

Cannabidiol (CBD) Resistant Salmonella Strains Are Susceptible to Epsilon 34 Phage Tailspike Protein

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Abstract : The rise of antimicrobial resistance is a global public health crisis that threatens the effective control and prevention of infections. Due to the emergence of pan drug-resistant bacteria, most antibiotics have lost their efficacy. Bacteriophages or their components are known to target bacterial cell walls, cell membranes, and lipopolysaccharides (LPS) and hydrolyze them. Bacteriophages, being the natural predators of pathogenic bacteria, are inevitably categorized as 'human friends', thus fulfilling the adage that 'the enemy of my enemy is my friend'. Leveraging on their lethal capabilities against pathogenic bacteria, researchers are searching for more ways to overcome the current antibiotic resistance challenge. In this study, we expressed and purified epsilon 34 phage tail spike protein (E34 TSP) from the E34 TSP gene, then assessed the ability of this bacteriophage protein in the killing of two CBD-resistant strains of Salmonella spp. We also assessed the ability of the tail spike protein to cause bacteria membrane disruption and dehydrogenase depletion. We observed that the combined treatment of CBD-resistant strains of Salmonella with CBD and E34 TSP showed poor killing ability, whereas the mono treatment with E34 TSP showed considerably higher killing efficiency. This study demonstrates that the inhibition of the bacteria by E34 TSP was due in part to membrane disruption and dehydrogenase inactivation by the protein. The results of this work provide an interesting background to highlight the crucial role phage proteins such as E34 TSP could play in pathogenic bacterial control.

Keywords : cannabidiol, resistance, Salmonella, antimicrobials, phages

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