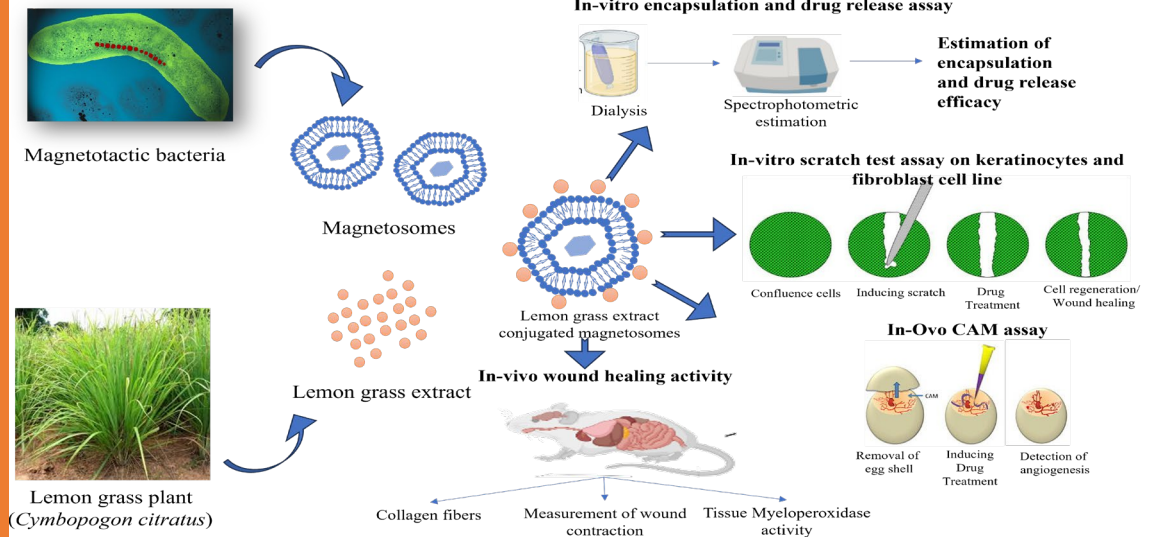


Preparation And Evaluation of Wound Dressing Material and Topical Ointment using Magnetosome Conjugated Lemon Grass Extract (MLGE)

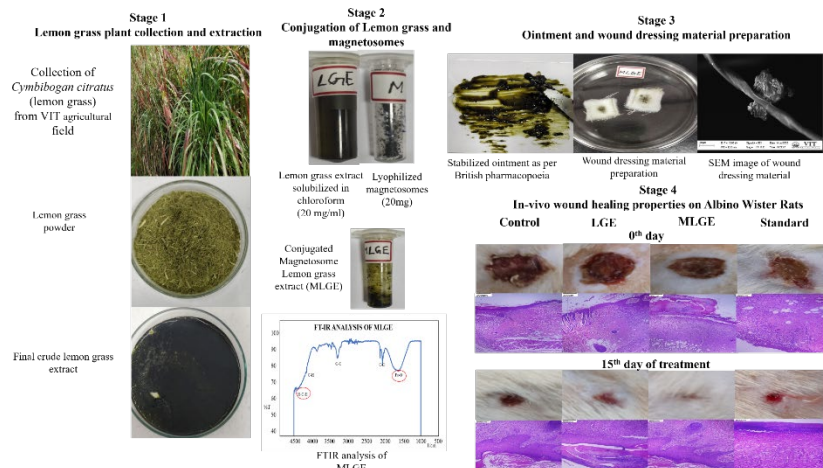
Graphical Abstract



Project Description

Wound healing is an important aspect of human health, especially one who undergoes trauma and surgical wounds. Especially the burn wound that affects more than just the skin; it also has a variety of local and systemic repercussions with inflammatory response reactions leading to fatality if left untreated. The main issues that arise in the wound-healing process are wound dressing with topical medicines, which get affected mainly due to the wound exudates, bacterial biofilms, and dead skin, and extends the wound-healing process. Current wound healing therapies have failed architecturally (wound re-epithelialization, fluid loss management) and functionally (histological features). Several herbal products are now being researched in this direction for burn wounds. Yet, they exhibit lesser efficacy due to their higher adherence on the wound surface, low solubility, and decreased bioavailability of the plant extract remains a major problem. In this study, we propose lemongrass (*Cymbopogon citratus*) as a potential plant extract that has not only wound-healing properties but also contains diverse therapeutic potential due to their citral and fernal compounds that depict antibacterial, antifungal, antioxidant, anti-inflammatory, and chemotherapeutic properties. However, the solubility and bioavailability of this extract remain a major problem during clinical applications. To counteract this issue and successfully penetrate the biofilms, we have identified the coupling of lemon grass extract with magnetosomes, a biologically synthesized nanoparticle from magnetotactic bacteria, which is composed of a Ferrite core surrounded by a phospholipid bilayer, along with several functional groups, (amine, carboxyl, and hydroxyl groups) which aids in functionalization with any crosslinkers and become a perfect carrier molecule that can enhance drug penetration and release. This research focuses on the functionalization of the magnetosomes with the lemon grass extract. It identifies their encapsulation efficiency, angiogenesis through CAM assay, and in-vitro and in-vivo wound healing properties. This research study delivers a critical understanding of the lemon grass extract's wound-healing properties and the magnetosomes' usefulness in clinical and biomedical applications.

Products/ Instruments/ Results/ Outreach Activities



Principal Investigator
Dr. K. Suthindhiran
Professor

School of BioSciences and Technology (SBST)



Co-Principal Investigator
Dr. M.A. Jayasri
Associate Professor

School of BioSciences and Technology (SBST)

Name of the Funding Agency
Indian Council for Medical Research (ICMR)

Name of the Scheme
Extramural Research Small Grant

Sanctioned Amount (in Rupees)
Rs. 25,11,694

Duration of the Project (years)
3