

Antioxidant, Antibacterial, and Cytotoxic Activities of the Ethanolic Origanum vulgare Extract and Its Major Constituents

- 1) Many spices exhibit biologically and pharmacologically beneficial properties. One such herb is Oregano.
- 2) Quote – oregano is a perennial shrub native to... mountainous area of Mediterranean and Euro/Irano-Siberian regions but it is also cultivated for its uses as a herb and therapeutic properties – unquote.
- 3) Previous studies have indicated that Oregano offers, quote – strong antioxidant capacity in both fresh and dry form – unquote.
- 4) Oregano in many forms has been historically used to treat, quote – respiratory disorders, indigestion, and rheumatoid arthritis – unquote.
- 5) The, quote – major components of its essential oil... are carvacrol and thymol – unquote.
- 6) Previous investigations have, quote – attributed ... oregano's antibacterial and antioxidant properties... mainly to carvacrol and thymol – unquote.
- 7) Other studies have shown that that the antioxidant characteristics of common Mediterranean spices were more effective than synthetic antioxidants.
- 8) Antioxidants are believed to reduce the presence of free radicals, which have been, quote – implicated in several pathological conditions, including cancer, cardiovascular diseases, neurodegenerative disorders, and drug toxicity – unquote.
- 9) This study set out to, quote – identify the main components of Origanum vulgare... assess the cytotoxic, antioxidant, and antimicrobial properties of the oregano extract – unquote, and determine the impact each constituent had on those effects.
- 10) The Oregano samples for this study were wild grown and collected on the, quote – southern slope of Mt. Parnon in Kynouria Peloponnese – unquote, Greece.
- 11) The Oregano Essential Oil (OEO) for these trials was prepared from ground leaves via ethanolic extraction, which yielded 19 percent dry weight.
- 12) The OEO was analyzed via gas chromatograph which indicated that it was composed of seven primary constituents: p-cumene, γ -terpinene, creosol, thymol, carvacrol, phytol, and 1-Octacosanol. Thymol and carvacrol were the major components, representing 25 percent and 60 percent respectively.
- 13) The first test sought to test the cytotoxicity of the OEO, and thymol and carvacrol individually, at increasing concentrations when applied to cultured A549 human epithelial cells.
- 14) The second test analyzed OEO's antioxidant properties by inoculating A549 human cell cultures with differing concentrations of OEO, thymol, and carvacrol before introducing hydrogen peroxide.
- 15) The third test investigated antibacterial properties of OEO, and thymol and carvacrol individually, using agar plates inoculated with multiple bacterial strains and differing concentrations.
- 16) The fourth test examined the rates of cellular uptake of carvacrol and Thymol when placed in contact with cultured A549 human epithelial cells.
- 17) The results of the first test indicated that the LC50 for oregano extract is 14ug/mL when in contact with the sample culture cells, which means that 14ug/mL was the calculated lethal concentration for 50 percent of the test cell population. It was also shown that the OEO itself was more cytotoxic than a mixture of thymol and carvacrol in the same ratio evident in the OEO, indicating that some of the lesser constituents was playing a potentially significant role in the cytotoxicity.
- 18) The second test showed that pretreating A549 cell cultures with concentrations of OEO between 0.73ug/mL and 2.93ug/mL offered significant antioxidant protection. It was also shown that OEO itself had greater antioxidant properties than either thymol or carvacrol or a combination thereof.
- 19) Results of the antibacterial testing indicated that, quote – the oregano extract inhibited the growth of reference ... bacterial strains with varying degree, but no trends were realized – unquote.
- 20) The investigation of cellular uptake of carvacrol and thymol suggested that carvacrol uptake was not affected by the presence of thymol, but thymol uptake was positively impacted by the presence of carvacrol.
- 21) Overall this study indicated that Oregano Essential Oil may have some verifiable therapeutic characteristics including antioxidant, antibacterial, and cytotoxic effects. Cytotoxicity is not typically a beneficial attribute, but by investigating the cytotoxic concentrations safe concentrations can be determined. Additionally, the cytotoxic nature of OEO could be used to target cancer cells or other malignant cells.

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