Treatment of Nitrate Contaminated Groundwater in Fluidized bed Reactor[1]

Hammoud Mouhammad Hammoud Al-Housin [2]
Salaw Hajjar[3] **Mouhammad Dhay[4]**

Abstract

Biological Denitrification process in anoxic fluidized bed reactor is a simple way to eliminate nitrate – nitrogen that pollute the groundwater.
In this method the biofilm (including organic bacteria) was cultured on the reactor bed particles, which we chose granular activated carbon (1-3) mm.
The raw water containing Nitrate ions and bacteria nutrients was pumped into the bottom of the reactor in an adequate velocity to fluidize the bed particles holding the biofilm.
Ethanol and DeHydrogenated Sodium ortho phosphate was chosen as bacteria nutrients, Ethanol as carbonic nutrient and DeHydrogenated Sodium ortho phosphate as phosphoric nutrient.
The bacteria exists in the biofilm will reduce nitrate into nitrogen gas as the following:

$$NO_3 \longrightarrow NO_2 \longrightarrow NO \longrightarrow N_2O \longrightarrow N_2$$

It was noticed in this research that the ideal ratio of Ethanol for the treatment process is: $C_2H_5OH / NO_3 = 0.095$ mg/mg.
And less amount of Ethanol about this value will give a manifest decrease in Denitrification qualification.

[1] For the paper in Arabic see pages (293-308).
[2] A student researcher in the Environment department Civil Engineering Faculty Aleppo University.
[3] Professor in the Environment department Civil Engineering Faculty Aleppo University.
[4] Professor assistant in the Environment department Civil Engineering Faculty Aleppo University