

# Integrated System for Fluoride, Nitrate and Arsenic Sensing in Potable Water

## Introduction

An alarming 80% of India's surface water is polluted as per assessment by Water Aid, an International Organization working for water sanitation and hygiene, shows. This has severe health impacts leading to increased water borne diseases such as cholera, dysentery, jaundice and diarrhoea etc. Also, water pollution is found to be a major cause for poor nutritional standards and development in children. As a consequence, availability of drinking water both in terms of adequacy and quality on a sustainable basis has become a major challenge. Therefore, provision of safe drinking water is one of the most critical requirements of India and deserves continued attention on both R&D and implementation fronts. Among the different pollutants, Fluoride, Nitrate and Arsenic are identified worldwide as major inorganic contaminants in drinking water. Therefore, an all-in-one in-situ sensorsystem for the detection of Fluoride, Nitrate and Arsenic in potable water has been developed which works on optical technique. This single system is capable to detect multiple water contaminants such as Arsenic, Nitrate and Fluoride. It uses Carbon dot-based sensor for detection of Fluoride and Arsenic, and reagent-less UV spectroscopy-based technique for Nitrate measurement.



## Features

- User friendly, doesn't involve time-consuming sample preparation before measurement.
- IoT, data card, and GPS can be easily integrated.
- Battery/mains operated.
- Non-toxic & low-cost sensor materials.
- Reagent-less UV spectroscopy-based technique for Nitrate measurement.
- Single integrated hardware for all the measurements.
- Scalable for more water parameters with minimum efforts and cost.

## Specifications

- Technique: Fluorescence/UV Absorbance/ASV
- Mode: Off-line/Test Kit
- Range:
  - 1 ppm-200 ppm (Nitrate)
  - 1 ppm-200 ppm (Fluoride)
  - 10-50 ppb (Arsenic)
- Resolution: 10ppb-5 ppm (based on the analyte)
- Temperature: 20-40°C

## Applications

Total water quality index for multiple applications including:

- Households
- Industrial units
- Real time rivers, lakes, ponds monitoring
- Overhead water distribution tanks (community levels and household levels)
- Automated monitoring stations/systems for Water ATMs, Water filters, industrial effluent release plants, sewage treatment plants.

## Status

Lab prototype ready and limited field trials done.

