TITLE: ANTIBIOFILM ACTIVITY OF OREGANO ESSENTIAL OIL AGAINST *ESCHERICHIA COLI*

AUTHORS: SCANDORIEIRO, S.; MOREIRA. H.; NOBRE, K.; AKAGI, C. Y.; DE CAMARGO, L. C., NAKAZATO, G., KOBAYASHI, R. K. T.

INSTITUTION: UNIVERSIDADE ESTADUAL DE LONDRINA, LONDRINA, PR (RODOVIA CELSO GARCIA CID, KM 380, S/N - CAMPUS UNIVERSITÁRIO, CEP 86057-970, LONDRINA - PR, BRAZIL)

ABSTRACT:
Bacterial biofilms represent a problem for public health as they affect clinical sectors, causing serious and multiresistant hospital infections, and food sectors. These microbial communities adhere to medical, dental or industrial surfaces and equipment, causing damage to health and economic losses. Research and development of antimicrobials that prevent biofilm formation are necessary.This study evaluated the antibiofilm activity of oregano essential oil (OEO) against *Escherichia coli* and the cytotoxicity of this compound to human cells. OEO was obtained from commercial source.The minimum inhibitory concentration (MIC) was determined by broth microdilution against two *E. coli* strains (Enteroaggregative *E. coli* - EAEC O42 and *E. coli* T3 EPM), according to the Clinical & Laboratory Standards Institute (CLSI), with necessary modifications. The effect of OEO on biofilm formation was evaluated by colorimetric assay using crystal violet. OEO toxicity was assessed against two cell lines (human red blood cells and HEp-2 cells) by determination of 50% cytotoxic concentration (CC50). The MIC value of OEO was 0.03 % (v/v) against EAEC O42 and *E. coli* T3 EPM. The subinhibitory oil concentrations (concentrations lower than MIC values) reduced the bacterial biomass adhered to the the microplate, this reduction was by 56% for EAEC and by 67% for *E. coli* T3 EPM in comparison to bacterial controls that were not treated with OEO. The MTT assay showed that OEO were toxic to HEp-2 cells, because CC50 (< 0,01 %, v/v) value was lower than MIC value. However, OEO presented low hemolytic activity, whose CC50 was 0.79% (v/v). The citotoxicity results corroborate with other studies reporting the antitumor activity of oregano essential oil, including against HEp-2 cells. This study suggests that OEO control *E. coli* biofilm formation, and due to low toxicity presented to non-cancerous human cells, this essential oil presents potential to be applied in industries and hospital settings.

Keywords: oregano essential oil, antibiofilm, toxicity, *Escherichia coli*

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