

CHOITHRAM SCHOOL
MANIK BAGH INDORE
SCIENCE PROJECTS

2014-15- Senior Biobalvigyan

Topic – Phytolace

AIM-Construction of a floating treatment wetland system at a microcosmic level

And

Phytoremediation of waste water using FTW concept

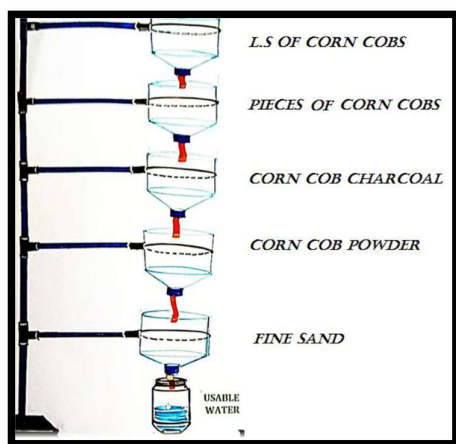
Conclusion- project “phytolace” emphasises on effective treatment of waste water containing heavy metals. It involves phytoremediation of heavy metals contaminated water. Phytolace proves to be potentially the least harmful method because it preserves the plants in more natural state. The only limitation is the bioaccumulation of heavy metals into the plants, which emphasise the safe disposal of affected plant material. So we used medicinal and ornamental plants which affectively serve the purpose of phytoremediation and do not disturb the food chain. These plants are not wasted, and can be used for certain non edible purposes



2015-16

Senior Bio Balvigyan

Aim : to prepare water filter by using corn cobs.



Conclusion-Since pond water contains a large quantities of heavy metals and contaminations and corn has a good tendency to absorb the heavy metals and effluents Corn cobs were found suitable adsorbents because of their high mechanical strength, rigidity and porosity. Hence, contaminants like oxides of salts, detergents, suspended particles, coloured dyes, oil and grease get adsorbed in the surface of the corn cobs. Corn cobs adsorb contaminants from surface water and prevent their entry into groundwater. Indirectly corncobs help to decrease the temperature of water by adsorbing the suspended particles which store heat and raise water temperature. These also help in preventing shock loading from hard surfaced parking lots. It is a cheap and low cost method using one the less utilized agricultural bio-wastes of the globe

2016-17

Sr. BalVigyan- Chemistry

“Mata Bhumi Putroham Prathviya”

AIM- is to introduce such a method which can reduce the amount of CO_2 in the atmosphere. Since CO_2 is harmful and global warming is not limited to a particular country rather the whole world, so there is a need for a global solution.

Here we have a simple and inexpensive new sustainable fuel technology that could potentially help to limit global warming by removing carbon dioxide from the atmosphere to make fuel.



Methanol and propanol are formed in these reactions, which are again used as fuels in vehicles. So a carbon neutral-cycle is formed.

JUNIOR BALVIGYAN 17-18

Topic: Energy Dependence for Future Sustenance- Model was constructed to show-

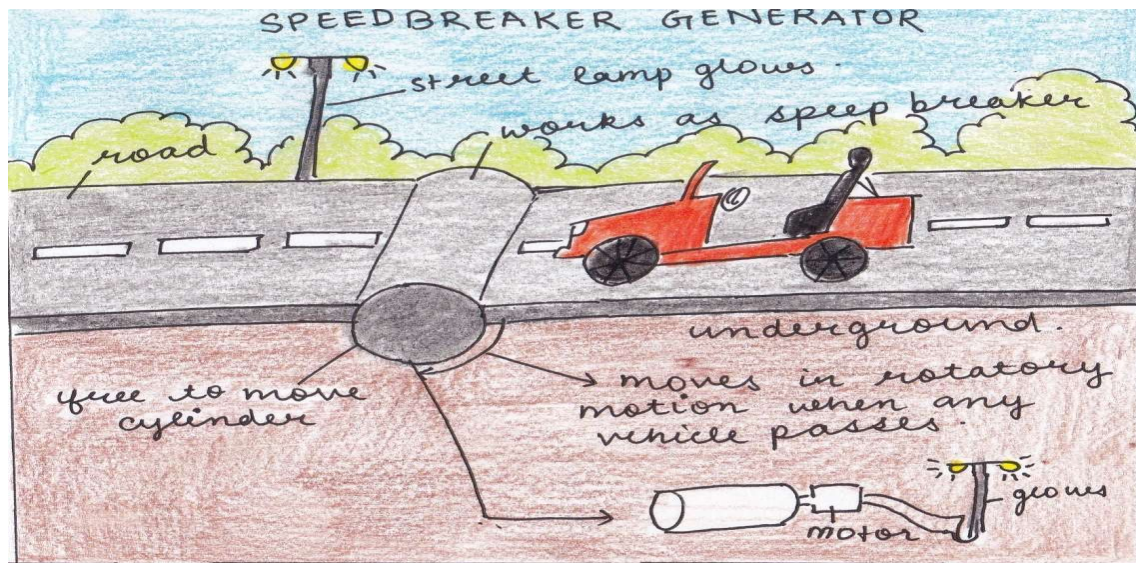
1.GENERATION OF ELECTRICITY THROUGH RUNNING WATER

2. GENERATION OF ELECTRICITY THROUGH WATER HARVESTING SYSTEM.



3. ELECTRICITY GENERATION THROUGH MAGNETS

4. ELECTRICITY GENERATION THROUGH SPEED BREAKERS



BIOLOGY BALVIGYAN 2018-19

THEME- FOOD SECURITY AND WASTE MANAGEMENT

TOPIC- GARBAGE- A SUSTAINABLE AND BIODEGRADABLE GREEN SOIL AMELIORANT

PREPERATION OF ORANGE PEEL MIXTURE (SAPs)

PREPERATION OF BIOCHARS- Three biochars were prepared through slow pyrolysis using Sugarcane bagasse, Coconut fibers and peanut shells



CONCLUSION

- Results of the experiments indicate SAP and Biochars can be used as an excellent biodegradable green ameliorant in drought prone areas or where there is scarcity of rains to increase the productivity as frequent irrigation can be avoided.

- Results of water holding capacity, soil moisture content and effect on the growth of the plants indicates that orange peel mixture absorbed the maximum amount of water and produced the healthiest and the tallest plant even after 20 days without watering.
- The orange SAP and biochars costs minimal expenditure as they are made from the wastes. Only expenses are in electricity and time.
- Orange sap acts as a gelling agent which possessed the ability to absorb 50% water and retained the moisture for 20 days keeping the plant healthy.
- Sugarcane and coconut biochars also provided a fruitful result of water retaining capacity as they are carbon rich compounds.
- Thus biochars and SAP can be considered as eco friendly, feasible, economical means of a sustainable and biodegradable green ameliorant.
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CHEMISTRY BAL VIGYAN 2018-19

- **THEME-RESOURCE MANAGEMENT**
- **TOPIC- BIOFUEL FROM USED OIL**

The first aspect of the experiment is to produce alternative fuel from a simple by-product of every home - cooking oil. Be it 'Extra Virgin Olive oil' or Sunflower oil, the main structure of all fats/oils stays same. Chemically, oil and fats are defined as tri-esters of higher fatty acids with a glycerol molecule. The variability of the 3 alkyl groups changes the properties of the oil/fat. For highly unsaturated chains, the triglyceride is liquid at room temperature and is classified under oils and for saturated (or sparingly unsaturated chains), it is a solid and is classified as a fat.

- The aim is to remove the glycerol molecule from the 3 alkyl groups and replace it with a methyl group via transesterification. This produces 3 molecules of alkyl-methyl ester and these are the components of biodiesel. A small amount of KOH or NaOH is used as a catalyst. In this particular set of experiments, KOH was used. The used oil was obtained from the school kitchen and was first filtered out to remove food particles from it.
- Then methanol and KOH were mixed. The KOH dissolves fairly quickly in methanol. Then this methanol and KOH solution was added to the filtered oil and stirred continuously. Immediately, the solution turned opaque and turbid, indicating that the reaction is happening. After stirring for 4-5 minutes, the solution had cleared up again.
- After letting the solution sit for 24 hours under airtight conditions, 2 distinct layers were observed in the solution.
- It was found that the layers were of biodiesel and the glycerol. The layers were separated using a separation funnel. and the biodiesel was further purified by washing it with distilled water and the glycerol being miscible in water, separates out from the biodiesel

PHYSICS Balvigyan 2018-19

THEME- FOOD SECURITY

TOPIC- REBBERVATION OF MAGNETIC FIELD ON PLANT

AIM- We tried to create a system that would be able to enhance growth of plants with minimal contamination of soil (caused by fertilizers) using magnetic field and tried to compare it with the present methods keeping all physical conditions same. However we are focusing towards the change in the system using some innovation

Conclusion-

The magnetic field used in the experiments is mainly the constant magnetic field produced by magnets or electromagnets.

Magnetic field may play an important role in cation uptake capacity and has a positive effect on immobile plant nutrient uptake. Studies on the meristematic cells of plants have shown that magnetic field affects normal metabolisms and has impact on cellular division.

Magnetic fields affect the synthesis of DNA and RNA as well as the cellular proliferation. Mitotic analyses indicated a positive influence of EMF on the rate of cell proliferation in pre-treated seeds with 3mT intensity for a 4h exposure time, and showed decrease in chromosomal aberrations.

The magnetic field stimulated the shoot development of plant and led to an increase in germinating energy, germination, fresh weight and shoot length

Plant growth and development are under the control of both intrinsic and extrinsic factors. This magnetic field enhances plant's intrinsic factors, which leads to its rapid development. Many electro-culture experiments are being done in laboratories to show that introducing an electric or magnetic field will enhance plant growth and seed germination. This method can be used in plant nurseries to improve the yield of plants being nurtured.

JUNIOR BAL VIGYAN 2019-20

THEME- WASTE MANAGEMENT

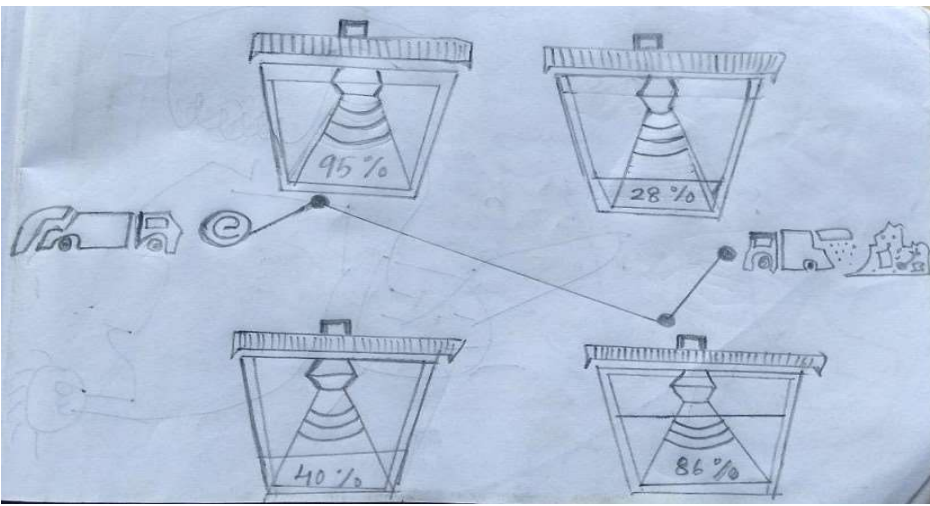
TOPIC- SWACHHTAM PARISARAM

PUNCH LINE: SMART BINNING WINS THE FUTURE INNINGS

Problem Statement: Open overflowing unhygienic waste poses a threat to the surroundings.

OUR IDEAS

A) E-BIN: SMART BINS FOR SMART CITIES



B) GENERATION OF ELECTRICITY THROUGH SEWAGE



Research Projects
(Since June, 2016)

1. **Effect of magnetic field on plant growth**
2. **Effect of magnetic and electric field on plant growth (Modified)**
3. **Extraction of Electricity from Atmosphere**
4. **Hiber - bot**
5. **Carbon-dioxide:-Menace into Manifestation**

Topic name	Details
Effect of magnetic field on plant growth	A study was conducted to test if a magnetic field can affect plant growth and health. The study divided plants into two groups. The first group of plant seeds grew in a magnetic field. The second group grew in the absence of a magnetic field. Several growth parameters were measured, including the germination rate, plant height, and leaf size. Plant growth was observed continuously for a few weeks. The results showed that magnetism had a significant positive effect on plant growth.
Effect of magnetic and electric field on plant growth (Modified)	
Extraction of Electricity from Atmosphere	We did mathematical modeling of how much electrical Energy is created when we place plates in different potential and how to extract electricity from Atmosphere. This method of electrical power Generation may be a very innovative step to replace.Hazardous means of electric power generation.As this method is renewable and eco-friendly, it will Not harm the environment while generating a fair Amount of electricity.
Hiber - bot	Hiber-Bot is a resilient mechanism that provides safety and comfort to astronauts travelling in deep space for an extensive period of time. The astronauts travelling must regain their health and shape and, thus, they must hibernate. This device will help them hibernate until a safe, life-supporting environment is discovered. Upon such discovery, a signal will be sent to the laboratories on Earth and the International Space Station. With this approach, deep space research can become a present reality.
Carbon-dioxide:-Menace into Manifestation	<p><u>Carbon Sequestration and Carbon Farming:</u></p> <p>Captured CO₂ can be stored underground to make the environment free of Greenhouse Gases (GHG's). In this CO₂ is pumped underground through pipes which are injected deep underground, typically around 1 km, where it would be stable for hundreds to millions of years. The technique requires a careful planning, to build the plant, to check the leakage of CO₂ after the injection process. Recommended time gap to monitor is 50 years post dumping. The dumped CO₂ then become isolated for a long time. In recent years international organisation are working to make the process efficient and cheaper. There are chances that carbon sequestration may be seen after Paris climate Agreement. Carbon farming revolves around the idea of organic farming. where various farming methods are</p>

incorporated to ensure the carbon stays in the soil and prevents it from escaping into atmosphere in the form of CO₂. Organic fertilizers are used and activities such as ploughing are done carefully to reduce the surface area resulting in further reduction of CO₂ emission. It's important since Agriculture contribute to approx. 7% GHG's emission.

Utilisation of CO₂:-

These models provide just a revolutionary idea that something like carbon dioxide which is becoming a menace can be used to produce energy, fuel and other valuable products. Utilizing Carbon dioxide efficiently and at a feasible cost, would be revolutionary and could change our perception about how we perceive our surroundings and would affect everything where humans can reach which includes space exploration. Carbon sequestration too has its benefits. It causes enhanced oil/gas recovery making the latter cheaper. While carbon farming increases the quality of yield by increasing the quantity of humus in soil (carbon).

Artificial leaf cell uses Sunlight and CO₂ as its products to produce H₂ by means of various chemical reactions and with the help of catalysts. Meanwhile the other model **Al-CO₂ electrochemical cell** is the system for CO₂ capture/conversion and electric power generation. The proposed cell would use aluminium as the anode and mixed streams of carbon dioxide and oxygen as the active ingredients of the cathode. The electrochemical reactions between the anode and the cathode would sequester the carbon dioxide into carbon-rich compounds while also producing electricity.

Name of project	Photos	Remark
		
		





BIOLOGY SENIOR BAL VIGYAN- 19-20

THEME- Smart City

Sub Theme - Environment conservation/Biodiversity

Title - Biological Management and Conservation of the Natural Resource (Jaiviki Suprayoga Samraksana Prakrittika Sadhansampath)

EXPERIMENTS

1) WATER PURIFICATION OF KHAN RIVER-

Extraction of sisal fibres and its uses

1. Sisal fibres were extracted from the Sisal plant leaves in Advanced Material and Processes Research Institute, CSIR, Bhopal by using Raspador



Conclusion

Results of the present study indicates the following –

Khan river water

Azolla acts as an excellent source of bioremediation for the uptake of heavy metals from Khan river water and can be used in various areas like in factories, horticulture, laundry etc.

Sisal Plant

Sisal plantation activity alone has an annual employment potential of about 113 man-days per hectare due to its various raw materials obtained from leaves like fibres and its residue which is being used in different areas. Moreover, its ecological and environmental benefits make all the more worthwhile to be grown amongst such people.



CHEMISTRY SENIOR BAL VIGYAN 2019-20

Theme- Smart City

Sub Theme- Automatic Water Saving and Smart Health & Wellness

TOPIC: 'prakalpaamahe jal-sanrakshanaartham' "let's gear up to save water"

To conserve water and minimize wastage, ensure it's more equitable distribution in the city and upgrade ground water level the students of Choithram School have come up with an idea of providing a sustainable solution to it by designing an automatic conservation system which will allow maximum water seepage and increase the ground water level.

A pervious concrete was prepared by using a mixture of cement, stone and water in fixed ratio. In this type of concrete, there are no fine aggregates normally used in the concrete matrix. Hence the void content is more which allows the water to flow through its body.

The benefits of pervious concrete are that it recharges the ground aquifers also by allowing rainwater to percolate into the ground; it prevents ponding and flooding problems and it reduces the need for expensive storm water management practices, such as retention pond, particularly in an urban area where land is scarce and prohibitively costly.

It can be implemented in the under-construction townships and can also be used to replace the in-use hexagonal or pavement tiles by the roadside and in the lawn or porch of villas and buildings.

ANVESHAN- 2019-20

Theme- Smart City

Sub Theme-Working Towards the Special Needs of the City

Title-Smart City Indore- Electricity and Security

Our Smart City is mainly focused on the supply of Electricity and Security in the city. Utilizing the renewable sources of energy available in surplus, we will be generating electricity in our city. Our chief resources include solar panels and a Vertical Axis Wind Turbine . With our idea, we expect the outcome to be propitious and ground breaking. It can be used practically on a large scale which will reduce our total dependence on the traditional methods of electricity production. It will also reduce the amount of excess carbon in the environment. we are also focusing on underground cable system for transfer of electricity from one part of city to other which is also an important from the concept of smart city.

As for the security of the city, we have designed a RFID chip that will contain all the essential information of the citizens of the country and eliminate the need of the mound of documents and paperwork that we generally carry. We will also have

smart cameras with facial recognition that will help build a secure environment.

We are also planning to use drones for different purposes like gathering information about any unknown object. They can also be used to gather precise spatial data and law enforcement which can help in the city's planning and

ILEOTHON 2019-20

AIM OF CREATING SMARTBREAKER-

To aid in Traffic & Waste Management

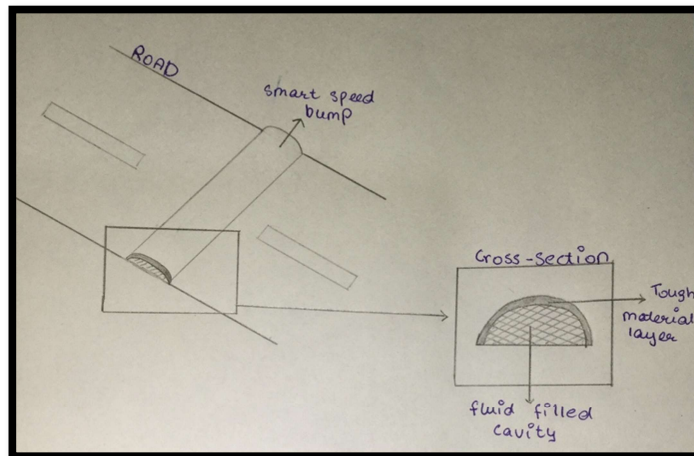
WORKING OF BREAKER:

The speed breaker can be either permanently or temporarily placed at a desired location, such as in street or roadway. The material in the tubes can be selected based on a desired shear rate. The shear rate selected will correspond to predetermined vehicle speed. When a vehicle rolls over the breaker below the predetermined speed i.e. below the critical shear rate of the material, the material remains in fluid form and the weight of the vehicle compresses the outer cover and the tubes.

When the vehicle has passed over the breaker, the breaker returns to its original shape. Thus, below the speed limit, little impact is felt by the driver. Therefore, if the vehicle is traveling under the selected speed limit which will provide a shear rate less than the critical shear rate however, in the event a vehicle impacts the speed breaker at a speed above the predetermined speed that is, providing a shear rate above the critical shear rate, the viscosity of the non-Newtonian fluid increases.

PREPARATION OF SMART

1. Adequate amount of corn with water according to viscosity.
2. The speed bump is made of a plastic/rubber
3. This hollow pipe is now corn flour mixture. The are sealed.
4. Fit the speed bump onto



BREAKER

flour is mixed
the required
of a flexible pipe
composite.
filled with the
ends of the pipe
the road.



-Solid on Compression



-Liquid on Relaxation

Observation and Analysis

- When a vehicle passes over the bump at a low speed, the molecules of the corn flour mixture get enough time to disperse, the viscosity remains low, and thus the vehicle passes smoothly without feeling any resistance.
- But when a vehicle moves at a higher speed, the molecules do not separate, viscosity increases, and thus the vehicle feels a bump.

Anveshan 2019-20

- In this competitive era, it is very demanding to learn hundreds of languages to communicate with other beings with the same fluency, fluidity and grammar. THEIA counters this problem by helping you understand and translate other languages to your own. It is a pair of “Smart Glasses” that helps you translate with ease, accuracy and efficiency. THEIA comes with a micro camera, pico projector, 3GB RAM along with stereo speakers and a built-in dictionary. Whenever you look at an image with text, THEIA extracts the characters in it and translates it to the language of your choice. Through a combination of NMT, SMT and semantics, THEIA offers you a speedy and precise translation with an option to either hear the translated speech or project it. Furthermore, when you travel to another state, or country, THEIA helps you converse with the natives by translating their speech to yours and vice versa. It also connects to your phone via Bluetooth 5.0, and helps you perform other functions like navigation, video streaming, messaging etc. THEIA also allows you to translate offline, saving a lot of your time and money. It is an ideal companion for any travel and with currently ongoing research, it may soon include the feature to translate to and from sign language. This device is useful for the businessmen, delegates, dyslexic, general population etc. It helps you learn a new language and visit a foreign nation with confidence. Through its implementation, THEIA can change the nature of future travel.



URJA DAY , SCIENCE EXHIBITION AT EDUCATION PARK SCHOOL, BHIKANGAON, DIST .KHARGONE, MADHYA PRADESH WAS ORGANISED ON 3RD DECEMBER,2018.

Brief about the Waste to Wire Project

Abundance of sewage water is present around us which can surely fulfill the demand of electricity to some extent. But now the question arises, where to store the sewage water?

The answer is that every society has its own waste water treatment plant where used and waste water is filtered. So, before filtering the waste water, we can first use it to generate electricity and when the capability of that stretch of water is over or reduced very much, we can send it to get filtered and use the next stretch of waste water to generate electricity. That means we can generate abundance of electricity at a very low cost and also at the same time make the used water to be easily filtered.

sewage water produces electricity is because it has a very high TDS where TDS refers to ‘total dissolved solids’. During digestion by some bacteria present in the sewage water, these bacteria convert the total dissolved solids into inorganic material and energy is extracted out of these inorganic materials. Another important reason is the presence of bacteria named geobacter which form nano wires through which electricity can pass through. . About 1 to 2 litres of sewage water was able to provide 4.5 to 5.2 volts of electricity for 8 to 10 days.



ANVESHAN-2021

PROJECT 1- It was a National Science Exhibition, a great platform for Science Enthusiasts. Sakina pakawala was a part of an idea presentation where students were asked to put their original ideas for the betterment of the human race. Her idea consisted of CRISPR technology where she explained how CRISPR can be used for autoimmune diseases. Her project consisted of combining cas-9 complex with UBA (ubiquitin-associated) to produce a permanent cure.

PROJECT 2- Murtuza Kapadia presented the idea of preparation and uses of Green Graphene.

Graphene is a versatile substance. It has many uses in different fields of sciences. It's proper implementation could change the overview of the world in just a couple of years. It has its own advantages and disadvantages. Along with being eco-friendly, it also reduces the need of graphite in our daily lives proving to be a better alternative in every aspect

Madhya Pradesh Vigyan Sammelan and Expo 2021 organized with IIT Indore-

under the theme climate change "Green The Cap" and second event "The seed Idea : Start UP generator". we have Presented SANJEEVANI, a lucrative business plan for a company ready to change the landscape of the agricultural and fertilizer industry.

