Development of a Biodegradable Polymer Infused With Delonix regia (Flamboyant) for Wound Care Applications

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Biodegradable polymers are often used to seek applications addressing specific needs, such as wound care, due to their compatibility with biological interfaces, are eco-friendly, and safe for organisms (Tran, 2023). Looking for an effective wound care option, the Delonix regia (Flamboyant) was identified as a promising candidate, rich in polysaccharides, safe, and an effective natural medicine with antibacterial properties. A biodegradable polymer was modified with extracts from Flamboyant flowers and seeds to stop the bleeding and prevent infections in wounds. Antibacterial properties were tested with extracts from flowers and seeds, used to infuse the biodegradable polymer in inoculated blood agar petri dishes, prepared with a central “wound” and a “periwound” diameter, and incubated for 24 hours. In the control with the biodegradable polymer, 68 colonies grew, 9 inside the “periwound” and close to the wound. With the flower extract, 34 colonies grew, 2 reached the “periwound”. With the seed extract, 76 colonies grew, 10 inside the “periwound” and close to the wound. With the flower and seed extract, 100 colonies grew and 2 reached the “periwound”. Since the flower exhibited greater antibacterial properties, hemostatic properties were tested, achieving complete hemostatic action in 32 seconds. An FTIR Spectroscopy of the flower infused polymer showed methyl groups (important for protein synthesis, regulation, and detoxification of body system activities). The modified biodegradable polymer with flowers can revolutionize wound care with hemostatic and antibacterial properties. The extraction processes concentrations will be optimized to enhance therapeutic efficacy and packaging options will be evaluated.