Leveraging the Antimicrobial Properties of Jatropha curcas in Suture Engineering

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Surgical site infections, SSI's, are the leading type of infection in countries with limited resources, affecting up to 2/3 of operated patients with a frequency up to nine times higher than in developed countries. Latex was extracted from the J. curcas tree and several feasibly studies were done to create long thin polymerized filaments for use as sutures. The tensile strength of sutures ranging from 6-0 to 2-0 width, were tested in six trials, showing average results (in increasing order of width) at 3.66N, 4.86N, 7.51N, 12.23N, and 19.56N which directly compares to the standard average tensile strength for these same widths used in surgery today at 3.7N, 4.9N, 7.5N, 12.3N, and 19.6N. Serratia marcescens, Escherichia coli, and Staphylococcus epidermidis were then used to test the prototyped suture design that harnessed the natural antimicrobial power of Jatropha curcas Linn latex. Using a modified version of the Kirby-bauer antibiotic testing method, which measures bacterial growth inhibition, the Jatropha curcas pure latex discs, ampicillin discs, and actual 6-0 width Jatropha curcas latex sutures were applied to respective bacterial spread plates. Results showed that at 24 hours the average area of two replicates, bacterial growth inhibition for the Jatropha curcas latex was 215.6mm2, 300.4mm2, and 699.4mm2 for S.marcescens, E.coli, and S.epidermidis respectively. The newly designed Jatropha latex sutures showed an average inhibition of 530mm2, 1060mm2, and 680mm2 at 24hrs. All plates were reviewed at 48 hours with an average increase of 25.11% in zone inhibition, supporting the hypothesis.

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