

Save Our

# MOTHER EARTH



MAK INDIA LIMITED

Save Groundwater for Drinking

Avoid Sewage Water

Use our Nip it at the Bud Technology







## ABOUT US

MAK Group of Companies was established in 1973 specialized in the manufacturing of diverse products in sectors like military equipment, space and aerospace machinery, electronic communications, power products, and equipment, indigenous technologies for the protection of the environment.

MAK Group is one of the pioneers in the military and aerospace sector equipped with state of the art manufacturing facility coupled with cutting edge technology. It has a strong capacity of R&D. MAK Group always developed and made products first of it's kind in India since 1973.

**MAK Controls and Systems Private Limited (MCSPL) was established in 1973.**

**MAK India Limited (MIL) was established in 1981.**

**Air+Mak Industries Inc., USA was established in 1997.**

Manuneethi Shri Manickam, is a son of a farmer from a small town nearby Salem, Tamil Nadu, India. He was a distinguished Electronic Engineering graduate with a honour from the esteemed PSG College of Technology, Coimbatore.

- He founded MAK Group with a strong belief that **MAKE IN INDIA** should be the norm for any product development and specialization in manufacturing which will not only benefit Mother India but also the rest of the world.

- MAK Group has its production facilities and offices across the globe with thousand plus employees with a humble beginning with a handful of people who were all passionate about proving their talents as prime capital.

## MAK HEADQUARTERS

MAK Group is headquartered in Coimbatore, Tamil Nadu, India. MCSPL has a factory in USA and INDIA. MCSPL has the presence of its product in more than 50+ countries in aerospace and military equipment.

## MAGNET OF R&D

MIL is specialised in R&D-based innovation and indigenous solutions for every pollution, which are affordable in costs, adaptability, and operation and maintenance.

MIL's products are commercially viable, sustainable and ensure zero waste management system.



# VISION

To Make Mother Earth Clean and Restore It To Her Original State

## MISSION

- To find sustainable and economically feasible solution for various pollution like air, water and land.
- To provide affordable sustainable indigenous technologies for overcoming challenges of municipal solid waste management across country and the rest of the world.
- To provide affordable sustainable technologies solutions for challenges of sewage wastewater treatment through decentralized models.
- To provide ecofriendly Bio farm inputs for organic farming.



## INFRASTRUCTURE

MIL has well established state-of-art infrastructure facilities including well-furnished office spaces, meeting halls, conference rooms, along with specialized manpower like chief scientists, senior engineers, HR, public policy and project specialists, etc, for designing projects, preparation of Detailed Project Reports (DPR) and execution of projects.

We have a well-established manufacturing capacity which is specialized with all modern equipment and machinery managed by required human resources who are well trained in their skills with core competence for achievements of productivity.





## LIQUID WASTE MANAGEMENT SYSTEM

### (Sewage Water Treatment)

The world of construction materials is undergoing paradigm shifts. One such revolution underway is the equipment and technology in the field of sanitation sector. The decentralized domestic sewage wastewater management including toilet wastewater is one such innovation being revolutionised.

- MAK DRDO Anaerobic Bacteria Digestion Septic Tanks (ABD ST) are playing major role in improving hygiene and sanitation since 2013.
- Jal Shakti Ministry has advised all State and Union Territories to Implement DRDO ABD ST via their Notification No. W.11044/1/2012-CRSP Vol.II dated 12-08-2014.
- Tamil Nadu Government also has included DRDO ABD ST in their septage guidelines via their G.O.(Ms) No.1 dated 02-01-2023.

### SALIENT FEATURES

- The technology was developed by a team of scientists led by **Dr.A.P.J.Abdul Kalam** when he headed the **Defence Research and Development Organisation (DRDO)** under the Ministry of Defence, Government of India.
- It is a patented technology for Anaerobic Microbial Inoculum (AMI) which is injected into the ABD Septic Tank for digestion and disintegration of toilet wastewater.
- MAK India Limited has ToT (Transfer of Technology) with lifetime validity.
- Our ABD Septic Tanks require less space and capital investment as compared to conventional septic tank system.
- Our ABD Septic Tanks are completely environmental friendly and made as concrete tanks.
- With our strong R&D Team, we make different models for ABD Septic Tanks depending upon the requirements of customers in different sectors, like residential houses, apartments, schools, colleges, institutions, offices, factories, shops, hotels & restaurants, tourists resorts, etc.
- This technology requires no power and zero maintenance for a lifetime with 99% pathogen reduction after treatment.
- Toilet wastewater treated through our ABD Septic Tank can be reused for gardening, irrigation purposes, re-flush (with tertiary treatment), etc.,
- In our ABD Septic Tank, there is no generation of sludge, hence there is no need for evacuation.

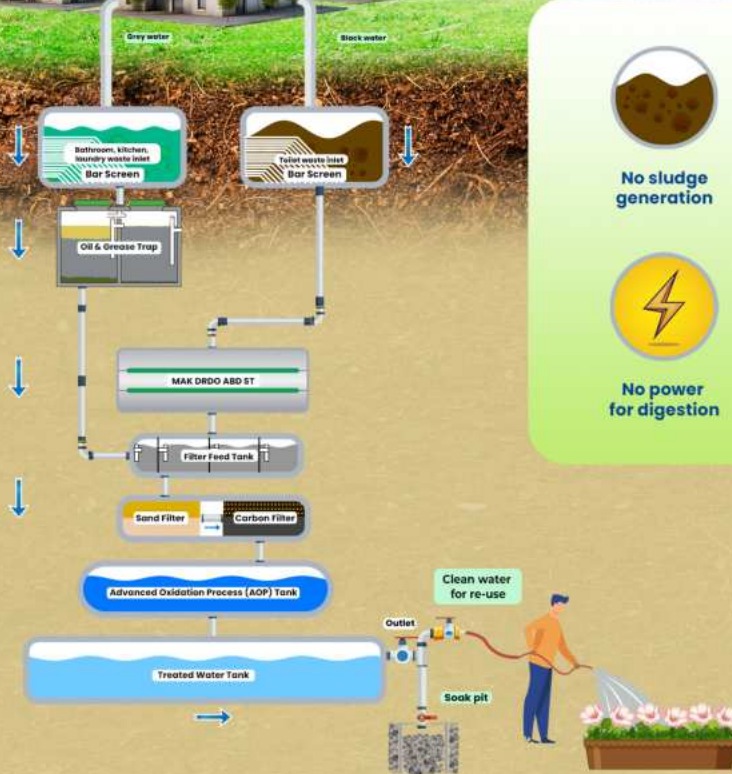


**PRODUCT NAME:** MAK DRDO Anaerobic Bacteria Digestion Septic Tanks, a decentralized technology and one-stop solutions for all toilet wastewater treatment.





## Anaerobic Bacteria Digestion Sewage Treatment Plant



-  No sludge generation
-  No bad & foul smell
-  Re usable pure water
-  No power for digestion
-  No maintenance in ABD tank
-  30% less OPEX than conventional STP

Our MAK DRDO CSIR ABD + AOP STP TECHNOLOGY meets all discharge norms and even re-use norms for all purposes [ Irrigation, flushing of toilets, construction, discharge in water bodies, etc.]

### ADVANTAGES OF MAK DRDO CSIR ABD + AOP STP TECHNOLOGY OVER CONVENTIONAL STP

S.No	PARTICULARS	MAK DRDO CSIR ABD + AOP STP TECHNOLOGY	CONVENTIONAL STP
1	Electricity	Very minimal (15%)	Huge
2	Chemicals	Not required because of biological process	Required and its adds another form of pollution to Mother Earth
3	OPEX for 100 KLD plant	< Rs 45,000.00 /month	Rs 1,04,000.00 /month
4	Sludge removal	No sludge residue	Huge sludge accumulation and so needed dedicated sludge transfer pump and sludge dewatering machine
5	Sludge pathogen risk	Nil	Very high
6	Operator	Semi skilled	Skilled



## Anaerobic Bacteria Digestion Sewage Treatment Plant

### WHY MAK DRDO CSIR ABD + AOP STP TECHNOLOGY?

- These are fit-and-forget types with minimal maintenance requirements. They comply with all discharge norms and reuse standards for treated water across various applications such as irrigation, toilet flushing, construction, discharge in water bodies, etc.

#### Treatment of Toilet Wastewater (Black water):

- To treat toilet wastewater separately is essential due to the challenges posed by faecal matter compared to other types of wastewaters.
- The Anaerobic Bacteria Digester represents a revolutionary advancement in sanitation. In conventional toilets, only 30% of human waste typically degrades, leaving the remaining 70% untreated in the septic tank.
- However, in ABD STP, up to 99.9% of human waste is digested by anaerobic microbial inoculum, converting it into reusable water.
- Anaerobic bacteria digester offer an eco-friendly disposal solution, requiring minimal maintenance, operating efficiently without relying on external energy sources, and producing odourless water.

#### Treatment of Kitchen, Bathing And Laundry Wastewater (Grey water):

- Treating grey water is essential to prevent foul odors caused by decay of organic compounds particularly when left untreated for more than 48 hours in a tank, where certain aerobic bacteria thrive.
- To address this, we employ filters, oil skimmers / oil and grease traps for kitchen waste to prevent food materials from overloading the bacteria.
- AOP system is used to oxidise the organic and inorganic materials in the wastewater and thus it ensures complete degradation of various pollutants.

*However, if the customer cannot separate black and grey water for further treatment then combined treatment is also possible with few modifications in the secondary and tertiary process so that the said norms can be achieved easily.*







## Inauguration of

# MAK DRDO CSIR ABD AOP SEWAGE TREATMENT PLANT OF 400 KLD

## CENTRAL RESERVE POLICE FORCE CAMPUS (CRPF)

*Thudiyalur, Coimbatore, Tamil Nadu 641034.*



The project is a joint venture of Defence Research and Development Organisation (DRDO), Central Reserve Police Force (CRPF), Central Public Works Department (CPWD), and MAK India Limited (MIL).

Sewage treatment technology developed by MAK India Limited and approved by DRDO is helping CTC - CRPF spread over 400 acres at Kurudampalayam near Coimbatore to save and re-use around 4 lakh litres of water a day.

This plant has been installed and working since April 2022 and officially commissioned on 28-07-2023 is treating the entire sewage and faecal matter generated by 400 families and 1,000 trainees on the campus and convert them into odour-less water which is used for irrigation all around the campus.



This plant is well recognized by higher officials of CRPF, CISR (Centre for Indigenisation and Self Reliance), and TNIUS (Tamil Nadu Institute of Urban Studies). According to them, the MAK DRDO ABD patented technology is the first of its kind in the country and it does not require power for digesting the content in sewage water.







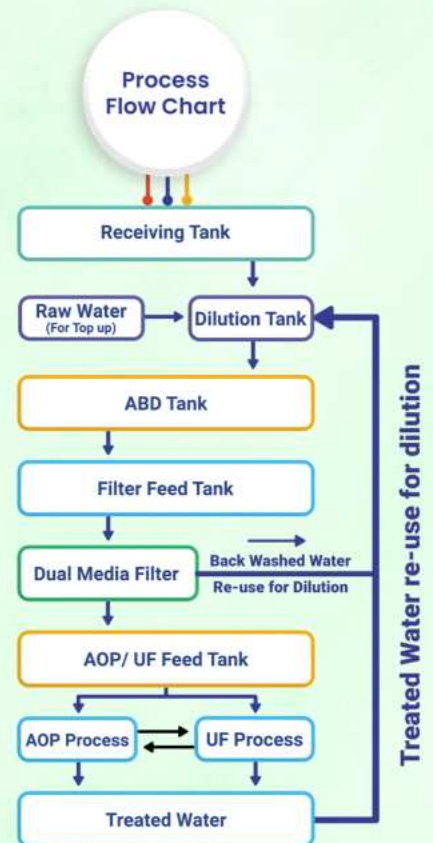
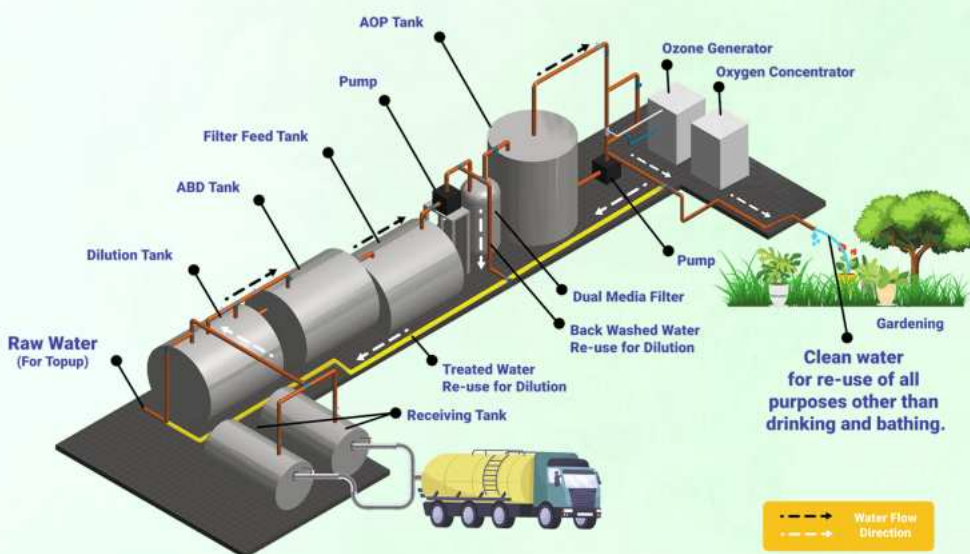
**MAK DRDO ABD CSIR AOP FSTP**

# FAECAL SLUDGE TREATMENT PLANT

## FSTP Pilot Project at Mak India Limited

### FSTP Working Principle

- The Faecal Sludge Treatment Plant (FSTP) starts with faecal sludge from individual home septic tanks is collected by tankers.
- Once the tankers dump into receiving tank, it is pumped into the Dilution Tank, where the sludge is diluted with water in a 1:2 ratio and it is pumped to the ABD tank, where it is retained for about four days.
- Inside the ABD, anaerobic bacteria break down the faecal and organic matter.
- Then it undergoes advanced oxidation using ozone for disinfection and enhancing the water quality.
- The ABD has three compartments: the first introduces bacteria to disintegrate waste, the second continues digestion with improved water flow, and the third adjusts the biological and chemical oxygen demand (BOD and COD) levels before the treated water exits.
- After this, the treated water flows through gravity to filter feed tank from where the water is pumped to AOP Tank through sand and carbon filter.
- This combination of processes produces high-quality treated water, suitable for irrigation and other uses.





## FSTP Pilot Project at Mak India Limited



## MAK FSTP Research Project at Rajanukunte, Karnataka

- Based on the successful outcome of the above said research project, we are equipped with technology and process to implement FSTP across the country for any capacity.
- We also use pro biotic bacteria to be mixed in the individual homes septic tank before evacuating to avoid bad smell.



In continuation to the success of above said pilot project, a demo unit of 1.5 KLD is established at MAK India Coimbatore, Tamil Nadu and treated water is re-used for all purposes other than drinking and bathing. The project key features are,

- ✓ No sludge is produced or formed.
- ✓ No need for sludge drying equipment.
- ✓ Compact Design: Requires less space compare to conventional FSTP systems.
- ✓ No chemical residues left in the treated water.
- ✓ Up to 50% less power consumption compared to conventional FSTP systems.
- ✓ More efficient disinfection than conventional FSTP systems.
- ✓ Simpler Process Flow compared to conventional FSTP Systems
- ✓ Requires 50% less manpower, with semi-skilled workers being sufficient.
- ✓ Lower Capital Expenditure (CAPEX): Around 90% on the cost of conventional FSTP systems.
- ✓ Lower Operating Expenditure (OPEX): 30% reduced operating costs compared to conventional FSTP systems.





## **MAK ACHIEVEMENTS IN ABD SEPTIC TANKS TECHNOLOGY**

- We have our own Anaerobic Microbial Inoculum (AMI) manufacturing facility with a capacity of 5.5 lakhs litres.
- More than 8,000 + ABD ST units were installed across the country and are successfully preventing groundwater pollution.
- Through our ABD Septic Tanks, a total of more than 100 MLD toilet wastewater is being treated in a decentralized model daily by preventing air and water pollution.
- We are the first firm to get Transfer of Technology (ToT) from DRDO for ABD Septic Tank technology.
- We are the first firm to get Transfer of Technology (ToT) from CSIR for AOP technology.
- Our Company has its own testing and evaluation laboratory for AMI and ABD ST with qualified QA / QC, having a Ph.D. in pure sciences.
- Our Company is officially approved for the inoculum manufacturing facility and monitored by group of scientists from DRDO at regular intervals and are duly certified. MAK always has an Inoculum Plant test certificate not more than one year old from DRDO.
- Our clients have received clearance certificates from TNPCB and Green Campus certificate by showing the installation of ABD septic tanks for toilet wastewater processing without any chemicals.



**10 USERS**

Capacity: 800 Litres

Upto 10 Nos. of Toilet Users / Day



**20 USERS**

Capacity: 1600 Litres

Upto 20 Nos. of Toilet Users / Day



**40 USERS**

Capacity: 2900 Litres

Upto 40 Nos. of Toilet Users / Day



**100 USERS**

Capacity: 8000 Litres

Upto 100 Nos. of Toilet Users/Day



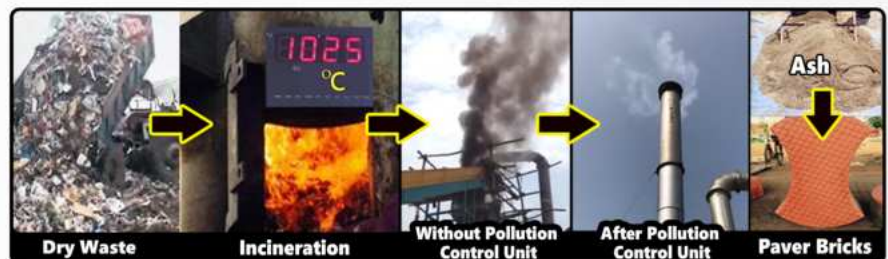
# MAJOR INDIGENOUS SUSTAINABLE TECHNOLOGIES

## MUNICIPAL SOLID WASTE MANAGEMENT SYSTEM

Municipal solid waste management is a real challenge faced by every city and town in the country. So far, the efforts are focused only on segregation at source, collection and transportation to dump-yards, while the decentralized technology solutions are not focused which is the need of the hour now and henceforth, MIL developed KILN-1000 and offers to address the issue in solid waste management.

### SALIENT FEATURES

- Our technology ensures with norms of Waste To Zero, Waste To Wealth, Waste To Energy.
- Our technology is patented with Indian Govt & International (In Progress).  
Patent No: 201841002296
- Our system produces useful by-products of **ENRICHED ORGANIC MANURE, CARBON, PAVER BRICKS** from municipal solid wastes.
- Our technology requires very less space and manpower as compared to conventional models.
- Our technology complies with all the norms of both the Central Pollution Control Board (**CPCB**) and Tamil Nadu Pollution Control Board (**TNPCB**) for scientific disposal of municipal solid waste.



**PRODUCT NAME: t**

A one stop solution for solid waste pollution.

### NOTABLE ACHIEVEMENTS

- MAK Scientific Green Incinerators successfully completed with R&D Plant and Pilot Plants at **ERODE** during 2016 - 2018.
- Scientific Green Incinerators Plants have been established and operated commercially for the Greater Chennai Corporation(GCC) with 10 TPD (2019) and 50PD (2021) capacity, with clearance from **TNPCB**.
- Our Scientific Green Incinerator technology won **NATIONAL INNOVATION AWARD - 2020 (Chinni Krishnan & MMA)** and broadcasted in Republic TV.







# MAK-GOLD

Organic Inputs

To protect the soil, to increase the yield  
we have to follow the organic farming method

## M - 590 MAK GOLD ADIURAM



### M-590 ADIURAM (ENRICHED)

- ✓ Unique, non-toxic, non-hazardous and eco-friendly bio fertilizer. Mobilizes the supply of NPK and other micro-nutrients to the plant.
- ✓ Formulated and manufactured to hold organic content in soil from day one of application. Absorbs Nitrogen from atmosphere and fix it in plant root nodules. Helps with wider branching of plant roots.
- ✓ Improves water and nutrient holding capacity of the soil.

### M-590 ADIURAM (GENERAL)

- ✓ Suitable for all crops and well compatible.
- ✓ Bacterial cultures enriching all major nutrients (NPK) in a very effective manner.
- ✓ Several organic matters which enhance intake of all nutrients by roots and retains plant health at high level.

## MAK BIO PIF S KIT

(Best for Soil Application)



### BIO PIF B1

Bacillus Subtilis is a bacteria that act as bio fertilizer, bio control & growth promoter

### BIO PIF F4

Pseudomonas Fluorescence is a bacteria that act as bio fertilizer and bio control acts anti disease agent.

### BIO PIF 5

VAM is fungi that act as BIO FERTILIZER.



## BIO PIF F

(Best for Foilar Application)



## MAK GB

A fish waste based growth booster for crops

### Nutrient-Rich

Fish waste is a natural source of essential nutrients, including nitrogen, phosphorus, and potassium, which are vital for plant growth and development.

### Improved Soil Health

MAK GB helps to enhance soil structure and fertility by increasing organic matter content. This leads to better water retention and nutrient absorption by plants.

## MAK Panchagavya

### Pest and Disease Resistance

Panchagavya contains natural compounds that can help to repel pests and reduce the incidence of plant diseases. This can help to minimize the need for chemical pesticides and fungicides, promoting sustainable and environmental friendly agriculture.

### Increased Crop Quality

Crops grown with Panchagavya often exhibit higher quality characteristics, such as improved flavor, aroma, and nutritional value. This is due to the enhanced nutrient uptake and overall health of the plants.

## BIO PIF F1

Trichoderma Viride is a fungi that act as biofungicide and biocontrol agent

## BIO PIF F2

Beauveria Bassiana is a fungi that act as bio pesticide, fungicide.

## BIO PIF F3

Verticillium Lecanl is a fungi that act as bio insecticide

## BIO PIF B1

Bacillus Subtilis is a bacteria that act as bio fertilizer, bio control & growth promoter





## MAK YRB

### INCREASED YIELD

MAK YRB promotes vigorous growth and development, leading to higher

### MAK PIF 3G Paste

#### Natural Pest Repellent

**Repellent:** The strong odors from garlic, chili peppers, and ginger deter pests like aphids, caterpillars, and beetles.

**Toxicity:** It is not toxic except for insect pests, disrupting their growth and development.

**Anti-fungal:** Neem oil also has antifungal properties, helping to prevent diseases like powdery mildew and rust.

### ENHANCED NUTRIENT UPTAKE

The formulation of MAK YRB helps plants absorb essential nutrients more efficiently, ensuring optimal plant nutrition.

### IMPROVED RASI (ROOT) SYSTEM

Healthy and well-developed roots are crucial for nutrient uptake and water absorption. MAK YRB enhances root growth and development, resulting in better nutrient assimilation and overall plant vigor.



## MAK ORGANIC FARMING RESEARCH AND DEVELOPMENT CENTRE

MAK Organic Farming Research And Development Centre was established at Semakottai Village, Panruti Taluk, Cuddalur District, Tamil Nadu to encourage farmers for organic farming and working since 2017 to uplift the living conditions of farmers.

### SALIENT FEATURES

- Our organic manure, ecofriendly bio fertilizer, bio pesticides products help our farmers to cultivate chemical pesticide-free Agri products.
- Our organic farm manure is used as farm input in crops like Paddy, Vegetables, Cashew, Sugarcane, Cotton, Guava, Jackfruit, Groundnut, Coconut, Banana, etc.
- Policy Advocacy for organic farming, organic manure production, etc.
- At present, we have an organic manure production capacity – 40 tonnes per week and will be increased to 100 tonnes per day based on market demand.
- So far, more than 1000 + tons of Adiuram has been produced and given to farmers to promote organic farming at affordable cost.
- We provide in hand experience and training to several FPO members, college students, self helps groups, environmentalist etc.,



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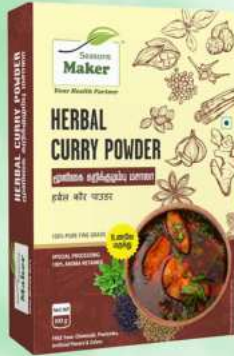


# Food As Medicine

We are the manufactures and marketers of



Turmeric Powder



Curry Powder



Chilli Powder



Coriander Powder



Moringa Powder



Health Drink

We are Traders for high quality

- 01 Dry Fruits and Nuts
- 02 Freeze dried food Products
- 03 Rice and pulses
- 04 Traditional rice and minor millets
- 05 Cold process edible oil
- 06 Moringa value added products
- 07 Food and health supliments





# SALT FREE DYEING



## SFD TECHNOLOGY

Sitra Along with its Industrial Partner **MAK** has synthesized a **"CATIONISING AGENT"** for **"SALT FREE DYEING"** of Cotton Fabric



### SOLUTION FOR TEXTILE POLLUTION



### MERITS OF GO GREEN SFD

- Stripping and redyeing without salt /Go Green SFD
- Applicable for all regenerated and cellulose materials
- Reuse of chemicals to reduce the use of water, chemicals & TDS
- 10-15 % improvement in depth of shade

### MULTIPLE EFFECT EVAPORATOR (MEE)



SFD TECHNOLOGY	CONVENTIONAL
No salt required	Salt required
No of baths = 9	No of baths = 10
10% saving in dye	Comparitively High
Improved Fastness	Comparitively Low
Low TDS (upto 70% reduction in dye drain)	High TDS
One stage MEE is Sufficient	Three stage MEE
Cost reduction ETP	ETP Cost high





# BIODEGRADABLE CUTLERY



## COMPOSTION



Produced from Natural Agro-waste fibre, plant based resin, Compatibilizer with minimal amount of food grade plasticizer.




### STORAGE

Room Temperature

### SHELF LIFE

2 Years

### ADVANTAGES

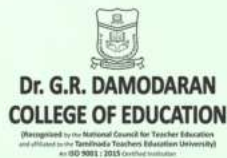
- 1 Bio - Based 
- 2 Suitable for serving cold meals (-30 °C to 85 °C) 
- 3 Compostable (IS / IS017088) 
- 4 Recyclable up to 2 times 
- 5 Dishwasher, Refrigerator and Freezer safe 
- 6 Produces renewable energy in the form of biogas 

### DOS AND DON'TS

- ✓ Wipe it dry after washing 
- ✓ Color of the product may fade after washing 
- ✗ Do not use under direct Heat 
- ✗ Prolonged soaking is not recommended 



## OUR ESTEEMED CUSTOMERS FOR MOTHER EARTH DIVISION



**MAK INDIA LIMITED**



# Products and Services from MAK to Build a Supreme India

- **Cleaner Mother Earth for our future generations**
  - ✓ **MAK DRDO ABD Septic Tank (ST)**
  - ✓ **MAK DRDO ABD + CSIR AOP STP Hybrid Technology**
  - ✓ **MAK DRDO ABD + CSIR AOP FSTP Hybrid Technology**
  - ✓ **SALT FREE DYEING Technology**
  - ✓ **SALT FREE TANNING Technology**
- **Organic Agriculture by Default**
- **Siddha and Ayurveda Health Care for Healthy Living**
- **Installing Our Good Old Good Governance System**



**MAK INDIA LIMITED**

Visit For More Information

- [www.makindialimited.com](http://www.makindialimited.com)
- [www.makbioprojects.com](http://www.makbioprojects.com)
- [www.makincinerator.com](http://www.makincinerator.com)
- [www.seasonsmaker.com](http://www.seasonsmaker.com)
- [www.makgold.in](http://www.makgold.in)
- [www.manuneethi.tv](http://www.manuneethi.tv)

- **Contact:** +91 95009 91787  
+91 99944 15000
- **Email:** [info@makindia.co.in](mailto:info@makindia.co.in)
- **Address:** 7/41 B, MAK India Road,  
Civil Aerodrome Post,  
Coimbatore, Tamil Nadu,  
641 014, INDIA.