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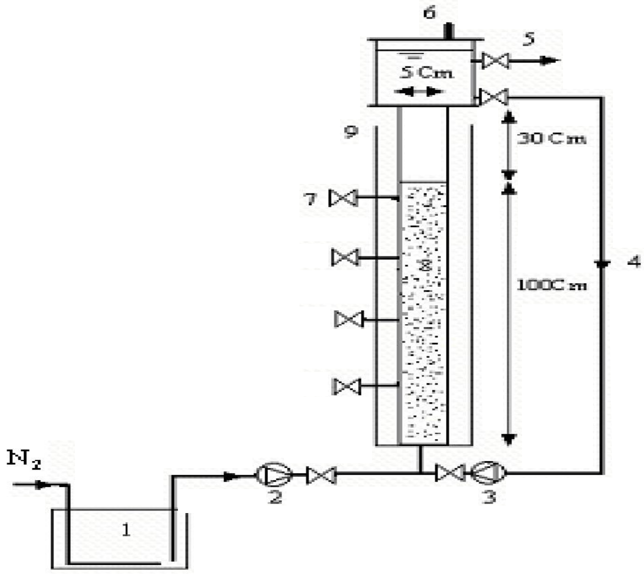
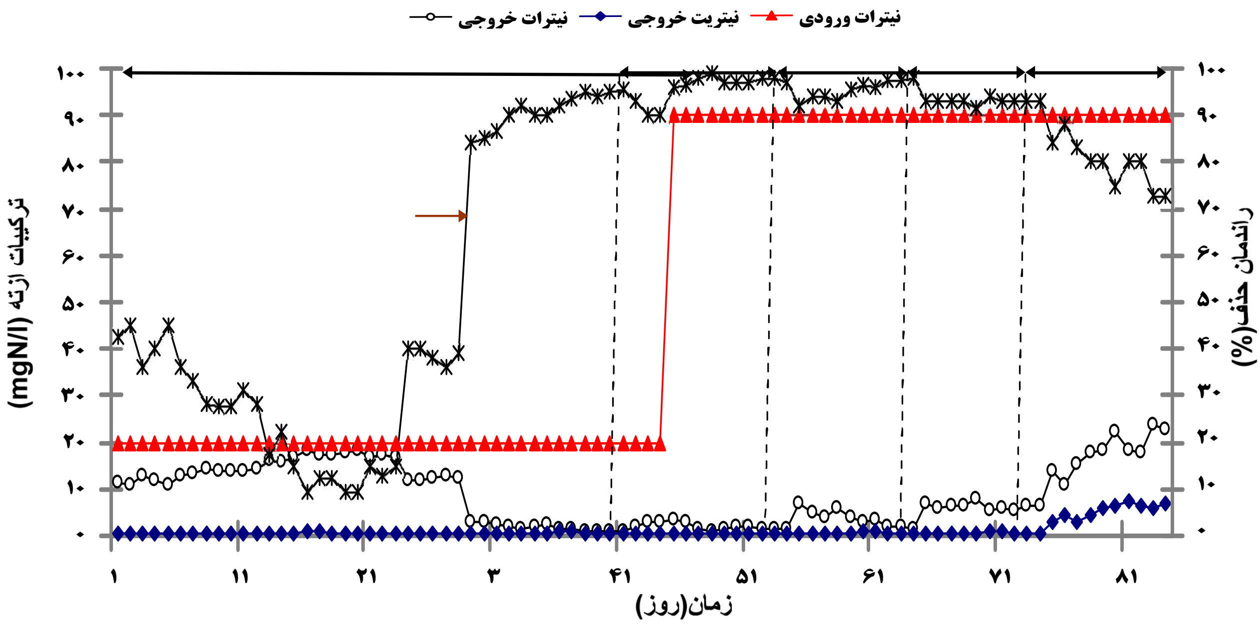
(mgNO$_3^-$-N/l)

(S°)

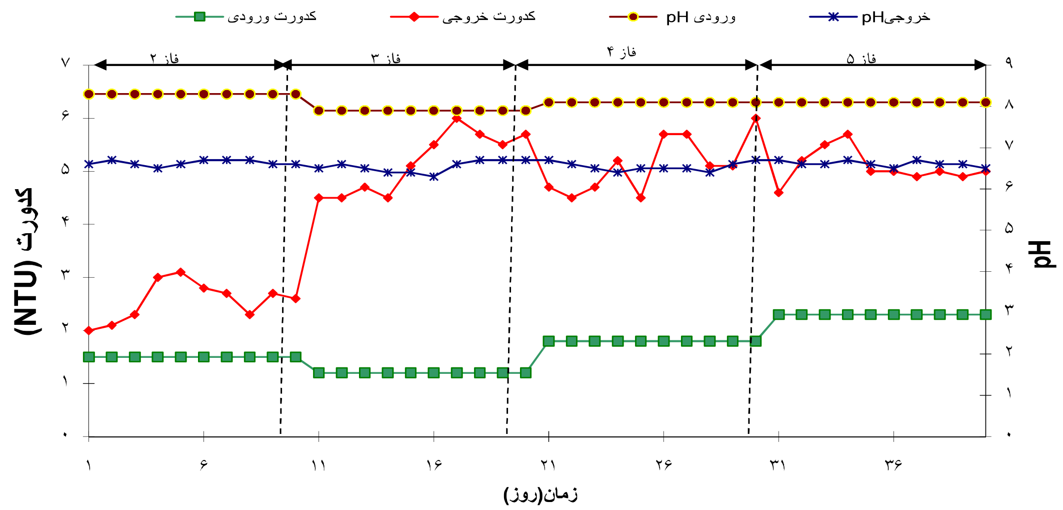
(Thiobacillus denitrificans)

(Thiomicrospira denitrificans)


6
5
5Cm
9
30 Cm
7
8
4
100Cm
N_2
2
3
1



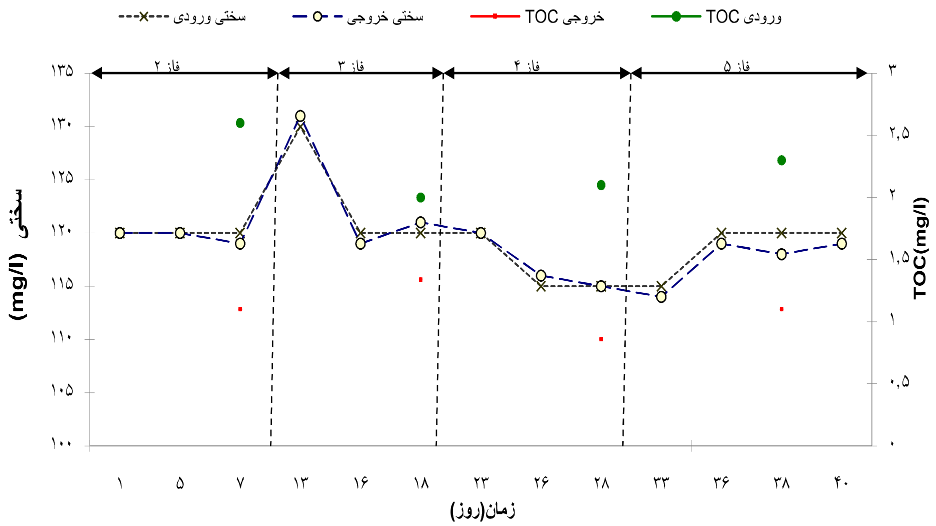
نیترات ورودی
نیتریت خروجی
نیترات خروجی
ترکیبات ازته (mgN/l)
راندمان حذف (%)
زمان(روز)
۱
۱۱
۲۱
۳
۴۱
۵۱
۶۱
۷۱
۸۱
۱۰۰
۹۰
۸۰
۷۰
۶۰
۵۰
۴۰
۳۰
۲۰
۱۰
۰



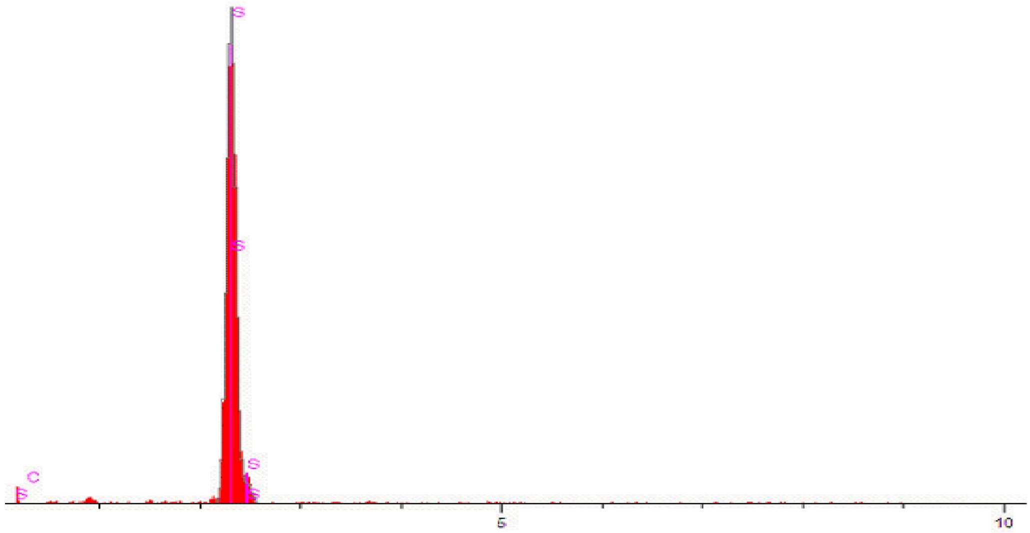
Ǵǭ5ǸǶ ŭ3ǂƩǁƩǃ ǌǂƩǁ 3ǋ ŮΣρƩϬ 3ǋ ϴρ3ȳŧ ρ **pH** ϴǂƩǃǃŭ :ĦǨŨǁ
(Ĩρħ ¡Ħ ¡ĥƩǨ) ϴρǨĀǭ ŨŨǃρ3ȳǵ ȳǨǭ ǯǨǭƩ 3ǋ

ρ (Ĥ/Ĩ h ŨŨǃρ3ȳǵ ȳǨǭ ǯǨǭƩ) 3Ǹǭŧ3 Ʃǂ ŭ3ǂƩǁƩǃ Ĩ ƩǨ ϴǂƩǃ Ǜzf 3ǋ 3Ǹǭŧ3 Ůǂ3ǩŧ Ĥ/ħĨ kgN/m³.d ŭ3ǂz3ǩ Ʃǁ Ĥǵ mg/L Ʃǂ ǀ ǃǁ Ǵǁ ŮΣρƩϬ ϴǂƩǃ ǯǂ3ǯǭ ρ ǴǭǨǂ ǀ ǵǩŧ ǰǃšǪǵ .Ơ5ǂ ȳǃ53 (ěĨĥ ǧǋǨǭ Ǜzf ǯǨǭȳǂ3) ϴƩǂ ǂ s f 3ǋ ȳǁ ǴǃĀǆǃ ǩǆ 3ǋ ƠǂƩǃ ƠǒǭŨ ϴǂƩǃǃŭ Ǵǁ ǋǸǁƩǭ Ƨǂǩǂ ŭăǂǭ ŭ3ǂƩǁ ǂƩǂǁ ǌǂƩǁ 3ǋ ŭ3ǂƩǁ ǂƩǂǁ ŬρƩǁ Ʃǂ ĪĦ d ǧǸĂ

Ǵŧ ĥ/ħ ¡ĥ/Ĩħ ¡Ĩ/ĨĦ ŮŨǃρ3ȳǵ ȳǨǭ ŭǨǵ3ǨƩ 3ǋ ǫρǂȳǭ ρ 3Ǹǂ 3ǂ3ǭ Ǵŧ Ơ5ǂ Ʃū3ǩǁ Ơ5ǂ ǂȳǁ ǂǋǂ 3ǩ ǂ ĥ ǨǕǁ 3ǋ ȳǂš Ʃǵ .Ơ5ǂ ǂǋǸǁ Ĥ mg/L Ʃǂ ƩǭǯŁ ǂ3ǂǸ3ǵ ŭȳǃǸǃ Ơǂ ƩǃǃǁŭǂƩǃ ƠǒǭŨ Ĥ/Ĩ h ŨŨǃρ3ȳǵ ȳǨǭ ǯǨǭƩ ǩǁ 3Ǹǭŧ3 Ʃǂ ŭ3ǂƩǁ ǂƩǂǁ ǩǁ ǀ ǃǁ Ǵǁ ρ ǀ ǂ3ǂ ŮΣρƩϬ ǂȳǁ ǴǃĀǆǃ ǩǆ 3ǋ Ů35 ǂȳǨǭ ǰǂ .Ơ5ǂ ǂȳǃ53 Ĥ mg/L Ʃǂ



Ǵǭ5ǸǶ ŭ3ǂƩǁƩǃ ǌǂƩǁ 3ǋ ŮΣρƩϬ ǩǆ 3ǋ TOC))Ũǂ ǰǂƩŧ ǨŦ ρ Ũǭ5 ϴǂƩǃǃŭ :ħǨŨǁ
(Ĩρħ ¡Ħ ¡ĥƩǨ) ϴρǨĀǭ ŨŨǃρ3ȳǵ ȳǨǭ ǯǨǭƩ 3ǋ



EDX

[illegible]

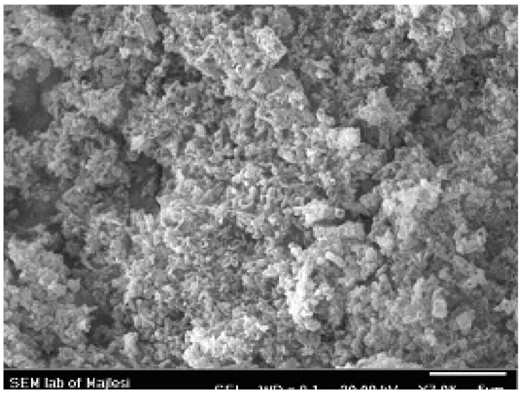
pH

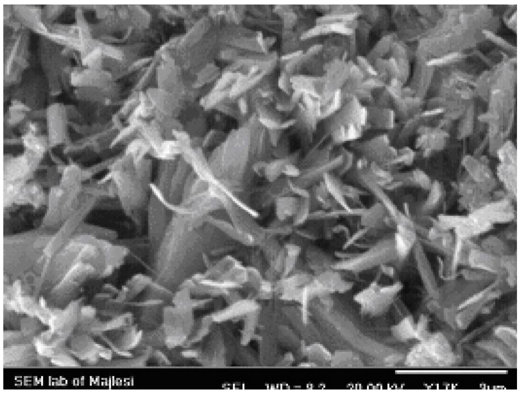
pH NTU

mg/L

EDX

[illegible]


SEM lab of Majlesi


SEM lab of Majlesi

Ma pH Soares pH Kim pH h (Sloughing)

mg/L pH pH pH pH pH

$$1.1\ S^0 + NO_3^- + 0.76\ H_2O + 0.4\ CO_2 + 0.08\ NH_4^+ \rightarrow 1.1\ SO_4^{2-} + 0.08\ C_5H_7NO_2 + 1.28\ H^+ + 0.5\ N_2$$

pH pH pH pH

ǔǃǨǻǭ

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Drinking Water Denitrification using Autotrophic Denitrifying Bacteria in a Fluidized Bed Bioreactor

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ABSTRACT

Background and Objectives: Contamination of drinking water sources with nitrate may cause adverse effects on human health. Due to operational and maintenance problems of physicochemical nitrate removal processes, using biological denitrification processes have been performed. The aim of this study is to evaluate nitrate removal efficiency from drinking water using autotrophic denitrifying bacteria immobilized on sulfur impregnated activated carbon in a fluidized bed bioreactor.
Materials and Methods: After impregnating activated carbon by sulfur as a microorganism carriers and enrichment and inoculation of denitrifying bacteria, a laboratory-scale fluidized bed bioreactor was operated. Nitrate removal efficiency, nitrite, turbidity, hardness and TOC in the effluent were examined during the whole experiment under various conditions including constant influent nitrate concentration as 90 mg NO3--N/l corresponding to different HRT ranging from 5.53 to 1.5 hr.
Results: We found that the denitrification rates was depended on the hydraulic retention time and the nitrate removal efficiency was up to 98% and nitrite concentration was lower than 1mg/l at optimum HRT=2.4 hr respectively. Moreover, there was no difference in hardness between influent and effluent due to supplying sodium bicarbonate as carbon source for denitrifying bacteria. However pH, TOC, hardness, and turbidity of the effluent met the W.H.O guidelines for drinking water.
Conclusion: This study demonstrated that an innovative carrier as sulfur impregnated activated carbon could be used as both the biofilm carrier and energy source for treating nitrate contaminated drinking water in the lab-scale fluidized bed bioreactor.

Keywords: Denitrification, Impregnated activated carbon, Autotrophic bacteria, Fluidized bed bioreactor

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