

CHAPTER 1

INTRODUCTION

Throughout history people around the world have used groundwater as a source of drinking water and even today, more than half of the world's population depends on it for survival. Ground water quality may be impaired by many natural constituents such as fluoride, arsenic, iron, nitrate and salinity of which fluoride stands as a pollutant of geogenic origin in many countries. Fluoride concentration in groundwater is reported from as many as 40 countries including India.

Fluoride is a normal constituent of natural water samples. Its concentration, though, varies significantly depending on the water source. Although both geological and man-made sources contribute to the occurrence of fluoride in water, the major contribution comes from geological resources. Except in isolated cases, surface waters seldom have fluoride levels exceeding 0.3 mg/l. Examples are streams flowing over granite rich in fluoride minerals and rivers that receive untreated fluoride-rich industrial wastewater. There are several fluoride bearing minerals in the earth's crust. They occur in sedimentary (limestone and sandstone) and igneous (granite) rocks. Weathering of these minerals along with volcanic and fumarolic processes lead to higher fluoride levels in groundwater. Dissolution of these barely soluble minerals depends on the water composition and the time of contact between the source minerals and the water.

Over the year's groundwater has generally been considered to be a protected and safe source of water, fit for drinking without treatment, as the main focus has been on the bacteriological quality of potable water. Little consideration used to be given to the risks of chemical pollution, particularly to the presence of elevated levels of fluoride, arsenic and nitrate in groundwater. This chapter deals with only fluoride. Consumption of water having excess fluoride over a prolonged period leads to a chronic ailment known as fluorosis. Incidence of high-fluoride groundwater has been reported from 27 nations around the globe. It has led to endemic fluorosis, which has become a major geo-environmental health issue in many developing countries. According to a recent estimate, 62 million people are affected by various degrees of fluorosis in India alone (Susheela, 2001).