

Abstract

In recent decades, scientific outcomes highlights the beneficial health effects of plant compounds, such as polyphenolic extracts. Evaluating the antioxidant potential of such compounds is a common practice for evaluating their potential in enhancement of the antioxidant defense system of tissues, entire organisms or the good outcome of a free radical-related disease.

This study was intended to provide an olive oil "fingerprint" based on its antioxidant properties due to biophenolic composition, using *in vitro*, cell cultures and *in vivo* based techniques. Extracts (mixtures) of olive oil with different polyphenolic composition as well as the main polyphenols as pure isolated compounds were examined. In addition, the antioxidant capacity of polyphenolic olive blossom extracts, which form the least studied part of the olive tree, were tested. Finally, an administration of a polyphenolic enriched olive oil, was made to Wistar rats in order to elucidate its molecular mechanism *in vivo*.