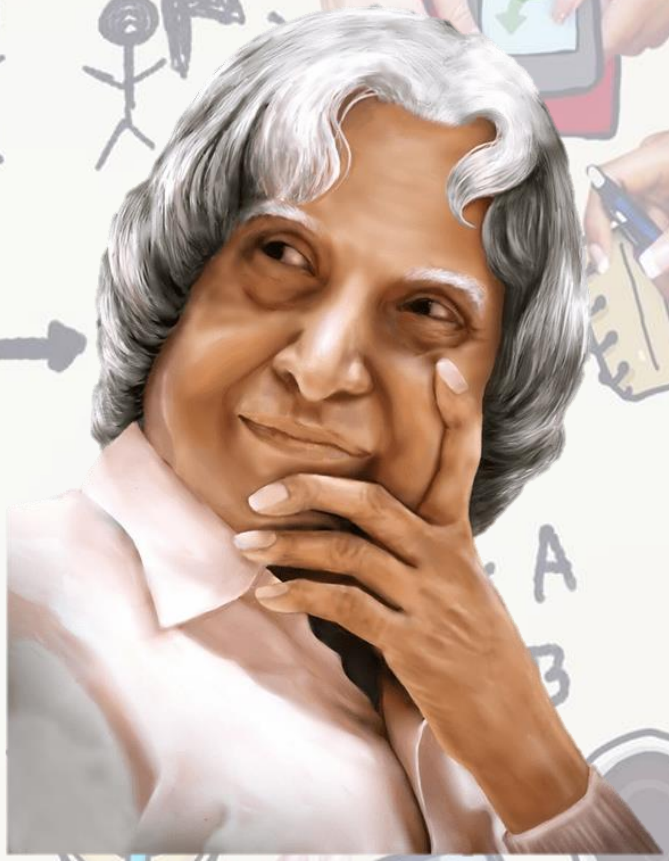
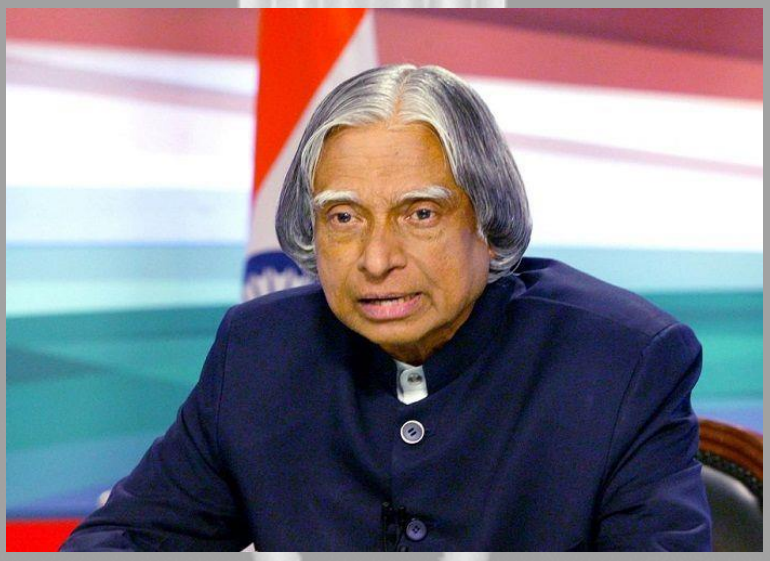
Dr. A.P.J. Abdul Kalam Young Research Fellowship By TERRE Policy Centre Vol.-1



Dream, Dream Dream, Dreams transform into thoughts And thoughts result in action

.....APJ Abdul Kalam

TERRE Policy Centre



APJ Abdul Kalam
Avul Pakir Jainulabdeen Abdul Kalam

A.P.J Abdul Kalam (15 October 1931 – 27 July 2015) was an Indian aerospace scientist and politician who served as the 11th President of India from 2002 to 2007. He was born and raised in Rameswaram, Tamil Nadu and studied physics and aerospace engineering. He spent the next four decades as a scientist and science administrator, mainly at the Defence Research and Development Organisation (DRDO) and Indian Space Research Organisation (ISRO) and was intimately involved in India's civilian space programme and military missile development efforts. He thus came to be known as the Missile Man of India for his work on the development of ballistic missile and launch vehicle technology. He also played a pivotal organisational, technical, and political role in India's Pokhran-II nuclear tests in 1998, the first since the original nuclear test by India in 1974.

Kalam was elected as the 11th President of India in 2002 with the support of both the ruling Bharatiya Janata Party and the then-opposition Indian National Congress. Widely referred to as the "People's President", he returned to his civilian life of education, writing and public service after a single term. He was a recipient of several prestigious awards, including the Bharat Ratna, India's highest civilian honour.

About A.P.J Abdul Kalam Fellowship

TERRE has declared national level 'Young Research Fellowship' in the reverential memory of **Dr. A.P.J. Abdul Kalam**. Dr. Kalam had high expectations from the youth of India and keeping this in context, TERRE has announced this noble award on the occasion of Late Dr. Kalam's birth anniversary - 15 October 2019.

Academic qualification: Under-graduates, post-graduates, Ph.D. of any stream.

Age eligibility: Minimum 19 years and maximum 25 years of age (as on 01.01.2020)

Research themes: Plastic, Clean Air, Agriculture and Environment Friendly Technology & Innovation.

Fellowship details: Young researchers who have worked or are working in the themes (as mentioned above) will be considered and upto 50 participants will be shortlisted for the fellowship. Innovative & unique idea will be awarded with INR 10,000 along with a Citation, Scroll and Medallion.

Fellowship will be awarded on remembrance day of Dr. Kalam i.e. 27th July 2020. Scrutinising committee headed Mr. Ashok Mangotra an Ex Chartered Officer and close acquaintance Late of Dr. Kalam

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Mr. Ashok Mangotra (IAS)

Joint Secretary,
President of India Office (Sep 2002 – Aug 2007)

Aiding and Advising the President of India Dr. A.P.J. Abdul Kalam (the highest office in India) in the discharge of his duties including constitutional, diplomatic, ceremonial, protocol and household affairs

Joint Secretary to Govt of India
Ministry of New and Renewable Energy (Feb 1998 – Sep 2002)

Policy formulation, implementation and roll out of a wide variety of plans, programmes and projects in the field of renewable energy in India. CLimate Change negotiations, CDM , UNDP GEF projects etc were all handled by me at the cutting edge level in this one of a kind Ministry in the world.

Dr. Vinita Apte

Founder Director
TERRE Policy Centre

Dr. Vinitaa is communication expert and manages the network activities with the governments, private sector and other NGOs. Presently she is executing the communication projects in the large private sectors in India and in UNEP. She has conducted numerous training and awareness events in the schools and for the teachers on the environmental protection. She has expertise in capacity building. A doctorate of Pune University, Vinita has worked as TV animator, cultural coordinator and creative writer. She participated and presented papers on CSR and role Social media in national and international seminars organized by UN in Bangkok, Paris, Langkawi (Malaysia), Cairo and Bali. She was presented with an award for the on the 20th Anniversary of the Montreal Protocol for innovative implementation of public awareness for the environmental protection. She has actively launched number of initiatives under the Safe Planet Campaigns of United Nations in Geneva.

Dr. Rajendra Shende

Chairman
TERRE Policy Centre

Dr. Shende, former Director at United Nations Environment Programme, is a leading expert in sustainable technologies and policies. As head of the Paris based Ozon Action Programme of UNEP, he worked with the governments of 146 developing countries‟ to develop their national management plans to eliminate use of Ozone Depleting Substances and to contribute to the mitigation of climate change. Through the teams of professionals and experts that he led from UNEP‟s five offices worldwide i.e. Paris, Bangkok, Nairobi, Bahrain and Panama City he led the capacity building and technology support programme under the Multilateral Ozone Fund and Global Environmental Facility (GEF). The programme has contributed in stabilizing the Stratospheric Ozone Layer and preventing a global catastrophe by enabling developing countries to comply with the Montreal Protocol. The Montreal Protocol is now considered as the most successful Multilateral Environmental Agreement so far, having put the Ozone layer on the path to recovery. Mr. Shende is a Chemical Engineer by qualification from the Indian Institute of Technology (IIT), Bombay. Before joining the UN, Mr. Shende had a senior management career in the private sector in India and was part of the task force set up by the Government of India to negotiate the multilateral environmental agreement, the Montreal protocol.

Shruti Belose
Student,
SIES Graduate School of Technology,
Nerul, Navi Mumbai
19 year

Aarti Desai
Student,
SIES Graduate School of Technology,
Nerul, Navi Mumbai
19 year

Project Title

Bioleather: A flexible package material as replacement to plastic.

Objective

To reduce use of plastic in packaging industry.

Method

To make SCOBY from kombucha, tea leaves or tea bags are added to boiled water and allowed to steep for five to ten minutes. The leaves or bags are then removed, and sugar is dissolved in the brew while it is still hot. The sweetened tea is cooled to ambient temperature, and the SCOBY, plus a small portion of previously-fermented kombucha, is added as a starter culture previously-fermented kombucha, also called starter liquid.
The SCOBY will steadily grow to cover the surface area of the fermenting kombucha and take the shape of the container that is it brewed in. Further it is dried either by sun drying or fan drying for few hours. After which bee wax mixed with coconut oil is applied to bioleather to form a flexible, elastic material.

Outcome

1) This project can give the world a better packaging material with producing absolutely no harmful by products and unwanted waste.
2) This can help the packaging industry to get a better packaging material by replacing plastic and paper.
3) It can also reduce the cost of package.
4) The bioleather can be moulded, stitched, glued and also dyed this would give a premium and appealing appearance to the product package.

Conclusion:- The experiment that is planned to perform is expected to give properties of bioleather such as tear strength, puncture resistance and flexibility which are affected by

parameters such as sucrose concentration, cycle time, thickness and post treatment. It is not only a greener alternative but also a cost efficient process to replace the use of leather made from animal hide and also various polymers. This can be produced on large scale as well as small scale giving large economical benefits.

Implementation

1) Can be used in packaging industry.
2) Can be used as a replacement to plastic and paper bags.
3) Can be used in textile and fashion industry also because of its premium texture and because of its stitching and dye quality.

Naveen Kumar V
M. Pharm. - Pharmacology First Year,
SRM College of Pharmacy, Tamil Nadu
21 years old

Project Title

Production of Haemodevices using Graphene Technology.

Objective

To produce exact blood test results and to manufacture haemodevices which can be recycled easily.

Method

An existing haemodevices (vacutainer tubes) are made of plastics, and with rubber closures which contains thiuram chemicals. While storing the blood specimen, these chemicals can easily react with blood and releases sulfur gases. When this blood is used for testing purpose, the sulfur gases react with blood, and this causes the tests that give false reports. For preventing this, manufacture of haemodevices which are made of graphene based biomaterials (having biocompatible properties) should be used. Another method is, adding graphene-based biomaterials while manufacturing plastic-based haemodevices such as vacutainer blood collection tubes and blood bags, this causes recycling of plastic can be easily done.

Outcome

By using graphene based biomaterials in manufacturing of haemodevices, they can reduce plastic medical waste.

By mixing graphene based biomaterials with plastic during manufacturing haemodevices, recycling of plastic after medical use will be improved.

An exact blood test reports will be obtained because there is no reaction of blood with sulphur gases. This helps to ensure patient safety management especially on lead poisoining conditions.

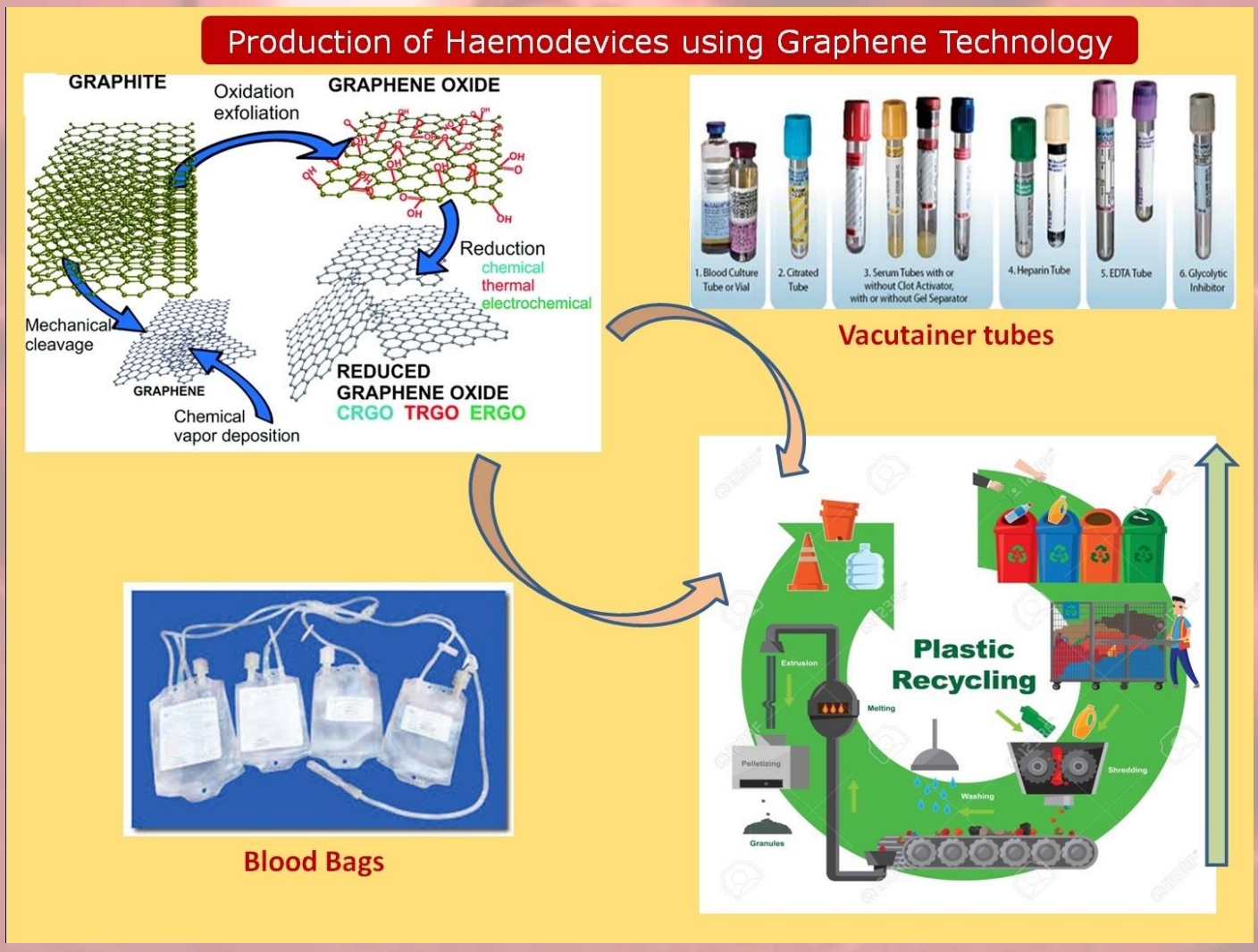
Due to the antithrombotic/anticoagulant property of graphene based biomaterials, this can provide the advantage in minimizing the production and utilization of different types of vacutainer tubes, minimizing the errors made by phlebotomists and also minimize the medical laboratory technicians inconvenience.

Conclusion:-

Graphene based biomaterials coated/incorporated/made haemodevices may enhance the recycling of plastic materials and leads to reduction in environmental pollution too. These technological haemodevices are more economical and having more market potential due to its more requirement in hospitals, research centres, clinical laboratories, diagnostic centers etc.

Implementation:-

This devices can be used in hospitals, research centres, laboratories and diagnostic centres. Can also be used in blood banks for storing blood in graphene based blood bags.



Janani G.
M. Tech Biotechnology, PSG college of technology, Coimbatore
23 years old

Project Title

Studies on waste cooking oil (WCO) & *Moringa oliefera* oil (MOO) mixture for a sustainable biodiesel production process using biomass based heterogeneous catalyst.

Objective

Optimization of biodiesel production from WCO & MOO using calcined nendran banana peel as heterogeneous catalyst with ultrasonic treatment.

Method

Ultrasound based esterification of *Moringa oleifera* oil was performed for the first time and acid value is reduced to relatively shorter time compared to conventional stirring.
Ultrasound based transesterification of waste cooking oil with nendran banana peel ash was being investigated.
Blending of waste cooking oil and *Moringa oleifera* oil will improve physicochemical properties of biodiesel and reduce the cost of second generation biodiesel.
Mixing of *Moringa oleifera* oil with waste cooking oil improves the cetane number of waste cooking oil which reduces gaseous emission.

Outcome

1) Efficient biodiesel production in lesser time with minimum solvent and catalysts than conventional biodiesel production.
2) Overall cost of second generation biodiesel will be comparatively less.
3)Quality of biodiesel will be improved without any time consuming and resources exploiting downstream process.
4) Sustainable production can be achieved by using a blended feedstock.

Conclusion

1) The efficiency of ultrasonication was evident from the results obtained with the esterification of *Moringa oleifera* oil.
2) Produces pure biodiesel without much time consumption.

3) We can use waste cooking oil for manufacturing biodiesel which means there is no residue of waste oil and low gaseous emission.

Implementation

1) Can be used in vehicle with mixture of conventional fuel.

2) In some power stations, biodiesel is the main source of fuel to run power generators.

3) Byproduct of this process like seed cake of *Moringa oleifera* oil and glycerol has various valuable applications.

Karthikka M.
PG Scholar,
PSG College of Technology, Coimbatore)
22 year old

Project Title

Surface Modification of Recycled Polyester Fibres for Technical Textile Applications.

Objective

The recycled polyester fiber is surface modified in order to enhance the porosity of fibers to develop technical textile products like wet wipes, filters, sound and thermal insulation panels.

Method

Recycling plastic material is the main concern now a days. PET bottles are converted into polyester fiber and used in textile materials. Because of its plane fiber structure this textile does not hold water in it.

Polyester fibers are treated with NaOH because of this treatment texture of fiber is change and we can use it as an insulator.

Because of treating with NaOH smooth polyester fiber changes its structure. Porosity of fiber is increased because of changed structure of fiber. Smooth fiber structure is converted into rough surface fiber.

This fiber structure can hold water contain in it because of its structure so we can use it as a wet wipes and filter. Because of its rough structure It can absorb sound waves so this can be used as a sound insulator also.

Outcome

1) We can easily recycle plastic waste by this method.
2) Because of structural change of fiber this can be used as a sound and thermal insulators.
3) Water holding capacity of fiber is increased so it can be used for making wet wipes.

Conclusion

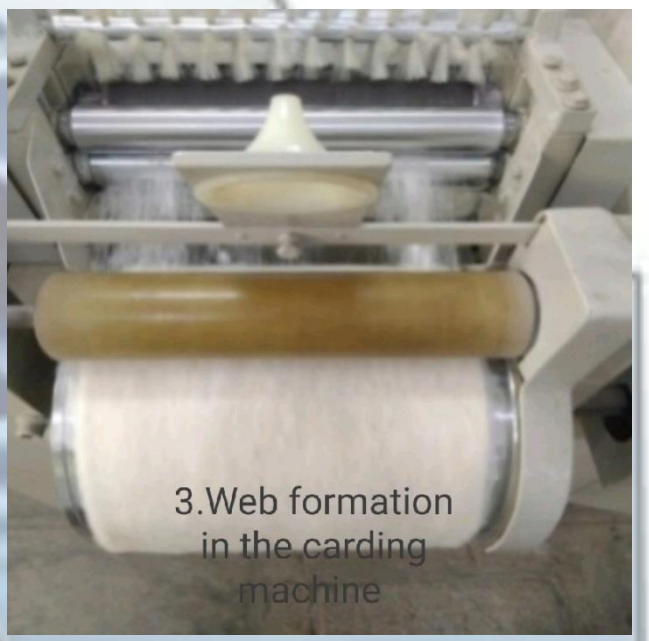
1) This process of converting structure of fiber is very simple.
2) Recycling of polyester fiber and plastic waste can be easily done.
3) Life of insulators and wipes is more than regular insulator and wipes.

Implementation

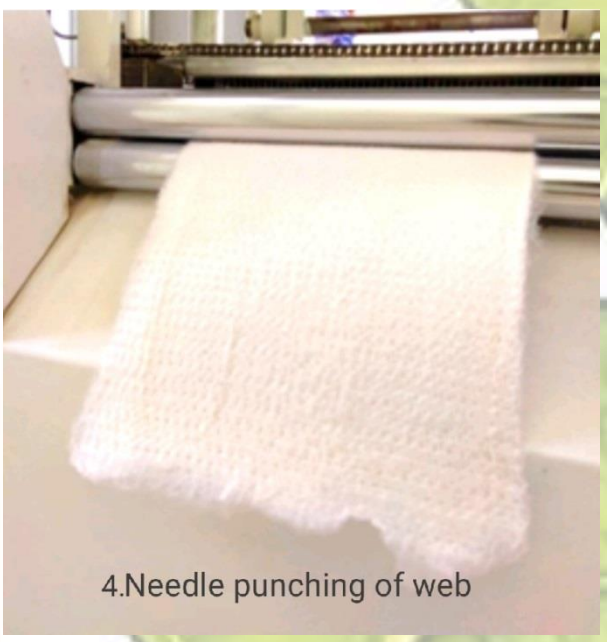
1) Can be used in sound recording studios.
2) Thermal insulators in Heat exchangers.
3) Wet wipes can be used in domestic use.

Step 1 - Recycled PET Fibers

Step 2 – Surface treatment of fibers



Step 3 – Web Formation in the carding Machine



Step 4 – Needle punching of web

Swapnil Pawar & Sunil Pawar
Student, Modern College of Arts, Science and Commerce, Pune
19 years old

Project Title

Solar powered algal air purifier.

Objective

By using micro algae purifying air and improving air quality with the help of solar power.

Method

Micro algae have potential to fix the air pollutant (Co_2) by the process of photosynthesis using the solar energy. In this solar powered algal air purifier ambient air is pumped at the bottom of the container which contains micro algae. Micro algae absorb CO_2 from pumped air and converted it into O_2. In this process suspended particles in air also get sedimentated in water and clean purified air is supplied.

For pumping Air pumps are used which works on solar energy. Conversion of CO_2 into O_2 takes place because of photosynthesis process of micro algae. In this process CO_2 is converted into O_2 with the help of light.

Outcome

1) This is simple and cost effective process of air purification.
2) Remove particulate matter by sedimentation.
3) Remove CO_2 from air by dissolving it in water and then trap it in microalgae.

Conclusion

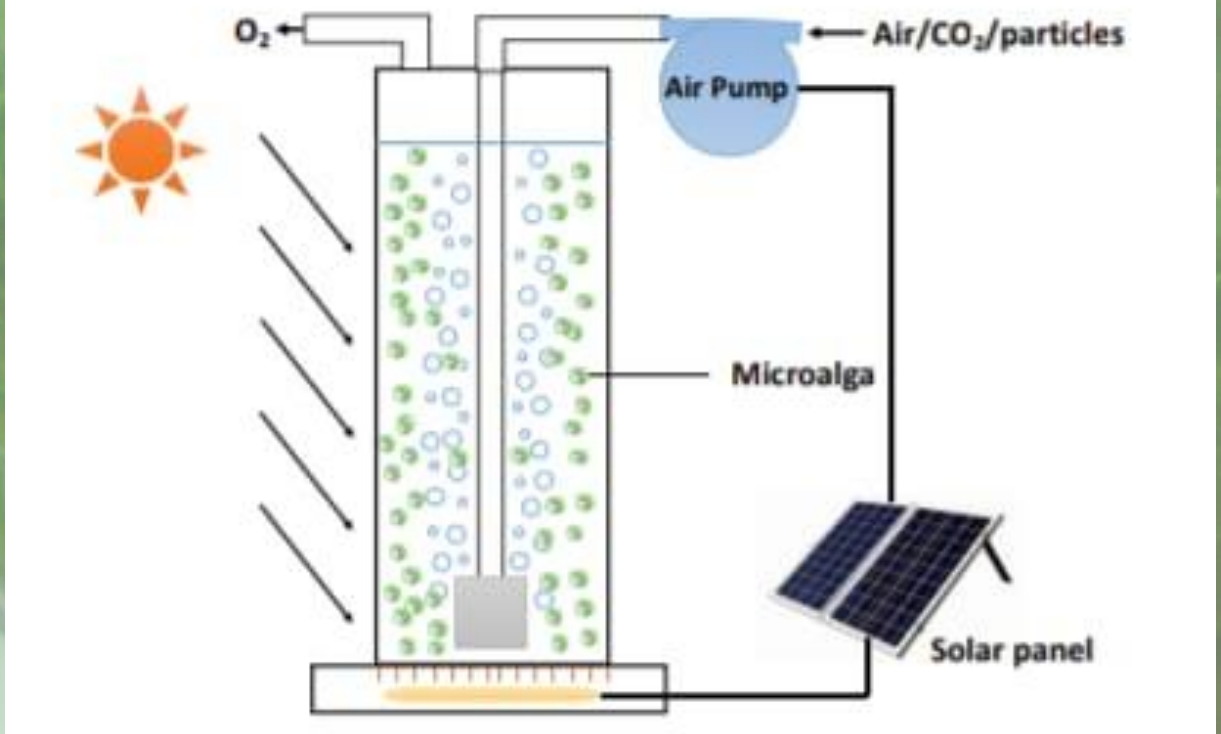
1) Algae can be successfully used to improve air quality.
2) If used on large scale this can reduce indoor air pollution.
3) Dual use of solar power: for carbon fixation and pumping of air.
4) System works 24x7 under indoor conditions.
5) This system is cost effective and eco-friendly.

Implementation

1) This can be used as house hold air purifier on small basis.
2) This can be used in industries on large scale.

released.

$$H_2O + CO_2 \xrightarrow{\text{sunlight}} [CH_2O]n + O_2\uparrow$$



Raja Balasaraswathi S
Student,
PSG College of Technology, Coimbatore
20 year old

Project Title

Surface modification of synthetic textiles to reduce Microfiber Shedding.

Objective

To reduce micro plastics pollution in marine environment happening because of shedding synthetic fiber.

Method

Commercially available synthetic textiles are sourced which are varied in the structure. The sourced fabrics will be subjected to surface treatments (NaOH, Enzyme) and finishing (Silicone, Polyurethane, natural polysaccharides like pectin, chitosan, chitin) to modify the surface properties of the fabrics. The effectiveness of these surface modifications can be tested by means of laundering the samples under varying conditions to determine the effect of detergents, wash temperature and wash time on fiber shedding. The wash liquid can be filtered using filter paper and the amount of fibers can be quantified by means of counting and weighing. The amount of fibers shed from treated and untreated samples will be compared. And also, among the various treatment tried, the effective method with higher reduction efficiency will be identified.

Expected Outcome

An novel application of surface modification or finishing process for the synthetic fabrics in order to reduce the fiber shedding which can ultimately reduce the threatening of micro plastics/fiber accumulation in the marine environment.

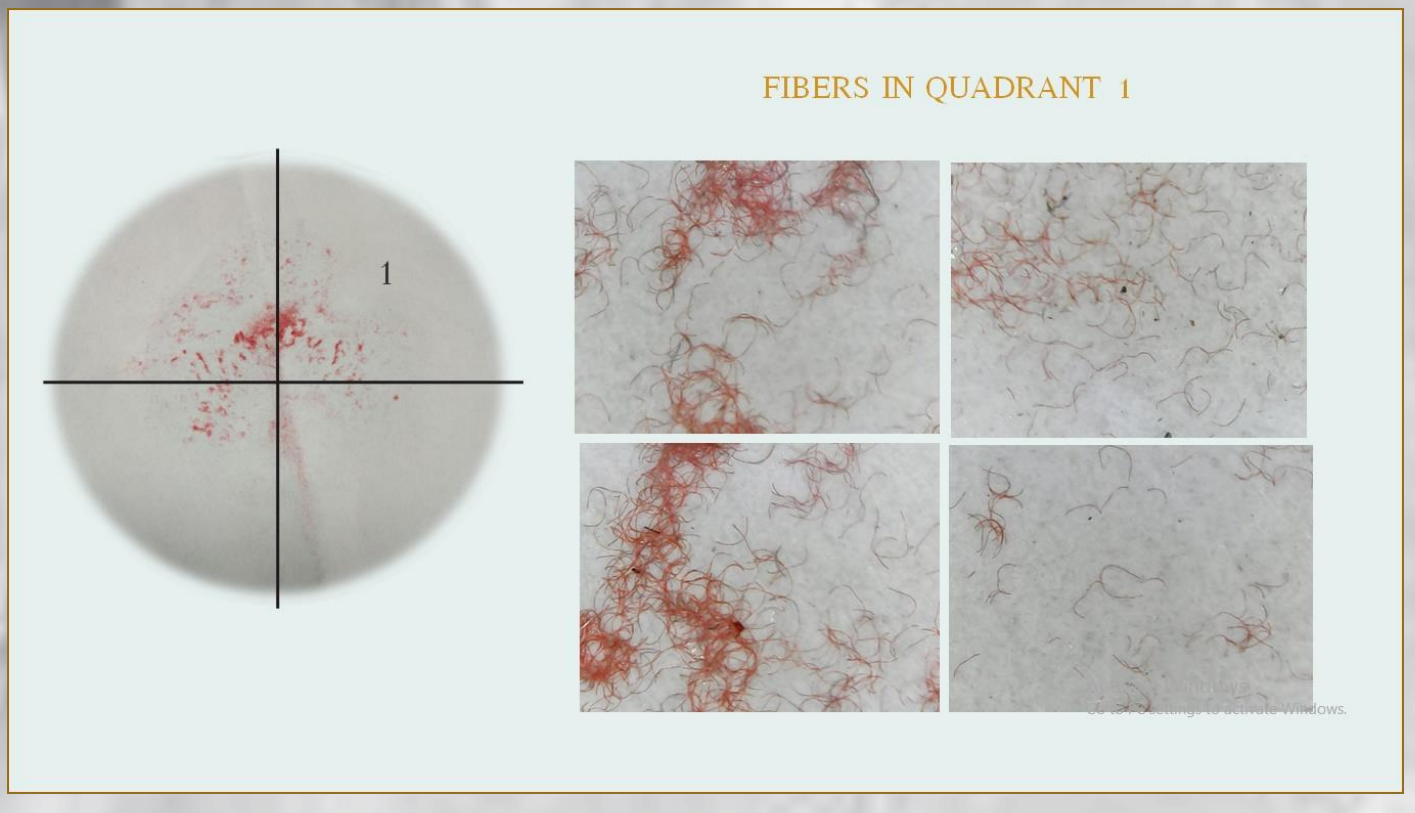
Conclusion

Since the synthetic textiles are being the major source of micro plastics, surface modification/finishing of the textile materials will be more effective as it can prevent the shedding before it is happening.

Implementation

1) This treatment can be used in textile industry.

2) Laundry Industry (Before washing clothes).



Venkatalakshmi R
M. Tech
Biotechnology, PSG College of Technology,
Peelamedu, Coimbatore
23 year Old

Project Title

Removal of copper from aqueous environment using a novel soyhulls based biosorbent and to study its equilibrium isotherm and kinetics.

Objective

Removing Copper particles from industrial used water by using soyhull.

Method

For removing copper particles from water body they made beads of soyhull mixed with sodium alginate. With the help of this we can remove considerable amount of copper particles from water.

For preparing this beads soyhull is grounded at the size of 1 mm grain. This grounded soyhull is mixed with sodium alginate. After many trials they have found optimum mixture ratio for maximum absorption of copper from water body. 9% soyhull is mixed with 1.5% of sodium alginate i.e. in the ratio of 6:1. After mixing with sodium alginate slurry beads of 4.5 mm are made and then allowed to cure in solution at 4^0 C for 24 hours.

Outcome

1) Optimum dosage of biosorbent was 3g of adsorbent/ 100ml of 50 ppm copper solution.
2) Bead optimization achieved at 6:1(9% soyhulls with 1.5% sodium alginate) was best adsorption capacity.
3) Optimum contact time was 45 minutes after which the beads can be filtered.

Conclusion

1) Soyhull mixed with sodium alginate slurry in proportion of 6:1 is optimum for absorbing copper from water.
2) For efficient removal of copper particles from water 3gm of soyhull balls should kept in water having copper pollutant. It can remove 50ppm from it.
3) Optimum removal of copper can be obtained if soyhull balls are kept in polluted water for 45 minutes. It shows 80% efficiency of copper removing.

Implementation

1) This can be used by industries which work on copper plating.
2) Industries where copper treatment is done on various materials.
3) Various refineries can use this for reducing contamination of water after refining procedure

Final Product

Bhagyashri Patil
Student,
D. B. F. Dayanand College of Arts & Science,
Solapur.
21 year Old

Project Title

Magic of surface tension of some medicinal plant from Solapur district.

Objective

To reduce surface tension of detergents which are harmful for cloths, human and environment also.

Method

Surface tension is directly connected with cleaning process. Detergents having high surface tension can cause high amount of cloth fiber shredding and this reduces cloths life also. Detergents with high surface tension are bad for humans also because of constant contact with detergents it causes irritation, etching and removal skin.

For reducing surface tension natural ingredients are mixed with distilled water and then used for cleaning purpose. Natural ingredients used in this process are Neem (Azadirectha indica) and Shikakai (Acacia) seed powder. This powders are mixed in distilled water and then few drops of coconut oil is added in this mixture. This mixture can be directly used in cleaning purpose.

Neem (2gm) +Shikakai(2gm)+ 100ml D/W this mixture have surface tension 25.29 dyne/cm

Neem(2gm) +Shikakai (2gm)+ oil drop(2 drop) +100ml D/W this mixture have surface tension 22.59 dyne/cm

Outcome

1) Detergent with low surface tension is obtained in this process.
2) By using all natural ingredients environment friendly detergent is made in this project.

Conclusion

1) Because of reduction in surface tension damaging of cloths will be reduced.
2) Because of oil contain in this detergent it maintain moisture in human skin.
3) Manufacturing cost is low because raw products are easily available in surrounding with minimum cost.
4) This detergent is ecofriendly.

Implementation

1) This products can be used in laundry industry because of its lower cost.

2) This can be used in washing machines also.

Final Product

Vedant Mishra
B.tech mechanical,
PSIT college of engineering kanpur
19 years old

Project Title

Automatic crop field shelter (solar or dc powered)

Objective

To protect crop field from sudden rain fall and harvesting rain water.

Method

This project works on Light Dependent Resistor (L.D.R.) circuits and related sensors with automation mechanism. Basically this sensors senses the light difference it might be because of sunset or because of cloudy weather. After sensing this automation system starts electric motors which cover the crop field with plastic sheet. When rain is going to start that time because of clouds L.D.R. gets activated and cover the field with plastic sheet. Short canals are constructed under the slope of shelter so rain water can easily flow through the canal. Further we can store this excess water in water tanks and we can harvest rain water also.

If we use DC power motors in this project then we can convert this whole project in to solar powered project. For this we have to place solar panel, battery and charge controller at field near the shelter.

With the help of this we can use solar power but it has very high installation cost and it required frequent maintenance also.

Outcome

1) With help of this technique crops can be saved from sudden rain fall.
2) We can use conventional and non conventional both energy sources in this project.
3) In summer or draught we can use excess water stored in water tank.

Conclusion

1) This model can prevent crop field from sudden rain fall during offseason.
2) Rain water harvesting can be done and used in harsh conditions.
3) Solar system can be placed for power supply.

Implementation

This system can be used for small crop fields


AUTOMATIC CROP FIELD SHELTER
By:
Vedant Mishra
XI-B
HIW
Hi-waote
GENERAL PURPOSE
151504

Concept By :- Dr. Vinita Apte
Founder Director
TERRE Policy Centre

Project Supported By :- Dr. Rajendra Shende
Chairman
TERRE Policy Centre

Project Lead By: - Rajkumari Suryawanshi
Project Leader

Compilation :- Shreeram Nijampurkar
Project Coordinator

Design and Inputs:- Sagar Lakhotiya
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