Pre-clinical evaluation of a new antimicrobial enzyme for the control of wound bioburden. Wounds 2009, 21(3), Pg 65-73

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Abstract:

A new, optimized, antimicrobial enzyme system was developed for the control of wound bioburden. This Glucose oxidase – Lactoperoxidase – Guaiacol (GLG) system was analyzed for antimicrobial activity and cytotoxicity. The susceptibility of a wide range of antibiotic-resistant bacterial strains to the GLG-enzyme system was analyzed using Minimal Inhibitory Concentration (MIC90), Minimal Bactericidal Concentration (MBC) determination and growth kinetics analysis.

Additionally, challenge tests and cytotoxicity tests were performed with a new hydroactive alginate gel dressing with antimicrobial activity obtained by the presence of the GLG-enzyme system (Flaminal® Forte, Flen Pharma, Kontich, Belgium). All bacterial strains were susceptible to the GLG-enzyme system at low concentrations. The exact concentration required for growth arrest and cell death was dependent on the experimental design. Further, a 20% (w/v) GLG dilution showed no cytotoxicity towards fibroblasts and keratinocytes. Conversely, other antimicrobial wound-care products applied in the same dilution showed a high degree of cytotoxicity. With increasing concerns about bacterial resistance to antibiotics, this study shows that low concentrations of the GLG-enzyme system are successful in killing antibiotic-resistant bacterial strains. Furthermore, results show that GLG-enzyme system combines strong antimicrobial activity with non-cytotoxicity and promotes optimal wound healing.