

## Effect of Silver Nano-Particle on Removing the *Enterococcus Faecalis* Bacterium Isolated from Industrial Wastewater

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### Abstract

**Background and Objectives:** Due to the unique absorption and antibacterial properties of nanoparticles, their use in water and wastewater treatment to remove bacteria is spreading. This research aimed to study the effect of silver nanoparticles in the removal of *Enterococcus faecalis* isolated from industrial sewage.

**Material and Methods:** after preliminary studies, field studies including sampling of industrial wastewater was conducted. First, Fecal Coliform, total coliform and *Enterococcus faecalis* of industrial Sewage were measured by standard methods of microbiology, then the effect of concentrations of 500, 250, 125, 62.5, 31.25, 15.62, 7.81, and 3.9 PPM of isolated nanoparticles serial dilution method on *Enterococcus faecalis* and standard (PTCC 1339) was determined. Next, and the turbidity of tube (OD), which represents growth of bacteria, was read at 600 nm with a spectrophotometer. After that, all tubes were cultured on solid medium and the results were analyzed using SPSS 22.

**Results:** fecal and total coliform contamination of industrial Sewage from slaughter and textile plant were approved and *Enterococcus faecalis* was isolated. The growth of isolates and standard bacteria was not controlled by any of these concentrations. None of the concentrations was able to remove the bacteria but the increase of concentration led to higher effect of nanoparticles, and in accordance with the type of bacteria, it was different, but the difference was not statistically significant.

**Conclusion:** Although silver nanoparticles ,according to the concentration, affect the *Streptococcus faecalis*, they cannot completely remove bacteria. Therefore, the economic factors and other involved factors need to be considered in the application of nanoparticles.

**Keyword:** Silver nanoparticles, *Enterococcus faecalis*, industrial Sewage