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Citrus oil and Dead Sea magnesium salts as antibacterial and anti-inflammatory agents

Boaz Mizrahi
Technion-Israel Institute of Technology, Israel

The antibacterial and anti-inflammatory properties of Dead Sea Magnesium Chloride ($MgCl_2$), citrus oil and their combination were investigated in this study. This combination is frequently used in several cultures to treat several gum diseases including periodontitis and mouth sores. Citrus oil is composed of monoterpenes, in particular D-limonene, which is known to inhibit growth of bacteria, fungi, and certain parasites. Inhibition of porphyromonas gingivalis *in vitro* was used to evaluate the antibacterial effect of a mixture of Dead Sea magnesium chloride and citrus oil and of each of the components. A subcutaneous chamber model in mice was used to assess the anti-inflammatory effect of the mixture and the individual components. Leukocyte migration, Tumor Necrosis Factor-Alpha (TNF-a) secretion, and interleukin (IL)-10 secretion were determined. Hydrocortisone was used as a positive control. Citrus oil had an antibacterial effect with a Minimal Inhibitory Concentration (MIC) of 1 mg/ml, whereas $MgCl_2$ at concentrations up to 10 mg/ml did not exhibit any antibacterial activity. However, a mixture of 10 mg/ml MgCl2 and 0.25 mg/ml citrus oil dramatically increased inhibition of bacterial growth. The combination of $MgCl_2$ and the citrus oil resulted in lower levels of TNF-a, and leukocyte migration while maintaining the levels of IL-10 compared to the control. These findings suggest that a mixture of citrus oil and $MgCl_2$ could be used as a natural antibacterial and anti-inflammatory agent.

Biography

Boaz Mizrahi has more than 10 years of experience in Biotechnology and Pharmaceutics, and he is the author of more than 20 scientific publications in this field. Boaz gained his PhD degree in the group of Prof. Avi Domb at the Hebrew University, where he acquired first-hand experience in the engineering and synthesis of materials for medical uses. He joined the Robert Langer Lab at MIT and the Daniel Kohane lab at Harvard Medical School. His research interest is focused on understanding and mimicking principles that nature uses and on designing functional materials based on these concepts. He is the Co-inventor of 12 patents, 3 of which were licensed.

bmizrahi@technion.ac.il

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