Antimicrobial Activity of Organic Herbal Extracts Infused With Ozone as a Combination Therapy on Helicobacter pylori

Al uwaisi, Basma (School: Al Amal School)
AlAufi, Aalaa (School: Al Amal School)

Recurrent exposure to antibiotics is a form of stress that renders the carcinogenic Helicobacter pylori highly resistant to antimicrobial therapy. To our knowledge, the effect of ozonated AKBA (extracted from frankincense oil) has never been tested on H. pylori, therefore, this study aims to investigate possible genetic and membrane damage as a mechanism of antimicrobial activity of ozonated AKBA extracted from organic frankincense on H. pylori. In vitro Antimicrobial activity of ozonated AKBA extracts which is readily available in Oman, was tested on 23 H. pylori clinical isolates from gastric biopsy samples using broth microdilution method of ozone-infused extracts in two-fold serial dilutions. Florescent dyes were used to assess for cell viability. AKBA was tested on the peripheral bloo mononuclear cells which to assess for cytotoxicity. Ozonated AKBA against H. pylori resulted in significant log reduction from 16 to 4 mg/ml. Electron microscopic imaging showed pronounced membrane damage. In addition, cell viability by chemi-luminescent assays were reduced, thus proving the direct activity of the ozonated-AKBA on the bacterial cells. Further genetic assays by sequencing to examine the genetic changes related to enzymatic expression suggested direct positive effect on virulence enzymes. Ozonated-AKBA exerts positive synergistic activity against H. pylori in-vitro by directly damaging the cellular membrane with possible distortion of enzymatic processes. This therapeutic combination could provide promising application to a wide range of bacterial infections and further experimentation and research is needed for future clinical applications. The cost of the project is $20.

Awards Won:
King Abdulaziz &amp
his Companions Foundation for Giftedness and Creativity: Full Scholarship from King Fahd University of Petroleum and Minerals(KFUPM) (and a $400 cash prize)
Sigma Xi, The Scientific Research Honor Society: Third Life Science Award of $500