

Jenna Hartley
Engineering a Novel Inhibitor for Encapsulated Pathogens

The basis of this project was to investigate the sensitivity of the development of surface-attached biofilm bacterial communities when exposed to the extract of Terminalia Chebula and Echinacea. In other words, I was testing if the extracts of herbs such as Terminalia Chubula and Echinacea are possible novel inhibitors for the biofilm of Pseudomonas Aeruginosa. The motivation behind this project originated when my friend, who has Cystic Fibrosis, told me about a pathogen, Pseudomonas aeruginosa, which I had worked with previously, that can cause severe respiratory tract issues for people with this condition. This is mainly because the mucus that initially causes a problem for people with Cystic Fibrosis, can also act as a biofilm for Pseudomonas aeruginosa, which, in turn, makes this pathogen very hard to treat. Due to the fact that this experiment is extremely broad and I had never worked with biofilms before, I chose to simply work on the inhibition of the biofilms this year. In order to conduct this experiment, I grew a Pseudomonas aeruginosa biofilm, which had either the extract of Terminalia Chebula, Echinacea, or distilled water in it. I dyed the biofilm with crystal violet dye and then examined it under a microscope. I also performed a test which determined if the treatment was inhibiting the biofilm or simply killing the cells. I found, and statistically proved, that Echinacea decreases the amount of microcolonies within the biofilm, and I observed that it additionally changes the structure. This indicates that Echinacea could act as a novel inhibitor for the biofilm of Pseudomonas aeruginosa.