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Protective role of the lemon essential oil fraction enriched in citral against the effects induced in normal hepatocytes by LPS treatment

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Statement of the Problem: Lemon essential oil (LEO) is known for its health properties; while less consideration is given to the biological properties of the its fractions (Cfr-LEO). The aim of this study is to evaluate the ability of Cfr-LEO, fraction enriched in Citral (2) to counteract in healthy human hepatocytes the pro-inflammatory effect and induction of oxidative stress and epithelium-mesenchyme transition (EMT) mediated by LPS.

Methodology & Theoretical Orientation: In this study, healthy human immortalized hepatocytes (THLE-2 cell line) were used for evaluating the protective effects of Cfr-LEO, as both 2h pretreatment and subsequent treatment with LPS for 6h and co-treatment with Cfr-LEO and LPS for 6h. The mechanisms through which the Cfr-LEO is able to exert its protective effects were investigated.

Findings: The obtained results showed that Cfr-LEO counteracts the effects induced by LPS such as the induction of the expression of pro-inflammatory cytokines, the production of ROS and EMT. These effects appear to be due to the ability of Cfr-LEO components to inhibit the TLR4/NF-kB pathway. Our future studies will evaluate the beneficial effect of the components of Cfr-LEO in order to understand whether this may be the factor responsible for the health effects observed.

Conclusion & Significance: The data obtained demonstrate that Cfr-LEO exerts a protective effect against hepatotoxic stimuli and lay the basis for the development of foods/drinks aimed at preventing or alleviating chronic inflammatory conditions associated to liver dysfunction. The identification of the "factors" responsible for the health effects observed could lead to more targeted drink formulations with beneficial properties.

Figure 1: Properties of Cfr-LEO in counteracting the pro-inflammatory effect and induction of oxidative stress and epithelium-mesenchyme transition (EMT) mediated by LPS treatment.

Recent Publications:

1. Pucci M, Raimondo S, Urzì O, Moschetti M, Di Bella MA, Conigliaro A, Caccamo N, La Manna MP, Fontana S, Alessandro R. Tumor-Derived Small Extracellular Vesicles Induce Pro-Inflammatory Cytokine Expression and PD-L1 Regulation in M0 Macrophages via IL-6/STAT3 and TLR4 Signaling Pathways. Int J Mol Sci. 2021 Nov 9;22(22):12118. doi: 10.3390/ijms222212118.

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Biography

Marzia Pucci is a researcher RTDA PON GREEN at the University of Palermo since December 2021. After graduating, she won a scholarship at the San Raffaele Giglio Hospital in Cefalù. The research project she followed was focused on the study of innovative technologies for the therapy of selective and radical destruction of neoplastic pathologies. After this experience, she started the International PhD in Experimental Oncology and Surgery at the Department of Biomedicine, Neuroscience and Advanced Diagnostics (Bi. N. D., UNIPA). In July 2018, she did a Postdoc fellow research and the research project she followed was focused on molecular analysis and functional role of bioactive compounds obtained from Sicilian citrus fruits. In April 2019, she won an AIRC (Italian Association for Cancer Research) scholarship for research activities related to the study of the effects of colon cancer-derived exosomes in inducing early phenotypic transformation in Heps in order to highlight new insight into pre-metastatic niche formation in the liver.

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