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Bactericide, Immunomodulating, and Wound Healing Properties of Transgenic Kalanchoe pinnata Synergize with Antimicrobial Peptide Cecropin P1 In Vivo

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Abstract

Procedure of manufacturing K. pinnata water extracts containing cecropin P1 (CecP1) from the formerly described transgenic plants is established. It included incubation of leaves at +4°C for 7 days, mechanical homogenization of leaves using water as extraction solvent, and heating at +70°C for inactivating plant enzymes. Yield of CecP1 (after heating and sterilizing filtration) was 0.3% of total protein in the extract. The water extract of K. pinnata + CecP1 exhibits favorable effect on healing of wounds infected with S. aureus (equal to Cefazolin) and with a combination of S. aureus with P. aeruginosa (better than Cefazolin). Wild-type K. pinnata extract exhibited evident microbicide activity against S. aureus with P. aeruginosa but it was substantially strengthened in K. pinnata + CecP1 extract. K. pinnata extracts (both wild-type and transgenic) did not exhibit general toxicity and accelerated wound recovery. Due to immunomodulating activity, wild-type K. pinnata extract accelerated granulation of the wound bed and marginal epithelialization even better than K. pinnata + CecP1 extract. Immunomodulating and microbicide activity of K. pinnata synergizes with microbicide activity of CecP1 accelerating elimination of bacteria.

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