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Polymer Antimicrobial Synergy Research

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ABSTRACT

Recent studies have shown that certain polymers, such as branched polyethylenimine (BPEI), have the potential to be antimicrobial. We have been growing certain strains of *Bacillus subtilis* (*B. subtilis*) and *Escherichia coli* (*E. coli*) and adding in concentrations of ampicillin to find the minimum inhibitory concentrations (MICs). This allows us to add in different concentrations of BPEI to test for synergy between our antibiotic and our polymer.

To find the MIC of each antibiotic, we grew an overnight of the bacteria in Lysogeny Broth (LB) and let it inoculate for 20 hours. We then inoculated a 24 well culture cluster with LB, ampicillin, and bacteria. The volume of bacteria was 10 μ L to 1,000 μ L of LB, making a 1% concentration. The plates were checked after inoculating for 20 hours, and the results of whether there was growth or no growth would be charted. After finding the MICs of our bacteria, we began adding different amounts of BPEI, at a 1 μ g/mL concentration, to our bacteria and ampicillin concentrations to look for any signs of synergy. The same procedures as before were used when testing using the polymer.

The results of the MIC of each bacteria are as the following: *B. subtilis* 1A578 was between 250 μ g/mL and 125 μ g/mL, *B. subtilis* 6051 was between 250 μ g/mL and 125 μ g/mL, and *E. Coli* ATTC11775 was between 4 μ g/mL and 2 μ g/mL. No clear synergy has been seen between BPEI and ampicillin.

Key Words: Antimicrobial, Synergy, Branched Polyethylenimine, Ampicillin

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