Introduction:
The presence of arsenic and fluoride in drinking water is of great concern in recent days. Consuming water characterized with arsenic greater than 0.05mg/L for short term (acute) exhibits the symptoms of abdominal pain, vomiting, and diarrhea. Likewise long term (chronic) exposure shows the development of dark spots on skin, corn growths on palms and feet, and cancers in skin, lung, bladder, kidney, liver, and prostate. Fluoride has always been double edged sword, when the concentration less than prescribed limits (1 to 1.5 mg/L) it has likely to cause dental caries and if it exceeds the limit it likely to cause spotting and discoloration of teeth.

The incidence of fluoride above permissible levels of 1.5ppm occur in 14 Indian state, including Karnataka and affecting a total of 69 districts and also 65% of India’s villages. Similarly, occurrence of Arsenic in ground water greater than permissible limit (0.05mg/L) is observed in states of West Bengal, Bihar, Uttar Pradesh, Assam and Chhattisgarh.

Methodology:
The conventional methods applied for reducing these groundwater pollutants are chemical precipitation, adsorption and ion exchange, filtration using porous media such as char coal, activated carbon, quartz, anthracite etc. Chemical precipitation method has major disadvantages like sludge production which is highly hazardous and complex to handle. Even
though the adsorbing or ion exchange or filter media are used effectively, they cannot be regenerated and reused. In recent days, owing to increasing eco-friendly alternatives such as silica beads or modified sand media are considered as they can be regenerated and reused.

Iron oxide coated filter media is a synthesized adsorbing media which is based on sand. Sand of grain size 0.25mm to 0.5mm is treated i) Immersed in 0.1M NaOH, for 24h and oven dried at 250 °C ii) treated with iron oxide solution of different strengths and baked at 550 °C this process increases the active adsorption sites on the sand matrix.

The present work is a novel technique and aims towards development of cost effective arsenic and fluoride filter. The prototype model consists of a specially fabricated and designed PVC column with necessary plumbing arrangements. Synthesized media will be inserted in the column and synthetically prepared water sample will be fed to the column. Vertically down flow pattern at constant velocity will be followed throughout the study. Removal efficiency of the parameters (arsenic and fluoride) from the water will be evaluated.

**Objective**

The objective of the present study is to evaluate the synthetic media in reducing the geogenic contaminants

**Specific Objective**

- To determine optimum flow rate based on removal contaminants
- To determine the exhaustion time of the synthetic media
- To design the cost effective filter unit