

## Adsorbents



Activated Alumina (AA)



Ferrite Impregnated Alumina (FIA)



Silver Impregnated Activated Carbon (SIAC)



Domestic type water filtration unit

# Water Purification Cartridge



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## Overview

Intake of fluoride (F-) contaminated water may cause degeneration of bone and teeth, called 'Fluorosis'. Removal of fluoride from drinking water is of utmost importance for the improvement of quality of life in rural India. Fluoride content in water is found beyond the permissible limit (1.5 mg/L, WHO 2011) in many states of India. Present effort is addressing the development and deployment of domestic defluoridation unit in the fluoride affected regions of India through Govt./ NGO support.

## Salient Features

1. Domestic type adsorption based multi-stage water filtration unit.
2. Comprised of AA+FIA+SIAC adsorbents.
3. Effective reduction of F- concentration from ~ 5 ppm to below permissible limit (~1.5 ppm).
4. Simultaneously useful for bacterial remediation since standard SIAC is used.
5. No electricity required.
6. Flow rate: ~ 5-6 L / hour
7. Adsorbent life (average): ~2000 L.
8. Storage capacity: ~15 L

## Applications

Presence of Fluorine is extremely dangerous. A large majority area of India is affected by fluorine in ground water. This technology leads to price competitiveness, better removal of fluorine (6 mg/L to 1.1 mg/L), Portability of unit.

## Motive

ANTS is interested to contribute to society by commercialization of indigenously developed technology and Make in India initiative. ANTS is willing to provide this product at its cost price only. ANTS prime interest to push the product to the reach of needy.

## Overview of De-fluoridation Technology

Multistage domestic de-fluoridation unit along with the novel adsorbents have been developed at CSIR-CMERI, Durgapur. The filtration unit is comprised of three different adsorbents (e.g. activated alumina (AA), ferrite impregnated activated alumina (FIA) and silver impregnated activated carbon (SIAC)). The developed FIA adsorbent shows improved defluoridation capacity than the commercially available AA adsorbents. The SIAC adsorbent present in the filtration unit acts as bacteriostatic adsorbent. The

adsorbents are kept in three sequential stages within the filter unit. The flow rate at 5-6 lit/h is controlled. The performance of the developed filtration unit for removing fluoride from contaminated water (with 6 ppm F-) is studied. Activated Alumina is widely known for property of fluorine absorption. The activated alumina is modified by impregnation. It leads to much better absorption capacity and better result. It has been proved by repetitive experiments in CSIR-CMERI Laboratory. Trail units have been given by ANTS Ceramics to Nischintapur Purba Sarbojonin, Birbhum for better understanding in community level operation.

## Why De-fluoridation Unit!

Groundwater is an important source of water supply in rural India; more than 90% of rural population depends on groundwater for meeting their drinking and domestic needs. Fluoride content in groundwater is found beyond the permissible limit in many states of India. As per the data available with Ministry of Health and Family Welfare, high fluoride contamination in ground water still persist in an alarmingly large number of 14,132 habitations in 19 Indian states. Rajasthan, Telangana, Karnataka, Assam, Andhra Pradesh, Bihar, Chattisgarh, Maharashtra, Odisha, West Bengal and Uttar Pradesh are badly affected due to the high fluoride contamination in ground water. Intake of fluoride contaminated water may cause degeneration of bone and teeth, called fluorosis. Removal of fluoride from drinking water is of utmost importance for the improvement of quality of life in rural India.

- A. The need of Society needs to fulfil by indigenously developed technologies. Rather than business, it has more social impact. Profitability is not prime criteria for this project. This product being portable can reach to far places. It can directly use ground water to convert into microbe free drinkable water.
- B. Other technologies are either dependent on alum or electrolysis. It generates sludge or cost of operation is high.
- C. The filtration unit is easy to remove and install.

## Innovation Content

It is important here to mention that ferrite impregnated activated alumina invented by the scientists of CSIR-CMERI shows improved defluoridation capacity than traditional activated alumina adsorbents. The invention has been filed for grant of patent titled 'Spinel magnesium ferrite impregnated activated alumina adsorbent for effective defluoridation of water and a process for the preparation thereof' (Ref. No. 201611014777, filed on 28th April, 2016). The technology of 'Domestic water filter for defluoridation', has been transferred to M/s. ANTS Ceramics Pvt. Ltd., Vasai (East), Maharashtra in the inaugural programme of 'Jubilee Outreach Programmes' and 'TechFest-2017' as a part of 'CSIR Platinum Jubilee' and 'CSIR-CMERI Diamond Jubilee Celebrations' held on 16.09.17.

## Social Impact

- A. Society will receive indigenously developed technology to get rid of fluorosis; Rural India will get solution of Fluorosis.
- B. Employment generation at ANTS
- C. Value addition to material technology
- D. The technology does not require any electrical or other energy.

## Team for Commercialization

CSIR-CMERI is ready to work with ANTS team for commercialization. ANTS is open to take more partners if required to reach to masses.

## What we need

- A. Support of panchayat system and Government system to reach to mass
- B. Purchase order of de-fluoridation unit