A Novel Approach to Treating Burn Wound Infections Using Flavonoids: Exploring the Interaction between Antibiotics and Flavonoids

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The purpose of this experiment is to find a novel way to treat burn wound infections by exploring the interaction between flavonoids and antibiotics. 'Flavonoids' are naturally derived secondary metabolites which have the potential to treat burn wound infections just as effectively as conventional antibiotics. This experiment's significance lies in the fact that over 40% of burn wound deaths are due to bacterial infection. Antibiotic resistance has been causing serious complications for the healing of burn wounds. There has been substantial research exploring the use of flavonoids and antibiotics together to combat antibiotic resistance in burn wound infections. The effect of flavonoid (Quercetin+Rutin+Hesperidin) and Amoxicillin combinations against wound infecting bacteria E. coli was determined by creating bacterial lawns with E.coli and placing an antibiotic disk made of either a combination of flavonoids+ antibiotics, only antibiotics, or only flavonoids at varying concentrations ranging from .5M, .75m, 1M, 1.25M, and 1.5M. Data was analyzed using the Johnson and Case Bacterial Analysis Test and an ANOVA Statistical Analysis. The results collected during this experiment concluded that the combination of flavonoids + antibiotics was the most effective at inhibiting the growth of E.coli compared to only flavonoids or only amoxicillin against E.coli. Additionally, the results of this experiment revealed that flavonoids could be utilized as a resistance modifying agent to increase the efficiency and lifespan of traditional antibiotics. Future research regarding the use of flavonoids could be evaluating the specific relationship between flavonoids and antibiotics through an antimicrobial synergy test.

Awards Won:
Air Force Research Laboratory on behalf of the United States Air Force: First Award of $750 in each Regeneron ISEF Category
U.S. Agency for International Development: USAID Science for Development First Award - Global Health