

عنوان مقاله:

Effect of dosage and particle size of natural zeolite on the survival of Escherichia coli in soil

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خلاصه مقاله:

Survival of enteropathogenic bacteria in soil is a key factor to control waterborne diseases. The significance of zeolite nanoparticles in comparison with natural size particles on the survival of Escherichia coli in soil was studied in sterile and unsterile conditions. The experimental mixtures prepared by adding zeolite and nanozeolite at levels of 0, 5, 15% w/w to a loam textural soil to obtain 100 gr mixtures. Mixtures inoculated by a nalidixic acid resistance Escherichia coli (E.coli NAR) at a rate of 10^6 cells gr^{-1} soil. Results showed that in the unsterile soils, adding 5% zeolite had no significant effect on the survival of bacteria in soil and 15% nanozeolite reduced bacteria survival in soil especially at initial days of inoculation (about 3 log-unit). While adding 15% zeolite and 5% nanozeolite had a significantly positive effect on bacteria s time need to reach the detection limit (td). Sterilization of soil mixtures significantly enhanced bacteria survival in all treatments. The highest value of td obtained in sterile soil amended with 15% zeolite (46 days). In sterile mixtures adding nanozeolite caused an increasing in bacteria population at initial days after inoculation (about 1-1.5 log-units). Decreasing in the size of natural zeolite particles to nanoscale had a negative effect on survival of the studied bacterium in unsterile mixtures and E.coli NAR survived more in zeolite amended mixtures. While this negative effect was not observed in sterile soil. These results clearly showed that competition is the main factor that controls enteropathogenic bacteria s survival in soil.

کلمات کلیدی:

Escherichia coli, Nanozeolite, Zeolite, Weibull survival model

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