Comparing the Effects of Synthetic Antibiotics and Natural Antibiotics on *Escherichia coli* and *Staphylococcus epidermidis*

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Abstract

Scientists are constantly seeking out new methods for combating antibiotic resistance, and some have turned to more natural substances as an alternative. Herbs like garlic, rosemary, and thyme are frequently used in "all-natural" disinfectants, and some claim these herbs possess antibacterial effects. The purpose of this paper was to investigate if natural antibiotics could become a viable alternative to synthetic antibiotics in soaps and common disinfectant products. Tetracycline and Chloramphenicol were tested as the synthetic antibiotics; garlic and rosemary were tested as the natural antibiotics. This paper investigates the effectiveness of these natural antibiotics at killing *Escherichia coli* and *Staphylococcus epidermidis*.This paper also examines the microevolution of *E. coli* and *S. epidermidis* when exposed to natural and synthetic antibiotics. In the first round, five synthetic antibiotics and three natural antibiotics were tested for their effectiveness at killing three common strains of bacteria. In the next trial, the most successful antibiotics moved on and were exposed to four generations of *E.coli* and *S.epidermidis* in order to find how long it took for the bacteria to build resistance. This experiment proved the hypothesis correct, natural antibiotics were less effective at killing the bacteria and were quickly made ineffective by the second generation of bacteria.