

# Assessing the Effectiveness of Iron Oxide Nanoparticles against Bacterial Growth

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The purpose of this investigation was to determine the effectiveness of iron oxide nanoparticles as an anti-microbial agent against *Escherichia coli*, *Bacillus cereus*, and *Pseudomonas fragi*. For experimentation in this investigation, concentrations of 50  $\mu$ l and 25  $\mu$ l were applied using a micropipette technique to blank sterile disks and placed onto a petri dish of either *Escherichia coli*, *Staphylococcus epidermis*, *Bacillus cereus*. One blank sterile disk (for the control) and one tetracycline disk (to use as a standard for comparison) was also added to each bacterial plate. The dishes were then incubated at 37 degrees Celsius. At 12 hour increments over a 72 hour period, petri dishes were observed and the zones of inhibition were recorded in millimeters. With a fair quantity of these tests showing statistical significance, it is very possible that a 50  $\mu$ l of biotin functionalized iron oxide nanoparticles is a possible antibiotic solution against *Escherichia coli*, *Bacillus cereus*, and *Pseudomonas fragi*. I am able to fully accept my hypothesis, for the 50  $\mu$ l concentration of the nanoparticles was the most effective concentration in inhibiting bacterial growth.