RABINDRA BHARATI PATRIKA
ISSN : 0937-0037

REMOVAL OF FLUORIDE FROM WATER UDAIPURWATI TEHSIL OF JHUNJHUNU USING LOW BIOADSORBENTS

Ruchika
Research Scholar, Jayoti Vidyapeeth Women's University, Jaipur

Dr. Neeraj
Assistant Professor, Jayoti Vidyapeeth Women's University, Jaipur

Abstract:
India is among 23 nations where in a large population suffers from dental and skeletal flourosis due to high fluoride concentration in ground water. Fluoride consumption from water and food is typically less than one part per million (ppm). Fluorosis is caused by exposure to levels greater than 1.5 ppm. The human body's maximum tolerance level is 1.5 ppm (WHO Standard). Some states have average F levels of 4 parts per million (ppm), 3 parts per million (ppm), 4 parts per million (ppm), or 8 parts per million (ppm): Gujarat, Punjab, Tamil Nadu, and South Africa. *In groundwater, the natural concentration of fluoride depends on the geological, chemical and physical,* the present study is carried out to study on effective and cheap adsorbents for the removal of fluoride from the water. The experiments were carried out in laboratory on certain low cost adsorbents like concrete, peepal leaves powder, Neem leaves powder, Wheat husk powder, Ground nut husk.

Key words: Fluoride, Adsorption, peepal leaves powder, Neem leaves powder, Wheat husk powder, Ground nut husk.

Introduction:

Water is a vital component of existence in our bodies. We cannot live without water. Water is included in any bodily process, including digestion, circulation, and respiration, as well as body temperature regulation and waste excretion. Water covers about 70 percent of the earth's atmosphere. Oceans provide 96.5 percent of the world's water. Fresh water that is available or drinkable makes up just 2.5 percent of global water. Well (13.0 percent), tap (15.5 percent), municipal water and tube well (13.0 percent) source is among the various sources of drinking water (58 percent). Polluted groundwater from such plants is released onto wetlands, soil, and waterways, where it eventually seeps into groundwater sources, altering its property and contaminating it. Detergents, ammonia for bathroom washing, acid rain, and other factors all contribute to water pollution. These toxins are rising in water every day, posing a serious threat to all living things. The physical, chemical, and biological characteristics of underground aquifers are evolving because of water pollution.

The majority of disease-causing chemicals found in water and food come from animals and human faeces. Pure water can have a temperature between 7 and 12 degrees Celsius. Absolute alkalinity, stiffness, complete soluble solids biological oxygen requirement, chemical oxygen demand, fluoride, calcium, magnesium ions, and bicarbonate ions are some of the chemical properties of ground water.

Treatment of water and wastewater containing fluoride ions requires a suitable and effective method. Membrane filtration , precipitation , nanofiltration , ion-exchange , electrocoagulation flotation , and adsorption have been used for fluoride removal. Among these methods, adsorption is the most effective

and widely used method because it is universal, has a low maintenance cost, and is applicable for the removal of fluoride even at low concentrations. Some of those adsorbents are activated coconut shell carbon and activated fly ash, groundnut shell, coffee husk, Wheat husk powder, Ground nut husk. *Phyllanthus emblica,* bark of babool, pine apple peel powder, orange peel powder, grind neem and pipal leaves, etc. Adsorption methods are adopted for removal of fluoride and these methods are suitable when fluoride is present in low concentrations.

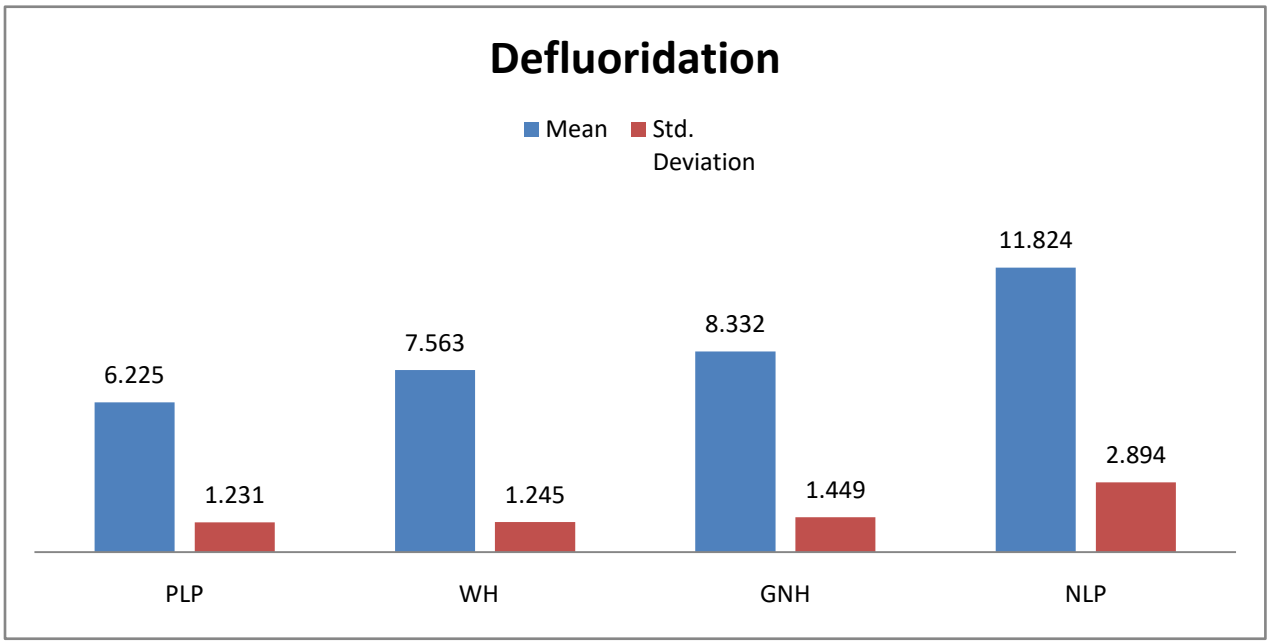
MATERIALS AND METHODS

In this paper an attempt has made to suggest certain low cost materials as effective adsorbents of fluoride. The adsorbents primarily were Dry Neem Leaves Powder, Dry Peepal Leaves Powde, Ground nut Husk Wheat Husk Powdered, Neem Peepal Leaves Mixture,Initially, all the adsorbents are screened by adding 15 gm of each adsorbent to 150 ml stock solution of fluoride.

Adsorption methods are adopted for removal of fluoride and these methods are suitable when fluoride is present in low concentration. For this purpose, an aqueous solution of 150 ml of fluoride (100ppm) of various concentrations is taken in 500 ml Stoppard bottles and 15 gm of adsorbents is added to the solutions. The initial and final concentrations of aqueous solutions solution of fluorid were determined by spectrophotometer and percentage removal of fluoride was determined.

Table 1: Comparison of Fluoride Removal Efficiencies of PLP,NLP and WH,GNH

S. No	Adsorbents	Mean	Std. Deviation	Std. Error Mean	t Value	Df	Sig.
1	PLP	6.225	1.231	0.054	14.866	359	0
2	WH	7.563	1.245	0.063			
3	GNH	8.332	1.449	0.201			
4	NLP	11.824	2.894	0.0217			



RESULTS AND DISCUSSION

Our results predict that the bioadsorbents taken as filter media are highly potential in their work. For NLP (Neem leaves powder) the defluoridation (11.824) is more effective and easily avlabile. which conclude that it is best for the purpose of fluoride removal at low cost and with appropriate availability, while in the research. For other research the experimental investigations clearly suggest that abundantly available and low-cost materials like Wheat Husk, Ground nut husk , Peepal leaves powder is effective in removing Fluoride from water to acceptable levels.PLP (6.225) is less effective defluoridation.

Next we present the low cost abosrbants most easily available and low cost material for the people even in village areas. This result is in the favor of the people who are not capable of purchasing high cost membrane filters to remove fluorine from their drinking water. Use of neem peepal mixture as adsorbent is the concept given by Tomar and Kumar.

The other most easily available raw material wheat husk also showed tremendous decrease in the amount of fluoride when used as adsorbent. Though the use of wheat husk was not reported anywhere and hence we implemented but we have used it in reference NLP,PLP GNH, with husk. The efficiency of various raw materials gave us the preference of their use, the sequence of efficiency can be given as NLP > GNH > WH > PLP .

Among the all above bio and waste material adsorbents concrete is selected for further studies to check the effect of contact time, concentration, adsorbent dosage and temperature on adsorptive removal of fluoride. After usage builders are dumping the waste concrete into dump yards of Hyderabad city. Taking this factor into consideration concrete selected as adsorbent for removal of fluoride from water and waste water.

CONCLUSION

The overall study analyze the physico-chemical biological properties and Removal of Fluoride through low-Cost Bio-adsorbent in water using different experimental techniques in the present investigation indicates that the quality of ground water collected from the 40 villages in different seasons like: rainy, spring, summer, winter. A Biological, Physical, and chemical analysis of groundwater samples were carried seasonal, considering several essential parameters like, Fluoride ion concentration, Total alkanity, Total dissolved solid, Temperature, BOD, Electrical conductivity, Dissolved oxygen, COD, The overall study analyze the physico-chemical biological properties and Removal of Fluoride through low-Cost Bio-adsorbent in water using different experimental techniques in the present investigation indicates that the quality of ground water collected in different seasons like: rainy, spring, summer, winter. A Biological, Physical, and chemical analysis of groundwater samples were carried seasonal, considering several essential parameters like, Fluoride ion concentration, Total alkanity, Total dissolved solid, Temperature, BOD, Electrical conductivity, Dissolved oxygen, COD,

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