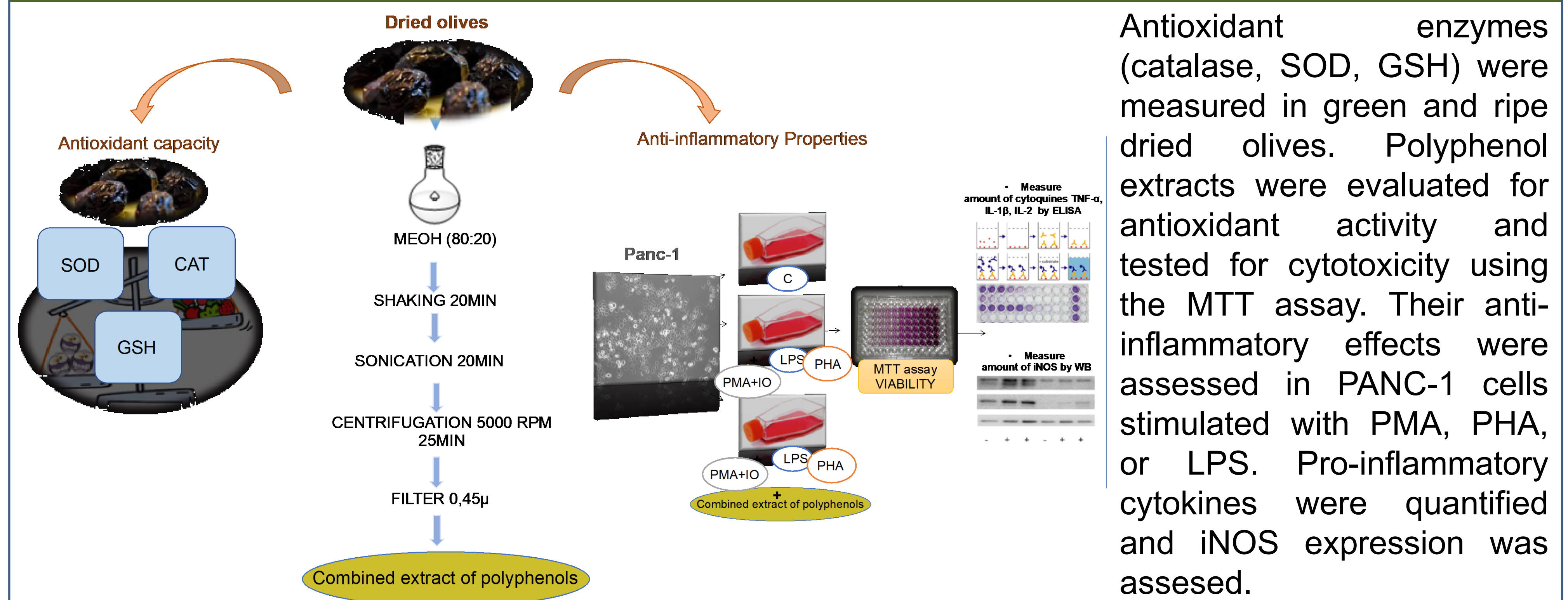


BACKGROUND & OBJECTIVES

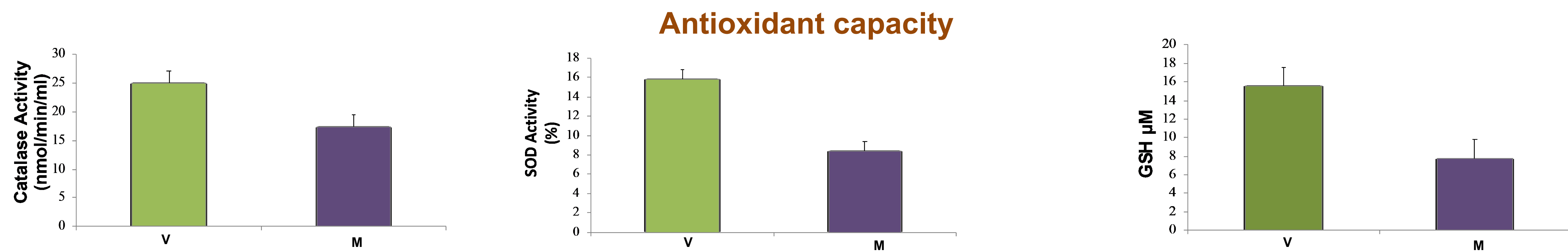
Dried olives, both at their green and ripe stages, represent an underutilized byproduct of olive cultivation, which could have valuable applications due to their high concentration of bioactive compounds. These olives contain polyphenols with antioxidant and anti-inflammatory properties, as well as protective effects against various metabolic and cardiovascular diseases. The objective of this study was to evaluate the antioxidant activity of dried olives at both ripening stages and to explore the ability of polyphenols extracted from dried olives to reduce inflammation in a cellular model of human pancreatic cells.

MATERIALS & METHODS



Antioxidant enzymes (catalase, SOD, GSH) were measured in green and ripe dried olives. Polyphenol extracts were evaluated for antioxidant activity and tested for cytotoxicity using the MTT assay. Their anti-inflammatory effects were assessed in PANC-1 cells stimulated with PMA, PHA, or LPS. Pro-inflammatory cytokines were quantified and iNOS expression was assessed.

RESULTS



Anti-Inflammatory properties

PANC-1 Cells viability

Components	Viability (%) Methanol + PBS
Polyphenol extract Green dried olive	99 ± 6.8
Polyphenol extract Ripe dried olive	98.8 ± 5.1
Polyphenol extract Green dried olive +LPS	99.7 ± 2.7
Polyphenol extract Green dried olive +PMA	97.73 ± 3.2
Polyphenol extract Green dried olive + PHA+IO	97.43 ± 12.6
Polyphenol extract Ripe dried olive +LPS	97.4 ± 0.7
Polyphenol extract Ripe dried olive +PMA	114.1 ± 1.2
Polyphenol extract Ripe dried olive + PHA+IO	114 ± 0.6

Table 1. The viability in PANC-1 after applying the tested compounds was measured using the MTT assay. Data are presented as mean ± SEM (n = 10).

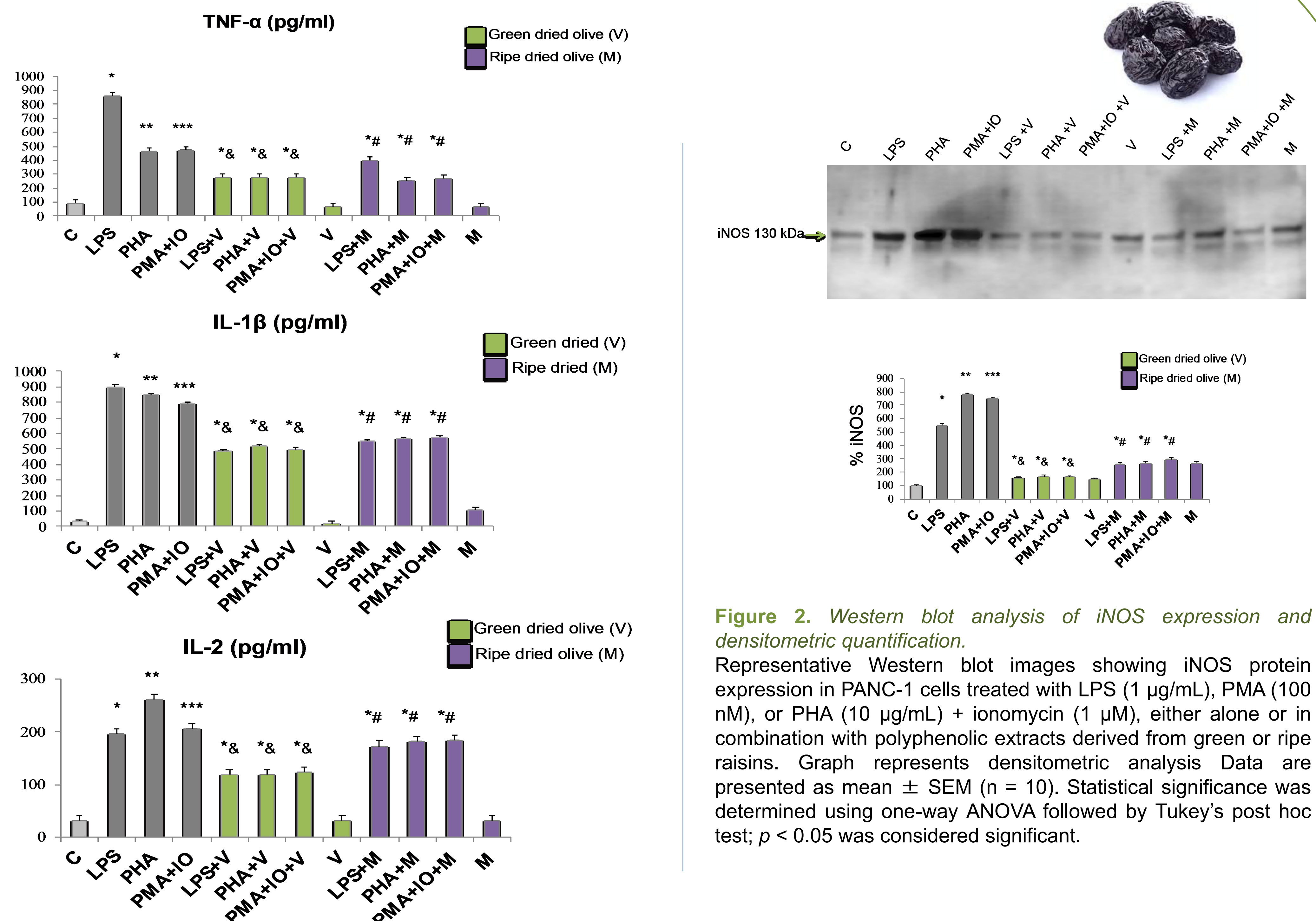


Figure 1. ELISA assays performed in PANC-1 cells. The concentration of TNF- α , IL-1 β and IL-2 was measured by ELISA in PANC-1 cells subjected to different treatments: LPS (1 μ g/mL), PMA (100 nM), or PHA (10 μ g/mL) + ionomycin (1 μ M), either alone or in combination with polyphenolic extracts from green or ripe dried olives. Results are expressed as mean ± SEM (n = 10). Statistical significance was determined using one-way ANOVA followed by Tukey's post hoc test; $p < 0.05$ was considered significant.

Figure 2. Western blot analysis of iNOS expression and densitometric quantification. Representative Western blot images showing iNOS protein expression in PANC-1 cells treated with LPS (1 μ g/mL), PMA (100 nM), or PHA (10 μ g/mL) + ionomycin (1 μ M), either alone or in combination with polyphenolic extracts derived from green or ripe raisins. Graph represents densitometric analysis. Data are presented as mean ± SEM (n = 10). Statistical significance was determined using one-way ANOVA followed by Tukey's post hoc test; $p < 0.05$ was considered significant.

DISCUSSION

ACKNOWLEDGMENTS

High antioxidant activity was observed in dried olives at both ripening stages, with greater antioxidant capacity noted in the green stage. The polyphenol extracts showed no toxicity at the concentrations used in the MTT assay, maintaining cell viability around 100%. In PANC-1 cells induced with PMA, PHA + IO, and LPS, the polyphenol extracts significantly reduced the production of TNF- α , IL-1 β , and IL-2, in addition to decreasing iNOS expression compared to controls. These results suggest that the polyphenols in dried olives may have a protective effect against chronic inflammation, offering new therapeutic alternatives and opening opportunities for the valorization of agricultural alternatives, contributing to both human well-being and environmental sustainability.

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