



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Kara Fan	Project Number J1603
Project Title Nano Particles Liquid Bandage	
<p style="text-align: center;">Abstract</p> <p>Objectives Each year in the U.S., at least 2 million people get an antibiotic-resistant infection, and at least 23,000 people die. A government study estimated that antibiotic-resistant bacteria could kill 10 million people every year by 2050 -- that's more than people died in cancer last year. The overuse of triple-antibiotics (polymyxin, bacitracin, and neomycin) first aid ointments may have created an antibiotic-resistance bacteria called USA300.</p> <p>The objective of my project is to determine if nano-copper and nano-silver can be an alternative to triple-antibiotics used in wound care, thus reducing the overuse of antibiotics. I created two nanoparticles liquid bandages and tested their antimicrobial effectiveness on four bacteria.</p> <p>Methods Nano-copper was synthesized from lemon leave and copper sulfate. The nano-silver solution and triple-antibiotics Neosporin were purchased online. The existence of nanoparticles was characterized by a transmission electron microscope. The nanoparticles solution was mixed with a water-soluble polymer (PVP) to create the liquid bandage. The antibacterial effectiveness of the Nanoparticles liquid bandage and Neosporin were measured by zone inhibition method. Four types of bacteria were tested in the experiments - Bacillus Subtilis, E. coli, Micrococcus Luteus, and garden soil. Each testing was repeated five times.</p> <p>Results At 500ppm concentration, nano-silver liquid bandage was 48% as effective as Neosporin. At 250ppm concentration, nano-silver liquid bandage was 34% as effective as Neosporin. At 125ppm concentration, nano-silver liquid bandage was 15% as effective as Neosporin. At 100 and 30ppm, nano-copper liquid bandage showed no antibacterial effect.</p> <p>Conclusions In this study, I wanted to see if nano-silver and nano-copper liquid bandage be an alternative to triple-antibiotics first aid ointment. My results showed that nano-silver liquid bandage inhibited growth on all four bacteria. At 500ppm, nano-silver liquid bandage was 48% as effective as triple-antibiotics Neosporin. The results are very promising as they show that nano-silver liquid bandage could be an alternative to triple-antibiotics ointment in wound care.</p>	
Summary Statement I created a nano-silver liquid bandage that effectively inhibits growth of Bacillus Subtilis, E. coli, Micrococcus Luteus, and garden soil bacteria.	
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