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TITOLO	Pomegranate by-products valorization: cell-based antioxidant activity of the hydroalcoholic leaf extract
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ABSTRACT (max 500 parole)	<p><i>Punica granatum</i> L. (Lythraceae family), commonly known as pomegranate, is a very popular plant native to Central Asia, but thanks to its adaptability it has now spread to different parts of the world. Besides the food consumption of the edible fruit, various parts of the pomegranate have been used since ancient times for their healthy properties. Indeed, non-edible parts such as peels, seeds, bark and leaves are a source of a plethora of specialized metabolites (tannins, alkaloids, flavonoids, terpenes) of interest to the pharmaceutical and cosmetic fields¹. This work focuses on the valorization of leaf extract of pomegranate originated from Sardinia. Pomegranate leaves are usually considered as a by-product of the pomegranate cultivation. However, they are rich in active compounds and have therefore traditionally been used to treat various ailments, such as sore throat, fever, and urinary tract infections. There are already data in the literature confirming the beneficial properties of extracts derived from pomegranate leaves and exploring new potential health benefits for pharmaceutical and cosmetic applications^{2,3,4}. This work aims to investigate the antioxidant potential of the ethanolic extract of pomegranate leaves on human umbilical endothelial (HUVEC) and human dermal fibroblast (HDF) cell lines, focusing on some pure compounds characteristic of the total extract (TE). In particular, the antioxidant activity was evaluated as a primary antioxidant by simultaneous incubation of the cells for 5 hours with the TE/compound and the prooxidant stimulus (H₂O₂, 500 µM) or as a secondary antioxidant by a preincubation of 24 hours with the TE/compound followed by incubation with H₂O₂ for 5 hours. The data obtained from the cell viability analysis were also confirmed by the analysis of reactive oxygen species production (ROS). Interesting results were obtained for TE on HUVEC cells, especially as a secondary antioxidant. In contrast, a slight activity was observed on HDF cells. The chemical composition of the extract, analyzed by high-performance liquid chromatography coupled to a photodiode array and tandem mass spectrometry (HPLC-PDA-MS/MS), revealed the presence of polyphenols (luteolin, apigenin, and ellagic acid derivatives), with ellagic acid (EA) and luteolin 4'-O-glucoside (LG) selected as the main analytes for further analysis. Briefly, EA showed a significant activity as a primary and secondary antioxidant on HUVEC cells, whereas only a statistically significant activity as a primary antioxidant was observed on HDF cells. Since LG showed a toxicity towards the tested cells, further experiments</p>

	<p>were performed with its aglycone, luteolin (LU). LU was able to demonstrate its role as a good primary antioxidant only in HDF cells.</p> <p>Although further studies are needed, these preliminary cell-based results confirm the potential use of pomegranate leaf extracts and some of their constituents as food supplements and cosmetic preparations with antioxidant effects. This work also highlights the differential cellular response to different antioxidant stimuli extracted from <i>P. granatum</i> leaves.</p> <p>References:</p> <ol style="list-style-type: none"> 1. Maphetu et al., 2022 Biomed. Pharmacother. Doi:10.1016/j.biopha.2022.113256 2. Machado et al., 2023 Food Biosci. Doi:10.1016/j.fbio.2022.102220 3. Acquadro et al., 2020 Planta Medica. Doi: 10.1055/a-1232-5705 4. Sanna et al., 2021 Plants. Doi: 10.3390/plants10102124
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