Effects of Prosopis glandulosa Leave Extract on Lowering the Antibiotic Resistance of Escherichia coli, Sarcina lutea, and Staphylococcus epidermidis

Romero, Andrea (School: Harvest Preparatory Academy)

Antibiotic resistance is one of the world's most urgent public health problems. Every year in the US, around 2.5 million people get an antibiotic resistance infection, while 35000 people ended up dying. This research investigated how Prosopis glandulosa (honey mesquite), a native Sonoran Desert plant, leaves extract can lower the antibiotic resistance of three different bacteria. To get the leaves extract, glycerin extraction was performed consisting of 680g of dried leaves soaked in glycerin and distilled water solution with 1:1 ratio. 5 isolated pure colonies of E. coli, S. epidermidis, and S. lutea were diluted into 2mL of sterile saline solution to prepare inoculums for Kirby-Bauer Antibiotic Assay. Part 1 investigated the antibiotic property of P. glandulosa extract alone using sterile paper discs with 20µL of extract. Part 2 investigated the effects of adding P. glandulosa extract into different antibiotics. 5 replicates of experimental (antibiotics + extract) and control treatments (antibiotics only) were prepared for each bacterium. Data were analyzed using one-way ANOVA. Paper discs consisting of P. glandulosa extract showed intermediate effects to all bacteria (Zones of Inhibition=15-19mm). Among all the antibiotics, Neomycin had significant effects to all tested bacteria when mixed with P. glandulosa leave extract with all zones of inhibition higher than 25mm (all p-values <0.05). All antibiotics showed significant effects on lowering the antibiotic resistance of S. epidermidis when mixed with P. glandulosa extract (p-values: Penicillin=0.005, Ampicillin=0.0009, Neomycin=0.002, Erythromycin=0.00002). The results support recent research suggesting pharmaceutical potential of P. glandulosa and a possible tablet binder agent.

Awards Won:
University of Arizona: Renewal Tuition Scholarship