

TITLE: INFLUENCE OF *Origanum vulgare* ESSENTIAL OIL AND ITS MAJOR COMPOUNDS ON THE ENZYMATIC ACTIVITY AND DNA SYNTHESIS OF *Salmonella* Enteritidis.

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ABSTRACT:

Plants contain numerous constituents and are valuable sources of new biologically active compounds against several microorganisms. Essential oils (EO) are complex volatile compounds, naturally synthesized during the plant's secondary metabolism. These substances contain a variety of volatile molecules, such as terpenes and terpenoids, aromatic and aliphatic phenol derivatives, which may have bactericidal, viricidal and fungicidal activity and can be used as alternative antimicrobials, especially in the discovery of new drugs. Therefore, the objective was to evaluate the influence of *Origanum vulgare* EO, thymol and carvacrol against *Salmonella* Enteritidis ATCC 13076 strain, particularly regarding the enzymatic activities and DNA synthesis. The maximum sublethal concentration (MSC) of the compounds was determined initially against a standard inoculum of *S. Enteritidis* (10⁵ CFU / mL) by the microdilution technique in Muller Hinton broth (MHB). From the broth containing only bacterium (control) and bacteria exposed to MSC of oregano EO, thymol and carvacrol, protein extraction was performed by means of buffer containing SDS-Tris followed by sonication and quantification of the protein extract. From this extract the activities of the enzymes superoxide dismutase, catalase, phosphofructokinase, lactate dehydrogenase and citrate synthase were evaluated. To analyze the influence of the compounds on the genetic material, the standard bacterial inocula were incubated (18 h a 37 ° C) in MHB plus different concentrations of oregano EO (0.25x, 0.5x, 1x, 2x and 4x MICs). Then whole cell DNA was extracted and subjected to 1% agarose gel electrophoresis. The MSC values obtained were 120 µg/mL for carvacrol and 130 µg/mL for EO oregano and thymol. In relation to catalase, oregano EO and carvacrol showed the highest level of activity. As for superoxide dismutase, an increase in enzyme activity was observed in the three groups exposed to antimicrobials. Enzymes related to the energetic metabolism of the bacteria exposed to the antimicrobial presented activity close to the control or reduced in relation to it. There was a reduction in the intensity of the DNA bands as the concentration of oregano EO increased. These results indicate that as the bacterium defends itself from the stress caused by natural antimicrobials, the energy production by the cell is altered and that OE has shown itself capable of penetrating the cell of the bacteria acting on the genetic material.

Keywords: biological activities, oxidative stress, energetic metabolism, DNA inhibition

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