The Antimicrobial Potential of Tree Bark Extracts

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To determine the antimicrobial potential of tree bark extracts against two gram- negative bacteria (Escherichia coli and Pseudomonas fluorescens) and one gram-positive bacteria (Bacillus subtilis) with further experiments applying to Pseudomonas bacteria, in particular Pseudomonas syringae pv. aesculi (Pae), which the bacteria causing Bleeding Canker on Horse Chestnut trees (Aesculus hippocastanum).Tree bark from five species were extracted using solvents: water, ethanol and acetone. The efficacy of these extracts was tested against these bacteria through a disk diffusion method (Kirby-Bauer). According to the findings Sitka spruce (Picea sitchensis) was the most effective natural inhibitor against the Pseudomonas and other bacteria.Picea bark extract has the potential to be an effective inhibitor of Pae infection in ‘Bleeding Canker’ disease.Further research involved infecting healthy Aesculus branches with Pae liquid culture on intentionally inflicted bark incisions. Infected specimen branches were simultaneously treated with Picea bark extract and infection levels assessed by continuing inspection of lesion development supported by PCR analysis and plate assays to confirm pathogen presence. The final stage of the research involved testing the properties of the active component(s) in the Picea bark extract. Tests showed that the bark extract was heat stable and non-polar and from NMR testing the likely chemical groups identified were resin acids and stilbenes.This study provides scientific understanding to further develop the bark extract Sitka spruce as having the antimicrobial compounds to inhibit plant pathogens.

Awards Won:

Third Award of $1,000