

Activities

Present activities

Antimicrobial and Antifungal Activity of Selected Essential Oils and Their Potential Applications in Antimicrobial Wound Dressings

This ongoing research explores the **antimicrobial and antifungal properties** of selected **essential oils (EOs)** and their potential use in **wound dressings** to combat multidrug-resistant microorganisms. Essential oils, rich in **bioactive compounds** such as alcohols, phenols, and terpenes, exhibit **broad-spectrum antimicrobial activity**, inhibiting pathogenic bacteria, fungi, and even viruses.

Key aspects of the study include:

- **Screening essential oils for antimicrobial efficacy** against common pathogens
- **Identifying active compounds** responsible for antimicrobial effects
- **Assessing biocompatibility and stability** for wound dressing applications
- **Developing EO-infused antimicrobial wound dressings**

This project, conducted in collaboration with **CRITAS, China**, aims to develop **natural, bioactive wound care solutions** to address the growing challenge of antimicrobial resistance.



Past activities

Antimicrobial Resistance Genes, Virulence Genes, and Associated Mobile Genetic Elements of Multidrug-Resistant Enterobacterales

This collaborative study investigated multidrug-resistant (MDR) *Klebsiella pneumoniae* ST16, *Escherichia coli* ST131 (Esc), and *Enterobacter hormaechei* subsp. *steigerwaltii* ST93 (*Enterobacter cloacae* complex [ECC]), marking their first isolation in Sri Lanka. Eight MDR uropathogenic Enterobacterales from hospital-acquired urinary tract infections (UTIs) underwent genomic sequencing and comparative genomics.

Key findings include:

- Multiple resistance genes, including carbapenemase, AmpC, and ESBL genes (e.g., blaNDM-4 and blaOXA-181 in ECC)
- Virulence factors, such as fimbrial genes in *K. pneumoniae* and extraintestinal pathogenic *E. coli* genes in Esc
- Efflux pump (acrA) and Type VI secretion system (T6SS) genes in ECC
- Mobile genetic elements contributing to AMR dissemination

This study, conducted in collaboration with Department of Microbiology, University of Colombo, Sri Jayewardenepura Hospital and the Centre for Clinical Microbiology, University College London, provided crucial insights into the molecular mechanisms driving AMR in Sri Lankan hospital settings.

