

The tritium as an indicator for landfill leachate pollution (case of Mediouna landfill, Morocco)

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Tracing landfill's leachate in groundwater usually relies on measuring the chemical changes of the standard pollution parameters. Such monitoring encounters difficulties of interpretation, due generally to interference with hydrogeological conditions and anthropogenic activity.

Several studies have shown in the last years the existence of very high tritium content in landfill's leachate, although the source of this weak radioactivity is not yet well clarified. Levels of tritium well above the usual environmental levels have been detected in association with landfill sites. Moreover, this element doesn't participate in chemical reactions and is only slightly exchanged onto geological material. These observations make the tritium an indicated tracer of landfill contamination.

Our study was carried out on Mediouna landfill which is the largest one in the country. Tritium investigation was undertaken on samples collected from wells upstream and downstream the landfill. The results were compared with those obtained by standard chemical parameters.

The use of tritium as pollution tracer brings an additional accuracy degree on the delimitation of the aquifer polluted area.

Geogenic contamination of groundwater with fluoride in the Rift Valley of Ethiopia and its mitigations

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Excessive and undesirable level of fluoride in drinking water supplies groundwater from geogenic sources is a major problem in the Rift Valley of Ethiopia.

In this study, the extent of contamination of ground water with fluoride was assessed based on the existing data. Result showed that over 14 million people are at risk. In rural communities where alternative water sources are not available, development of simple and low cost groundwater treatment system is appropriate option to control fluorosis. The applicability of various technologies was evaluated under laboratory and field conditions. Result showed that the applicability of most of the methods is limited.

A new method has been developed using aluminium hydroxide as an adsorbent. Detailed investigation was carried out under batch and continuous operations. Design parameters were established based on equilibrium and kinetic models for batch and continuous mode of operations. The material has superior performance with capacity of 23.7 mg F-/g and 25.79 mg g-1 in batch and continuous modes, respectively under optimised conditions. Among the ions in groundwater, Cl⁻ and SO₄²⁻ have very little effect on the fluoride uptake capacity of adsorbent but HCO₃⁻ and PO₄³⁻ had a profound effect. Household defluoridation units of different size were developed based on the optimised parameters and the performance is in close agreement with results of laboratory investigations. Hence it is concluded that the proposed method is simple and has superior performance as compared to other commercially available adsorbents such as activated alumina.