

UPGRADING SEPTIC TANKS EFFICIENCY USING SELECTED BACTERIAL ADDITIVES

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Abstract

The experimental work was executed on 6 septic tanks represent two modified types located in villages of the Upper Egypt. Three of them receiving waste with medium organic load, while the others receiving waste with high load. Mixture of five locally selected, adapted, enzyme active producers, bacillus bacterial species has been used as additive to the septic tanks in order to test its ability to improve the effluent quality.

Regarding those receiving the medium load, a slight improvement in the effluent quality was achieved few days after the addition of the bacteria. At day 60, the effluent of tanks that supported with cultured bacteria had the following values: 77.2-104.8 ; 44.1-58.7mg O₂ /l for COD and BOD₅ ; 52.9-70.6; 4.1-15 mg /l for TSS, oil & grease and 10⁴-10⁶ MPN/ 100ml for coliforms. Septic tanks without bacterial additives (control) were able to show removal percentages ranged as: 79.3-88.5, 80 - 85.5, 75.1 - 83, 28 - 41.7, and 98.5 - 99.85 for COD, BOD₅, TSS, oil & grease and coliforms, respectively.

Septic tanks that receiving influent with high load of pollutants, again the actual improvement in the effluent quality appeared at the 6th day with maximum removal after 36 days, and may extend to 42 days, after addition of bacteria. During this period, the removal percentages for COD, BOD₅, TSS, oil & grease and coliforms were ranged as 93.8 - 97.2, 94.5 - 97.0, 94.0 - 97.9; 64.0 - 93.8; 99.81 - 99.99, respectively. Control tanks showed percentages of removal ranged as 64.7 – 87.2, 73.4 – 89.6, 56.7 – 86.9, 34.6 – 45, and 92.8 – 99.28 for COD, BOD₅, TSS, oil & grease and coliforms, respectively.

Although, the removal efficiency of septic tanks with bacterial additives was higher in case of those receiving the high load of pollutants than those receiving medium load, the pollutants residual in the final effluent (after 60 days) of the first case are higher.

Keywords: Egyptian Rural area, Septic Tanks, Bacterial Additives, improvement the effluent quality.