils besides their earlier recognized role as conventional nutrient as energy provider, may also play an efficient and competent role in immune responses by decreasing dietary total fat intake with the inclusion of higher amounts of phytosterols such as sitosterol and also moderate amounts of poly unsaturated fatty acids with adequate antioxidant nutrients. It has a high quantity of vitamin E, in the form of alpha-tocopherol, which makes it excellent for being used in cooking. It has a high smoking point, which means that sunflower oil holds on to its nutritional content at higher temperatures. The result shows that the degree of unsaturation was higher in plant oils in comparison to animal fat and among all plant Refined Sunflower oil had highest degree of unsaturation. Higher degree of unsaturation of oils is good for human health. So, apart from all the above discussion the conclusion was made that plant oils are good for consumption as they contain unsaturated fatty acids as well as plant oils are rich in phytosterol i.e. sitosterol, which lowers the cholesterol absorption in human beings.

**Group VII Title of the Project****Access the contamination levels of chemicals in easily accessible Drug Paracetamol (Acetaminophen)****Name of the Mentor : Dr. M. Purushothaman****Students Name :** A. Mohamed Irfan, Reg No. 18UA4744  
S. Mohamed Irffan, Reg No. 18UA4745  
J. N. Mohamed Jaffer Refayee, Reg No. 18UA4746  
K.Mohamed Jaws, Reg No. Reg No. 18UA4747  
S.Mohamed Juber, Reg No. 18UA4748  
J.Gowthaman, Reg No. 18UA4751**Abstract**

Paracetamol is a widely used non-prescription analgesic and antipyretic medication for mild-to-moderate pain and fever. Harmless at low doses, paracetamol has direct hepatotoxic potential when taken as an overdose and can cause acute liver injury and death from acute liver failure. Even in therapeutic doses, paracetamol can cause transient serum aminotransferase elevations. However, the contamination levels of chemicals using spectrometry the intensity of absorbance for commercial medical sample paracetamol is measured and beer's law is obeyed in the concentration range of 10-180Mg of paracetamol in final volume of 25ml.

**Group VIII Title of the Project****Study of presence of insecticides and pesticides in various fruits, Vegetables and Beverages****Name of the Mentor : Dr. S. S. Syed Abuthahir****Students Name :** M. Ramasamy, Reg No. 18UA4752  
M. Mohamed Ashkar Ali, Reg No. 18UA4753  
M. Thilip Raj, Reg No. 18UA4754  
S. Jaffer Hussian, Reg No. 18UA4755  
R. Mohamed Raseen, Reg No. 18UA4801  
S. Vimalashwaran, Reg No. 18UA4802  
A. Barvesh Mushruf, Reg No. 18UA4716  
A. Dufail Ahamed, Reg No. 18UA4719**Abstract**

The present study is to analysis the presence of pesticides and insecticides in various fruits and vegetable available from various markets in tamilnadu. The analysis technique is done by simple elemental nitrogen analysis. Nitrogen present in organic compounds is detected by Lassaigne test. Nitrogen, Sulphur, and halogens present in organic compounds are detected by Lassaigne's test. This test shows presence of pesticides and insecticides in various fruits and vegetable. If a blue or green precipitate or coloration is obtained it indicates the presence of nitrogen containing insecticides. If a blue or green precipitate or coloration is not obtained it indicates the absence of nitrogen containing insecticides.

## **(Section B)**

### **Group I Title of the Project**

#### **Analysis and comparative study of permissible limit of chemical in the easily accessible Drugs**

**Name of the Mentor** : **Dr. M. Seeni Mubarak**

**Students Name** : A. Nithishkumar, Reg No. 18UA4805  
S. Mohamed Mansoor, Reg No. 18UA4807  
Muzavir Ahammad, Reg No. 18UA4809  
G. Porselvan, Reg No. 18UA4810  
M. Prasanth, Reg No. 18UA4811

#### **Abstract**

A drug is any substance that causes a change in an organism's physiology or psychology when consumed. Drugs are typically distinguished from food and substances that provide nutritional support. Consumption of drugs can be via inhalation, injection, smoking, ingestion, absorption via a patch on the skin, suppository, or dissolution under the tongue. In pharmacology, a drug is a chemical substance, typically of known structure, which, when administered to a living organism, produces a biological effect. A pharmaceutical drug, also called a medication or medicine, is a chemical substance used to treat, cure, prevent, or diagnose a disease or to promote well-being. Traditionally drugs were obtained through extraction from medicinal plants, but more recently also by organic synthesis. Pharmaceutical drugs may be used for a limited duration, or on a regular basis for chronic disorders.

### **Group II Title of the Project**

#### **Detection of food additives in packed foods: chemical composition and product quality control of turmeric powder (*Curcuma longa* L.)**

**Name of the Mentor** : **Dr. A. Jafar Ahamed**

**Students Name** : S. Nethaji Subash Chandrabose, Reg No. 18UA4812  
R. Santhosh, Reg No. 18UA4813  
A. Sheik Abdulla, Reg No. 18UA4814  
M. Vignesh, Reg No. 18UA4815  
S. H. Muhammad Tawfiq, Reg No. 18UA4816

#### **Abstract**

Chemical constituents of various tissues of turmeric (*Curcuma longa* L.) have been extensively investigated. To date, at least 235 compounds, primarily phenolic compounds and terpenoids have been identified from the species, including 22 diarylheptanoids and diarylpentanoids, eight phenylpropene and other phenolic compounds, 68 monoterpenes, 109 sesquiterpenes, five diterpenes, three triterpenoids, four sterols, two alkaloids, and 14 other compounds. Curcuminoids (diarylheptanoids) and essential oils are major bioactive ingredients showing various bioactivities in *in vitro* and *in vivo* bioassays. The essential oils from leaves and flowers are usually dominated by monoterpenes while those from roots and rhizomes primarily contained sesquiterpenes. The contents of curcuminoids in turmeric rhizomes vary often with varieties, locations, sources, and cultivation conditions, while there are significant variations in composition of essential oils of turmeric rhizomes with varieties and geographical locations.



Further, both curcuminoids and essential oils vary in contents with different extraction methods and are unstable with extraction and storage processes. As a result, the quality of commercial turmeric products can be markedly varied. While curcumin (1), demethoxycurcumin (2), and bisdemethoxycurcumin (5) have been used as marker compounds for the quality control of rhizomes, powders, and extract (“curcumin”) products, *Ar*-turmerone (13),  $\alpha$ -turmerone (14), and  $\beta$ -turmerone (15) may be used to control the product quality of turmeric oil and oleoresin products.

### **Group III Title of the Project**

#### **Investigation of foaming capacities of different washing Soaps available in the market**

**Name of the Mentor** : **Dr. K. Riaz Ahamed**

**Students Name** : A. Murugavel, Reg No. 18UA4817  
P. Prithiviraj, Reg No. 18UA4819  
S. Praveen, Reg No. 18UA4820  
P. Tamilnesan, Reg No. 18UA4821  
S. Tamil Selvan, Reg No. 18UA4822  
A. Syed Abdulla, Reg No. 18UA4823

#### **Abstract**

Soaps are carboxylate salts with very long hydrocarbon chains. Soaps and detergents are cleaning ingredients that are able to remove oil particles from surfaces because of their unique chemical properties. Soap is a common term for a number of related compounds used as of washing clothes or bathing. Soaps are created by the chemical reaction of a jetty acid with on alkali metal hydroxide. The cleaning action of soap and detergents is a result of thrill, ability to surround oil particles on a surface and disperse it in water. To investigate foaming capacity of different washing soap and effect of addition of sodium carbonate on them. In a chemical sense soap is a salt made up of a carboxylic acid and an alkali like sodium of potassium. Soaps are less effective in hard water, which is water that contains a significant concentration of  $Mg^{+2}$  and  $Ca^{+2}$ .

### **Group IV Title of the Project**

#### **Determination of quality of different samples of Milk**

**Name of the Mentor** : **Dr. S. K. Periyasamy**

**Students Name** : P. Nadesh Kumar, Reg No. 18UA4824  
C. Naveenkumar, Reg No. 18UA4825  
P. Sankar Sathish, P. Thiruppathi  
T. Selva Kumaran, S. Thivakar

#### **Abstract**

The present study was carried out for quality and safety assessment of cow milk samples was collected. The milk samples were collected from dairy shops, vendors and milk producers and evaluated on the basis of various analysis tests, physical-chemical properties, proximate estimation and chemical studies following the standard procedures. The variation in the concentration of different components found in milk depends on mammalian species, genetic, physiological, nutritional factors, and environmental conditions. Here, we analyse, for the first time, the content of

different components in milk of different brands. The high quality milk should have better density and is free from the adulterants. Milk is most commercially sold commodity both by local vendor's as well super markets. However, in local areas to increase the yield certain adulterants are added which may affect the nutritional quality of milk. Milk adulteration is a social problem. It exists both in the backward and advanced countries. Consumption of adulterated milk causes serious health problems and a great concern to the food industry. The Country milk producers and consumers facing problem to find the quality of milk, accept the fair of price and consumption. So it is necessary to ensure the quality of milk by measuring type and amount of adulterants that are added to the milk. This is performed by using combined electronic sensory instrumental system such as p<sup>H</sup> electrodes. The different quality parameters such as colour, pH, adulterates and chemical content are also noted. Food safety and food security are very much at the top of the agenda in India, so it is of utmost importance to screen the quality of milk and milk products in the market for avoidance of skimming practices and/or adulteration of milk with water and human health problems.

#### **Group V Title of the Project**

#### **Detection of chemical additives in packaged Foods**

**Name of the Mentor** : **Dr. J. Muneer Ahamath**

**Students Name** : V. Vellaichamy, Reg No. 18UA4831  
R. Siddik Ali, Reg No. 18UA4832  
M. Sikkandar Basha, Reg No. 18UA4833  
R. Surendar, Reg No. 18UA4834  
R. Ravivarman, Reg No. 18UA4835  
S. Mohammed Shajahan, Reg No. 18UA4836

#### **Abstract**

This thesis on "Detection of chemical additives in packaged foods" was conceived and carried out with the objective of identifying the presence of adulteration in chilli powder & Sugar (the major ingredients used for cooking in India). Various samples of the above mentioned were collected from local super market. Both branded and unbranded samples were selected for the study to determine the adulteration levels and the qualitative difference between them. The tests were carried out by chemical analysis in a majority of products and through visual inspection in few of the products. After the tests, the products containing adulterants were identified in packed food products. This study is attempted to bring awareness to the public on the important subject of food adulteration and various simplest methods available to detect food adulteration

### **Group VI Title of the Project**

#### **Study on presence of pesticides in various fruits, vegetables and green leaves in and around Tiruchirappalli District, Tamil Nadu, India.**

**Name of the Mentor : Dr. R. Abdul Vahith**

**Students Name :** P. Vinoth, Reg No. 18UA4837  
P. Parthiban, Reg No. 18UA4838  
J. Nijamdheen, Reg No. 18UA4839  
V. K. Renganathan, Reg No. 18UA4840  
M. Thiyagarajan, Reg No. 18UA4841  
M. Mohamed Riaz, Reg No. 18UA4842

#### **Abstract**

Pesticides compounds represent an important class of pollutants for food, soil and surface water resources. To Study the presence of insecticides or pesticides (Nitrogen Containing) in various fruits, vegetables and green leaves are produced in Tamil Nadu, India. In the current study clearly pointed out the samples were taken for our analysis from various markets and farms in and around Tiruchirappalli district and also it contains absence of nitrogen in it.

### **Group VII Title of the Project**

#### **Investigation on foaming capacity of different washing Soap**

**Name of the Mentor : Dr. M. Yaseen Mowlana**

**Students Name :** M. Sheik Mohamed, Reg No. 18UA4843  
A. Mohamed Suhail, Reg No. 18UA4844  
S. Surya, Reg No. 18UA4845  
M. Mohamed Sadam Ushain, Reg No. 18UA4847  
R. Raazik Fayas, Reg No. 18UA4848  
S. Riyas Khan, Reg No. 18UA4849

#### **Abstract**

Soap is a substance that dissolves in water to remove dirt and grease from surfaces such as skin, textiles, oily particles and other solids. But all soaps are not equally effective in their cleaning action. Soaps are the sodium and potassium salts of higher fatty acids such as palmitic acid, stearic acid and oleic acid. Soaps are mainly used as surfactants for washing, bathing and cleaning. The present study was carried out to assess the foaming capacity of different washing soaps in addition to it, this study also carried out the various properties of different soaps, in terms of pH, basicity, emulsification, washing property, hard water reaction. The study aimed to collect all the relevant information with the objective to compare parameters for performance and ecofriendliness of the available commercial detergents and also help the consumer to make an informed choice of the detergent available in the Indian local market and avoid being misled by manipulative marketing strategies that push out smaller and perhaps more polluting detergents. It can be concluded that the values determined are within the limits set by standards.

**Detection of chemical additives in packed Foods (Food adulteration in coriander powder)**

**Name of the Mentor** : **Dr. S. Farook Basha**

**Students Name** : T. Vimal, Reg No. 18UA4850  
H. Shaik Mohammed Rafiq, Reg No. 18UA4851  
C. Sathis Kumar, Reg No. 18UA4853  
T. Ajay, Reg No. 18UA4854  
A. Mohamed Noorul Fayaz, Reg No. 18UA4855  
D. Hemachandran, Reg No. 18UA4856

**Abstract**

This study on “Detection of food adulteration in coriander powder using physical and chemical methods” was conceived and carried out with the objective of identifying the presence of adulteration in coriander powder (The major spices used for cooking in India). Various samples of the above mentioned spices were collected from Tiruchirappalli. Both branded and unbranded samples were selected for the study to determine the adulteration levels and the qualitative difference between them. The tests were carried out by chemical analysis in a majority of products and through visual inspection in few of the products. After the tests, the products containing adulterants were identified in branded and unbranded food products. This study is attempted to bring in awareness to the public on the important subject of food adulteration and various simple methods available to detect food adulteration.

### **(iii) Department of Mathematics**

#### **Group I Title of the Project**

#### **Use of pert network analysis in project management problems**

**Name of the Mentor** : **Dr. A. Nagoor Gani**

**Students Name** : Arivusudar P, Reg No. 18UMA003  
Chandru L, Reg No. 18UMA006  
Deva P, Reg No. 18UMA008  
Gobi B, Reg No. 18UMA011  
Gopinath S, Reg No. 18UMA015  
Vendhan S S, Reg No. 18UMA061

#### **Abstract**

Pert is a method of analyzing the tasks involved in completing a given project, especially the time needed to complete each task, and to identify the minimum time needed to complete the total project. In this project, we incorporate uncertainty by making it possible it schedules a project while not knowing precisely the details and durations of all the activities. It is more of an event-oriented technique rather than start-and completion-oriented, and is used more in these projects where time is the major factor rather than cost, it will be applied on very large-scale, one-time, complex and non-routine infrastructure.

#### **Group II Title of the Project**

#### **Study on advantages and disadvantages of online classes**

**Name of the Mentor** : **Dr. A. Mohamed Ismayil**

**Students Name** : Dhameem Ansari M, Reg No. 18UMA009  
Dhanumalayan K S, Reg No. 18UMA010  
Harishraj A, Reg No. 18UMA017  
Janarthanan V, Reg No. 18UMA019  
Prithiviraj R, Reg No. 18UMA045  
Riyas Ahamed B, Reg No. 18UMA048

#### **Abstract**

Due to COVID-19 many of the countries prefers to teach the school and college lessons to the students in online mode. In this 21st century, most of the foreign universities offer the online courses to all over the universe. Even in Indian Universities like IIT Chennai offers online programmes. IIT Chennai offers online courser on date science. Government of India offers more than 1000 courses for Arts, Science and Engineering students through Swayam-NPTEL portal. In this situation, we analyse the advantages and disadvantages of online learning and how the online classes useful to the learners.

**Group III Title of the Project****Statistical survey and analysis on higher education (Using SPSS)**

**Name of the Mentor** : **Dr. R. Jahir Hussain**

**Students Name** : Arun Kishore Kumar C, Reg No. 18UMA005  
Gokula Kannan S, Reg No. 18UMA014  
Hafiz Ahamed S, Reg No. 18UMA016  
King Ahmed Patel A, Reg No. 18UMA021  
Mahadeen Mohamed J, Reg No. 18UMA023  
Yahiya T, Reg No. 18UMA063

**Abstract**

Students choosing mathematics course in higher studies decreased in recent period. so in this project studied to assess the survey conducted among school students and analysis the collected data using SPSS.

**Group IV Title of the Project****A study on the contribution of eigen values and eigen vectors in google search engine and some real time applications**

**Name of the Mentor** : **Dr. M. Mohammed Jabarulla**

**Students Name** : Mohamed Aashick J, Reg No. 18UMA005  
Mohamed Subiyan R, Reg No. 18UMA034  
Roshan Akthar U, Reg No. 18UMA049  
Sathish B, Reg No. 18UMA052  
Senthooran E, Reg No. 18UMA054  
Mohamed Ashraf S, Reg No. 18UMA065

**Abstract**

In this project we are discussed about Eigen values and Eigen vectors, solved numerical problem. And also discussed the contribution of Eigen values and Eigen vectors in the Google search engine and some real time applications like communication system, facial recognition, construction of bridges, Schrödinger equation, principle of component analysis and vibration analysis.

**Group V Title of the Project****A study on covid-19 infections in Trichy using mathematical modelling****Name of the Mentor : Dr. S. Mohamed Yusuff Ansari****Students Name :** Aasim Al Kareem M, Reg No. 18UMA001  
Jaya Karthikeyan R, Reg No. 18UMA020  
Mohamed Ashick S, Reg No. 18UMA028  
Sajith Ali S, Reg No. 18UMA033  
Mohamed Umar Farook S, Reg No. 18UMA035  
Mohammed Yousuf K, Reg No. 18UMA037**Abstract**

The main focus of this study is to propose conceptual model for the COVID-19 outbreak at Trichy city in Tamilnadu State, without the consideration of individual behavioral reaction and governmental action, e.g. travel restriction, hospitalization and quarantine. The model is concise in structure and it successfully captures the course of Covid-19 outbreak, and thus sheds light on understanding the trends of the outbreak by building SIS model.

**Group VI Title of the Project****Balancing chemical equations using linear Algebra (An Interdisciplinary with Chemistry Department)****Name of the Mentor : Mr. N. Mohamed Thoiyab****Students Name :** Jameer Basha B, Reg No. 18UMA018  
Muhammad Jameel S, Reg No. 18UMA039  
Nandha Kumar S, Reg No. 18UMA042  
Reevanth M, Reg No. 18UMA047  
Sanjeevi R, Reg No. 18UMA051  
Zavith Hussain N, Reg No. 18UMA064**Abstract**

This project describes a procedure employing Gaussian elimination method in linear algebra to balance chemical equations from easy to relatively complex chemical reactions. This result satisfies the law of conservation of matter and confirms that there is no contradiction to the existing ways of balancing chemical equations.

**Group VII Title of the Project**

**Application of matrices in cryptography**

**Name of the Mentor** : **Dr. A. Prasanna**

**Students Name** : Chithiraranjan R, Reg No. 18UMA007  
Gokul D, Reg No. 18UMA013  
Naveen K, Reg No. 18UMA043  
Praveen N, Reg No. 18UMA044  
Selvakumar S, Reg No. 18UMA053  
Sukumaran R, Reg No. 18UMA058

**Abstract**

The study embarks to learn and apply matrices in cryptography to ensure the secure communication between the sender and receiver

**Group VIII Title of the Project**

**Application of matrices in the analysis of red blood cell production (An Interdisciplinary with Zoology Department)**

**Name of the Mentor** : **Mr. S. Masoothu**

**Students Name** : Rajesh R, Reg No. 18UMA046  
Rubeshkumar R, Reg No. 18UMA050  
R.M.Shahul Hameed, Reg No. 18UMA055  
Sivakumar R, Reg No. 18UMA056  
Sureshkumar S, Reg No. 18UMA059  
Vengatesh R, Reg No. 18UMA062

**Abstract**

The main focus of the project is to explore the relevant issues of Red Blood Cells, its life cycle, creation, RBC count and Blood diseases. Using diagonalisation method in matrix theory the production of Red Blood Cells is analyzed. The number of Red Blood Cells in the blood stream on  $(n+1)$ th day is found out using the data about Red Blood Cells count on  $n$ th day.



**Group IX Title of the Project****A study on statistical analysis of health and hygienic of people during Covid-19 lockdown and pandemic period**

**Name of the Mentor** : **Dr. P. Muruganantham**

**Students Name** : Manikandan N, Reg No. 18UMA024  
Mohamed Afzal S, Reg No. 18UMA026  
Mohamed Ashik Ali K, Reg No. 18UMA029  
Mohamed Faizal T, Reg No. 18UMA032  
Mohammed Akeel M, Reg No. 18UMA036  
Sowmiyanarayanan S, Reg No. 18UMA057

**Abstract**

This project describes some statistical survey and study on health and hygienic of people during the pandemic period of Covid-19 disease. This study purely, based on the people's perspective.

**Group X Title of the Project****Study on statistical analysis of students career opportunities in Tiruchirappalli**

**Name of the Mentor** : **Dr. M. Mohamed Althaf**

**Students Name** : Arsath Farvesh K, Reg No. 18UMA004  
Mohamed Annas I, Reg No. 18UMA027  
Mohamed Faisal A, Reg No. 18UMA031  
Musharaf M, Reg No. 18UMA040  
Nafeesh Ahamed S, Reg No. 18UMA041  
Thameemul Ansari K S, Reg No. 18UMA060

**Abstract**

Realizing the high demand of skilled management and graduates across Tiruchirappalli, this study has been conducted to explore the students' desire and views about their future career options. It has become important to understand the choices of students or present graduates about their job preferences and location preferences in today's highly competitive world. Nowadays, Indian students are exploring their options in foreign companies and MNCs are also trying to recruit a lot of Indian talent on their rolls. During the study, students' responses about profession, management with national /international companies have been collected and analysed to derive certain trends about their job preferences and understand students' thought process while selecting their first job.

### **Group XI Title of the Project**

#### **A study on mental wellbeing and education related challenges faced by the students during Covid-19 lockdown in Tiruchirappalli**

**Name of the Mentor** : **Dr. M. A. Rifayathali**

**Students Name** : Ajith R, Reg No. 18UMA002  
Mohamed Asif M, Reg No. 18UMA030  
Mugunthan D, Reg No. 18UMA038  
Sheik Mohammed A, Reg No. 18UMA066  
Prasanna S, Reg No. 18UMA067  
Shariq Ahamed R, Reg No. 18UMA068

#### **Abstract**

Student's mental well-being and Education related challenges has been an increasing concern. Lockdown has been announced due to corona virus which has obstructed students in their studies. So in this project studied to assess the impact of lockdown amidst COVID-19 on students of various colleges and universities of Tiruchirappalli. An online survey was conducted from 7th February to 17th February 2021 to collect the information and the simple percentage distribution was used to assess the mental well-being and learning status of the study participants.

## **(iv)Department of Physics**

### **Group I Title of the Project**

#### **Determination of refractive index of different liquids using hollow prism.**

**Name of the Mentor** : **Dr. A. Ishaq Ahamed**

**Students Name** : N. Abdul Hameed, Reg No. 18UPH001  
A. Abdul Musharaf, Reg No. 18UPH002  
A. Abrar Ahmed, Reg No. 18UPH003

#### **Abstract**

Refractive index of water has been carefully measured by many researchers for over a century. The description of the propagation, reflection, and absorption of light in water requires the knowledge of the dependence of its refractive index as a function of the wavelength under different physical (but also chemical) conditions such as pressure or temperature. Mainly, optical experiments carried out in water are often used as references for other liquids. Also, knowledge of the refractive index of water itself can be used as an in situ probe for finding out other physical parameters of the liquid such as its density or pressure. In our project study we have measured the refractive indices of liquids using hollow prism. However as the work of this nature requires enormous time for the study of molecular behaviours, experimentation and measurements, we referred to theories of molecular interactions and the works of earlier researchers such as Henryk Eisenberg, Nir et al. and have selectively used the data obtained/calculated by earlier people such as Dorsey, Tilton and Taylor, Painter et al. to derive the conclusions we had set out at the beginning. Some of these are the calculation of the molar refraction, electronic polarizability, specific refraction, the variations of the refractive index with pressure and temperature, Debye's dispersion coefficients and the variation of the refractive index with frequencies/wavelengths that lead to the concept of dispersion of water or other liquids.

### **Group II Title of the Project**

#### **Design and Development of Home Appliances–Solar Water Heater**

**Name of the Mentor** : **Dr. N. Peer Mohamed Sathik**

**Students Name** : M.N. Ameer Hamsha, Reg No. 18UPH004  
A. Amuthan, Reg No. 18UPH005

K. Azarudeen, Reg No. 18UPH006

#### **Abstract**

In a solar water heating system, the most frequently met difficulty is to obtain the hot water at a required temperature continuously due to variation in the incident solar radiation over a day or even in the different seasons of the year. This work deals with the designing of a control mechanism based on the sensed temperatures, along with the water flow rates from the two systems, primary (hot water source) and secondary (cold water source), which are continuously monitored. This mechanism proposes a solution to the problem of obtaining warm water at a desired temperature and fulfilling the temperature specific activities as it estimates the amount of cold water to be supplied

from the secondary source. Further, the energy consumption can also be reduced by implementing a hybrid mode (using a solar water heater and an electric heater), where the water will be preheated by the solar water heater. As a result, the electricity expenses of the electric heater can be curtailed.

**Group III Title of the Project:**

**Design and Development of Home Appliances–Solar Cooker**

**Name of the Mentor** : **Dr. R. Radhakrishnan**  
**Students Name** : V. Chinnasamy, Reg No. 18UPH007  
D. Deepan, Reg No. 18UPH008  
P. Devak Kumar, Reg No. 18UPH009

**Abstract**

Alternate source of energy is always a green approach of energy consumption, in the time of crises of energy and global warming. Use of solar energy for cooking is better solution, but still not established as user friendliness and economic aspect. Food is the basic need of human being. Food can be cooked with conventional fuels like wood, cow-dung, kerosene, Liquid Petroleum Gas (LPG) and electricity. Solar cooker is clean and eco-friendly energy device for cooking. There are large number of solar cookers designed and developed by the scientists and researchers all over the world but still the utilization of solar cooker is not sufficient. There are many reasons for the insufficient uses of solar cooker like, its bulky size, heavy weight, lack of open place, slow cooking, fixed timing for cooking, less awareness etc. In this project, different solar cookers like solar panel cooker, solar parabolic cooker, solar box type cooker and hybrid solar cooker etc. are discussed in detail. Still lot of modifications are required to make the solar cooker user friendly, lighter in weight, smaller in size and still economic. Development of a photovoltaic and thermal hybrid solar cooker has started a new horizon in the field of solar cookers as the cooking is faster than conventional box type solar cooker and can be used at users convenient time. The cooker was converted into solar dryer by small modification and was used for drying vegetables. Still lots of scopes are there for research in solar cooker especially for small size domestic solar cookers.

**Group IV Title of the Project**

**Design and Development of Home Appliances–Solar Distillation**

**Name of the Mentor** : **Capt. F.S. Muzammil**  
**Students Name** : Arasu Durai, Reg No. 18UPH010  
E. Karthikeyan, Reg No. 18UPH011  
D. Mahendran, Reg No. 18UPH012

**Abstract**

Solar distillation is a technology for producing potable water from brackish and underground water of low-quality at low cost. It can reduce water-scarcity problems together with other water purification technologies. Solar distillation is analogous to natural hydrological cycle. It uses an apparatus called a solar still in which water is evaporated using solar energy, a form of renewable energy, and collected as distillate after condensation of the vapor. It effectively produces distilled water after removal of impurities. The major advantage of this is the use of solar energy instead of

electrical energy generated from conventional fuels. This helps in producing potable water without degrading our environment. In this project, many aspects of this technology are being covered. Among those, the working principle explains the production of distilled water through evaporation and condensation process inside the solar still, including its advantages and drawbacks. The evolution of the solar still is discussed under the historical background section and classified as passive or active solar stills. Various heat gains and losses and a methodology to develop a thermal model to predict the solar still performance are presented. In conclusion, the probable extensive use of this technology to solve water problems on a large scale all over the world is presented.

### **Group V Title of the Project**

#### **Determination of Dielectric Constant for Solids**

**Name of the Mentor** : **Dr. R. Raj Muhamed**

**Students Name** : M. Manikandan, Reg No. 18UPH013  
A. Mohamed Aathif, Reg No. 18UPH014  
A. Mohamed Absal, Reg No. 18UPH015  
M. Mohamed Fazil, Reg No. 18UPH016

#### **Abstract**

The dielectric constant is an essential piece of information when designing thin film capacitors and in other circumstances where a material might be expected to introduce capacitance into a circuit. It is the ratio of the capacitance of the capacitor with test material as the dielectric to the capacitance of a capacitor with vacuum (or air) as the dielectric. In this project, we have measured the dielectric constant of BaTiO<sub>3</sub> mixture using LCR meter and analyzed the variation of the dielectric constant with various factors such as temperature, applied dc voltage, applied ac voltage and in the case of ac voltage, frequency of the ac voltage applied. In order to understand the theory of dielectrics, as well as to know their importance a brief survey of literature was made and observations and calculations of dielectric constants of some known materials were carried out. In particular the capacitances of four solid materials, namely 1. Glass, 2. Bakelite, 3. Teflon and 4. Lead Zirconium Titanate was found and from these measurements, the dielectric constants of these materials were calculated. Further the dielectric constants for different solids were measured using a quadrant electrometer. The dielectric constants of dielectric composites such as inorganic dielectrics (Ceramics) and Inorganic dielectrics (Polymers) were studied and compared. Finally, the measurement of the dielectric constant of the mixture BaTiO<sub>3</sub> was carried out.

## **Group VI Title of the Project**

### **Determination of Dielectric Constant for Liquids**

**Name of the Mentor** : **Mr. J. Umar Malik**

**Students Name** : K.S. Mohamed Mujjamil, Reg No. 18UPH017  
A. Mohamed Nousath, Reg No. 18UPH018  
S.Mohammed Eliyas, Reg No. 18UPH019  
A. Moideen Mohamed Hussain, Reg No. 18UPH020

#### **Abstract**

Dielectric liquids are critical for the proper operation of electrical equipment. Power equipment cannot operate without energy loss, which leads to rises in temperature. It is essential to dissipate the heat generated by the energy losses, especially under high load conditions. Failing to do so results in premature aging, and ultimately to failure of the equipment. Heat dissipation can be achieved by circulating certain liquids, which also ensure electrical insulation of energized conductors. The insulating fluids market is therefore likely to be dominated by liquids, leaving to gases limited applications in power equipment. In our present work, we are interested in certain liquids that are used commonly in Physics laboratory for many other purposes. We tried to find their dielectric values and their probable place of application. We zeroed in carbon tetra chloride, acetone and ethyl alcohol. The experiment has been done in our PG laboratory using an instrument that was brought under DBT scheme. Using the formula already available in the literature, we found their dielectric values and are readily agree well with the literature value.

## **Group VII Title of the Project**

### **Design and Development of Home Appliances – Solar Pumping**

**Name of the Mentor** : **Dr. J. Ebenezar**

**Students Name** : N. Muhilan, Reg No. 18UPH021  
G. Nallasekaran, Reg No. 18UPH022  
S. Nasarul haq Al Hassan, Reg No. 18UPH023  
J. Nazeemdeen, Reg No. 18UPH024

#### **Abstract**

Agricultural technology is changing rapidly. Farm machinery, farm building and production facilities are constantly being improved. Agricultural applications suitable for photovoltaic (PV) solutions are numerous. These applications are a mix of individual installations and systems installed by utility companies when they have found that a PV solution is the best solution for remote agricultural needs such as water pumping for crops or livestock. A solar powered water pumping system is made up of two basic components such as PV panels and pumps. A PV panel is the solar cell. Each solar cell has two or more specially prepared layers of semiconductor material that produce direct current (DC) electricity when exposed to light. This DC current is collected by the wiring in the panel. It is then supplied either to a DC pump or AC pump (after conversion), which in turn pumps water whenever the sun shines using the pump. Thus, the present project work is to design, development and mechanism of home appliances for solar pumping system and its advantages.

### **Group VIII Title of the Project**

#### **Design and Development of Home Appliances – Solar Dryer**

**Name of the Mentor** : **Mr. A. Abbas Manthiri**

**Students Name** : M. Periyasamy, Reg No. 18UPH025  
K. Rinoskhan, Reg No. 18UPH026  
G. Rishiikowsike, Reg No. 18UPH027  
M. Santhosh, Reg No. 18UPH029

#### **Abstract**

The solar drying system utilizes solar energy to heat up air and to dry any food substance loaded, which is beneficial in reducing wastage of agricultural product and helps in preservation of agricultural product. Based on the limitations of the natural sun drying e.g. exposure to direct sunlight, liability to pests and rodents lack of proper monitoring, and the escalated cost of the mechanical dryer, a solar is therefore developed to cater for this limitation. This project presents the design and construction of a domestic passive solar dryer. The dryer is composed of solar collector (air heater) and a solar drying chamber constraining rack of three cloth (net) trays both being integrated together. The air allowed in through air inlet is heated up in the solar collector and channelled through the drying chamber where it is utilized in drying. The design was based on the geographical location which is Abeokuta and meteorological data were obtained for proper design specification. The dimensions of the dryer is 94cm x 45cm x 101cm / 20cm (length x width x height). Locally available material were used for the construction, chiefly comprising of wood (gmelina), glass, aluminium metal sheet, copper and net cloth for the trays. The optimum temperature of the dryer is 50.50 °C with a corresponding ambient temperature of 34.50 °C. The moisture content removal of 43.2% and 40.6% in maize and plantain respectively using the solar dryer was achieved as against 28.2% and 27.89% in maize and plantain using the sun drying method and indication 15.0% and 12.71% difference respectively, the rapid rate of drying in the dryer reveals its ability to dry food items reasonable rapidly to a safe moisture.

### **Group IX Title of the Project**

#### **Design and Development of Home Appliances – Solar Photovoltaic Cell**

**Name of the Mentor** : **Dr.A.S. Haja Hameed**

**Students Name** : P.Sarath Eswar, Reg No. 18UPH030  
R. Sathish Kumar, Reg No. 18UPH031  
K. Sheik AhamedImthiyas, Reg No. 18UPH032  
K. Sudharsan, Reg No. 18UPH033

#### **Abstract**

Single/Mono-Crystalline Silicon Solar Cell, Polycrystalline Silicon Solar Cell (Poly-Si or Mc-Si), Second Generation Solar Cells—Thin Film Solar Cells, Amorphous Silicon and Cadmium Telluride (CdTe) Thin Film Solar Cells, Copper Indium Gallium Di-Selenide (CIGS) Solar Cells, Nano crystal based solarcells, Polymer based solar cells, Dye sensitized solar cells and Concentrated solarcells etc., can increase the efficiency up to 31%. A new design with the fusion of solar thermal energy and thermoelectric energy conversion using Seebeck effect is one of the remarkable technologies, which have great potential to play a significant role in the energy requirements in the near future. The solar parabolic dish concentrator and Thermo-electric generator modules (TEGs) are used in order to increase the

efficiency of the cell. Here, the solar parabolic dish concentrator concentrates the solar heat energy to create hot-end whereas cold- end temperature is kept down by means of water flow. A parabolic dish concentrator consisting of plane mirrors concentrates solar heat to the aluminum receiver, which has two sides one is hot side and another is cold side. Thermo-electric generator modules (TEGs) consist of bismuth telluride ( $\text{Bi}_2\text{Te}_3$ ) semiconductor. Solar thermal energy collecting system comprising of parabolic dish concentrator to achieve a temperature gradient of about 270 °C between hot and cold side of the receiver which was expected to produce 14 W per thermo- electric generator module. The two-axis linear solar tracking system is used to increase the overall efficiency of the system. Multiple modules can be used to generate power up to 500 W and the efficiency can be maintained by keeping the temperature difference. The technology which uses both solar thermal energy and thermo-electric energy has a great potential to play a vital role in the eradication of energy crisis.

### **Group X Title of the Project**

#### **Assembling of HAM Radio Transmitter**

**Name of the Mentor** : **Dr. S. Abbas Manthiri**

**Students Name** : S. Surya Prakash, Reg No. 18UPH034  
K. Surya Bharathiv, Reg No. 18UPH036  
S. Syed Mohamed Haneef, Reg No. 18UPH037  
M. Umar, Reg No. 18UPH038

#### **Abstract**

Ham radio is both a hobby and a service that uses various types of radio communications equipment to communicate with other radio amateurs for public service, recreation and self-training. A participant is called an amateur radio operator, or a ham. Amateur radio operators have been around since the beginning of radio, but the Amateur Radio Service did not come along until the advent of a licensing body. Amateur radio operators enjoy personal wireless communications with each other and are able to support their communities with emergency and disaster communications if necessary, while increasing their personal knowledge of electronics and radio theory. An estimated six million people throughout the world are regularly involved with amateur radio. Millions of amateur radio operators communicate daily with each other directly or through ad hoc relay systems and amateur satellites. Amateur radio operators have traditionally been recognized as an important part of the radio community. With regard to the spectrum use, all frequencies are shared or common to all amateur radio operators and no frequency is assigned for the exclusive use of any amateur station. Amateur radio operators cooperate in selecting transmitting channels to make the most effective use of the allocated frequencies. Amateurs do not broadcast their transmissions; they have two-way communications with other amateurs. In fact, it is illegal for amateurs to broadcast information for the general public on the amateur radio bands or communicate with non-amateurs.



### **Group XI Title of the Project**

#### **Design and Development of Home appliances –Solar Inverter**

**Name of the Mentor** : **Dr. S. Shek Dhavud**  
**Students Name** : N. Eismail, Reg No. 18UPH042  
T. Harish, Reg No. 18UPH043

#### **Abstract**

A solar inverter converts the variable direct current (DC) output of a photovoltaic (PV) panel into alternating current (AC) that can be fed into a commercial electrical grid or used by a local, off-grid electrical network. In most of the houses, only main power supply is used compared to solar and other renewable energy sources. The off grid system is more suitable for the rural areas where it is difficult to the supply the power from grid due to the geographical location. The difference between main power supply and the solar is the payment of the bill. If consumer use main power source, they have to pay the bill every month but if they use off-grid system consumer just have to rely on its off grid system. The reason is, during daytime power will be taken from solar energy, some of that power will be used and some will be stored for usage at night. Therefore during the night time, there is no power needed because battery will discharge to the run appliances. The battery will discharge until next morning and then solar will start to run the appliances again. Solar power inverters have special functions adapted for photovoltaic arrays and maximum power point tracking systems. Consumer can check Voltage and Current on device via the Liquid Crystal Display. Our goal in this project is to use the portable inverter which will be handy in emergency situations and it also has many other applications to run the AC appliances.

### **Group XII Title of the Project**

#### **Assembling of HAM Radio Receivers**

**Name of the Mentor** : **Mr. S. Mohamed Ibrahim SulaimanSait**  
**Students Name** : V. Nithish Kumar, Reg No. 18UPH044  
A. Mohamed Ibrahim, Reg No. 18UPH045  
S. Mohammed Aslam, Reg No. 18UPH046  
A. Sheik Abdullah, Reg No. 18UPH047

#### **Abstract**

Ham radio is a popular hobby and service that brings people, electronics and communication together. People use it to talk across town, around the world, or even into space, all without the Internet or cell phones. It's fun, social, educational, and can be of great help in times of need. Hams can operate from just above the Amplitude Modulation (AM) broadcast band to the microwave region, in the gigahertz range. Many ham bands are found in the frequency range that goes from above the AM radio band (1.6 MHz) to just above the citizens band (27 MHz). During daylight, 15 to 27 MHz is said to be a good band for long-distance communications. At night, the ideal band for is 1.6 to 15 MHz. These bands are often referred to historically as short-wave bands (representing short-wave radio). Many hams begin on VHF-FM, using battery-operated hand-held transceivers to transmit on one frequency and receive on another frequency. The FM repeater receives one signal at a time and simultaneously rebroadcasts it on another frequency using many more watts of power than available from a small hand-held radio. This extends the range of the hand-held radio from a few miles to tens or hundreds of miles. When a ham is traveling, he or she can find a repeater to use, and

have a good, static-free, FM-radio-quality conversation via a radio that is small enough to fit comfortably in one's pocket or purse. Linked repeaters make possible fun wireless communications across an entire state with a hand-held radio. Repeaters use common transmits and receive frequency pairs. The frequency pairs in use are informally assigned by groups of hams in such a way that one frequency pair in use is far enough from another repeater thus avoiding unwanted interference.

### **Group XIII Title of the Project**

#### **Development of Physical Pest Control Devices Using Ultrasonic Waves**

**Name of the Mentor** : **Dr. C. Hariharan**

**Students Name** : P. Prakash, Reg No. 18UPH050  
A. Mohammed Asif, Reg No. 18UPH051

#### **Abstract**

The main objective of this research work is to develop a prototype model of a variable frequency ultrasonic pest repeller. In order to protect human being from the pest disease such as leptospirosis, typhoid fever, dysentery, cholera, poliomyelitis, yaws, anthrax and dengue, a highly efficient pest repeller is required. The diseases caused by the pests in the environment should be controlled. Thus, it leads to the design and development of an ultrasonic pest repeller where the frequency of emission of ultrasonic sound is continuously varied step-by-step automatically from the range of 25 kHz to 65 KHz. This electrical pest repeller can be used to repel rats, cockroaches, mosquitoes, and other pests. It is controlled by a built-in microcomputer, carrier wave pulses circuit, and carrier frequency pulse circuitry. The pest repeller is designed using high-frequency pulse acoustic waves and electromagnetic waves to attack the nervous system of pests. The only way for them to survive is to leave the area. No smell, no poison, no fumes, non-audible and no side effect to human. It can be used continuously and suitable for use in homes, offices, restaurants, warehouses.

## **Department of Zoology**

### **Group I Title of the Project**

#### **Evaluation of radioactivity in various building materials.**

**Name of the Mentor** : **Dr. R. Krishnamoorthy**

**Students Name** : S. Arun Kumar, Reg No. 18UA5208  
M.Abdul Basith, Reg No. 18UA5201  
S. Chindhan, Reg No. 18UA5245  
R. Irshath Ahamed, Reg No. 18UA5212  
Muhammed Zinan, Reg No. 18UA5244  
A.S. Abdul Muthalif Asfaq, Reg No. 18UPH048  
V. Sakthi, Reg No. 18UPH049

#### **Abstract**

The high radiation levels are due to the presence of large quantities of naturally occurring radioactive minerals in the rocks, soils, sediments, etc. Among the various geological formations, sediments plays a predominant role in aquatic radioecology and plays a role in accumulating and transporting contaminants within the geographic area. It is the basic indicator of radiological contamination in the environment. The terrestrial gamma radiation and gross-radioactivity concentration were investigated in various buildings materials collected in Tiruchirapalli. Terrestrial gamma radiation exposure doses (excluding cosmic radiation) were measured using a Plastic Scintillation Counter, a rugged, light weight and portable instrument designed for radiometric, geophysical and environmental reconnaissance survey was used to measure terrestrial gamma radiation level. The terrestrial gamma level was found to be 05 $\mu$ R/h in sand, 06 $\mu$ R/h in mineral sand, 07 $\mu$ R/h in brick, and in cement respectively. The gross alpha radioactivity of buildings material was performed using Radiation Counting System (Nucleonix- RC 605A). The gross-alpha activity concentrations were found to be 1.834Bq/kg (sand), 0.458Bq/kg (mineral sand), 11.459Bq/kg (brick), and 8.25 Bq/kg (cement) respectively.

### **Group II Title of the Project**

#### **Production of bio fertilizers from fish wastes available from fish market at Tiruchirappalli.**

**Name of the Mentor** : **Dr. M. Meeramoideen**

**Students Name** : D.Jeevanandam, Reg No. 18UA5214  
P.N. Afzal Ahamed, Reg No. 18UA5235  
S. Abdul Basith, Reg No. 18UA5202  
V.Parameshwaran, Reg No. 18UA5225  
Noorul Ameen, Reg No. 18UA5241

#### **Abstract**

The fish consumption per person has doubled on a worldwide basis and hence the fishery waste on land has also increased. The discarding of fish waste creates environmental problems as well as disposal problems. The common practice of disposing the residue of the seafood market into natural open bodies of water and landfills has on odor problems, floating debris and visible surface slick, attractants of undesirable changes in the environment and nearby people. Conventional methods for reutilization of fish waste are animal feeds, and composting fertilizer. Composting fish waste is a relatively new and an environmentally sound alternative to disposing of fish waste. It is economical, odorless and a biological beneficial practice for sea food operation. The reutilization of fish waste as liquid fertilizer was particularly economical alternative at present. Fish compost can be prepared with fish wastes such as tissues, bones and scales mixed with three different substrates such as sugarcane juice, jangery and Curd in 1:0.1 ratio. Fish compost characters such as odor, physical state, weight, pH and protein content were estimated. After 48 days, bad odor gradually turned into relatively odor less in fish waste mixed with jangery and sugarcane juice. The bone and scales of fish became degraded and turned into liquid state.

### **Group III Title of the Project**

#### **Evaluation of anti-mosquito larvicidal activity of plant extracts**

**Name of the Mentor** : **Dr. P. Rajasekar**

**Students Name** : Z. Ajeez Ahamed, Reg No. 18UA5203  
S. Manoj, Reg No. 18UA5219  
K. Mohamed Riyas Khan, Reg No. 18UA5221  
S. Mohamed Sarif, Reg No. 18UA5222  
G.Thamistheen, Reg No. 18UA5229

#### **Abstract**

The mosquito larvicidal activity of plant extracts was evaluated using hexane, chloroform, ethyl acetate, acetone, and methanol leaf, flower and seed extracts of the Poncirustrifoliata(Kamala), Murrayapaniculata (Kattukariyilai), Citrus bergamia(Narandam), Aegle marmeles(Vilvam) and Limonia acidissima(wood-apple. The results showed that the crude hexane, benzene, chloroform and methanol solvent extracts of leaf of P. trifoliata were effective against the larvae of two important vector mosquitoes, viz. An. stephensi and Ae. aegypti. The results suggest that the effective plant extracts have the potential to be used as an ideal ecofriendly approach for the control of disease vectors. This study provides the first report on the larvicidal activity of extracts of different mosquitoes.

**Group IV Title of the Project****Impact of polluted water (tributaries of river Cauvery) on macrofaunal diversity****Name of the Mentor** : **Dr. K. Prabakar****Students Name** : A. Mohamed Yunus, Reg No. 18UA5223  
V.Kamalesh, Reg No. 18UA5217  
N. Balaji, Reg No. 18UA5209  
S. Shahul Hameed, Reg No. 18UA5227  
Muhammed Saeed, Reg No. 18UA5243**Abstract**

Rivers are important ecosystems that are integrated into biogeochemical cycles and constitute an essential resource for numerous human uses. However, the assessment of the biological diversity and composition of microbial communities found in rivers remains incomplete, the present study analyzed the microbial diversity of the planktonic and sediment populations in a river in Tiruchirappalli that is exposed to severe pollution. Six water and six sediment samples were analysed. The dominant bacterial phyla in both sediment and water were the Proteobacteria, followed by Bacteroidetes and Actinobacteria in the water column and by Chloroflexi and Acidobacteria in the sediment. Biological diversity appeared to be greatly decreased by environmental pollution, whereas the microbial community structure was variable across the analyzed transect. Moreover, a narrow relationship between industrial and urban sources of contamination and the bacterial genera detected at these sites has been observed. A variety of potentially pathogenic bacteria was detected, including Klebsiella, Treponema, Faecalibacterium and Enterococcus, indicating that the river might pose a substantial risk to public health.

**Group V Title of the Project****Impact of polluted water (tributaries of river Cauvery) on macrofaunal diversity****Name of the Mentor** : **Dr. A. Sadiq Bukhari****Students Name** : J. Umar Sherif, Reg No. 18UA5230  
M.Khaleefa, Reg No. 18UA5218  
M.Mohamed Asip, Reg No. 18UA5220  
B. Gunaseelan, Reg No. 18UA5210  
A. Arief Ahmed, Reg No. 18UA5205**Abstract**

In the present study, characterization of borewell water showed the type of pollution were studied at the municipal solid waste dumping yard, located in and around Tiruchirappalli City, Tamilnadu. The composition was sampled at four different locations at the landfill. Groundwater samples were collected from ten bore well hand pumps at various radial distances from the boundary of the dumping yard. The objective of this paper is to evaluate the bore well water pollution due to the landfill leachate. The groundwater physicochemical parameters were characterized. In the present study the concentration of heavy metals in leachate samples were in the following sequential order Fe < Mn < Zn < Cu < Cr < Cd < Pb < Ni. The general observation is that the water samples collected from bore wells clearly show that the nearest water sources are polluted more than the ones farther away. The study has revealed that the ground

water quality does not conform to the drinking water quality standards as per Bureau of Indian Standards. Therefore, urgency for leachate treatment at this site is recommended to prevent further contamination of groundwater.

#### **Group VI Title of the Project**

##### **Vermicompost preparation**

**Name of the Mentor** : **Dr. S. Mohamed Hussain**

**Students Name** : R. Nisar, Reg No. 18UA5224  
K. Ragavan, Reg No. 18UA5226  
H. Kaiyasudeen, Reg No. 18UA5215  
P. Kalaiselvan, Reg No. 18UA5216  
R. Vishnupriyan, Reg No. 18UA5236

##### **Abstract**

Vermicomposting is a controlled, aerobic, biological process and able to convert biodegradable humus like organic substances and suitable for the application of soil amendment. An Organic solid waste collected from local vegetable market and cow dung used for vermicompost preparation whereas cow dung alone used as control. By standard procedures, the two different earthworms *E. eugeniae* and *E. fetida* were inoculated into the pits at the end of 45<sup>th</sup> day the compost was collected. Vermicompost were analyzed for their physico chemical properties. For the plant growth activities, the compost was applied to the brinjal plants cultivated in large cement tanks. Various field parameters were analysed. As a conclusion, this study showed that the two different earthworms producing vermicompost application yields good results in egg plant. Among the two earthworm, *E. fetida* showed significant results on improved soil quality and plant yield parameters.

#### **Group VII Title of the Project**

##### **Predictive distribution of Insects and Birds in Cauvery river bank using Mathematical modeling**

**Name of the Mentor** : **Dr. M. Salahudeen**

**Students Name** : A. Arjun Raj, Reg No. 18UA5206  
A.C. Venuprasanth, 18UA5233  
S.P. Akilan, Reg No. 18UA5204  
M.Gunaseelan, Reg No. 18UA5211  
K.T. Muhammed Amal, Reg No. 18UA5238  
T.Salavudeen, Reg No. 18UA5232

##### **Abstract**

Biodiversity loss is a global problem, conserving habitat for species of insects and Birds is uncommon and generally of low priority, although there are exceptions. They also play a major role in maintenance of ecosystem services. In the present study we have focused on distribution of Insects and Birds in the cauvery river bank. Species are surveyed based on Transect method. Totally 25 species birds and 40 insect species were documented. Curve fitting analysis was done to predict future distribution of birds and insects in the study site. Red wattled lapwing is the common bird present in the all three transects. The future availability of this bird will become quite normal. Further, eco restorations should be planned in the cauvery river banks to reduce threats to the birds and insects in the study areas.

**DBT Star College Scheme**

# **Group Projects Report (2020-21)**



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