

Plant Science

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Cytotoxic, antidiabetic and anti-inflammatory activities of selected Algerian medicinal plants: From traditional use to scientific validation

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Phytochemicals, including phenolic compounds, present in many plants have received much attention in recent years due to their health benefits, including antidiabetic, anti-inflammatory and cytotoxic activities. This study was conducted to determine the biological properties of *Pistacia lentiscus* and *Fraxinus angustifolia*, two plants used in traditional Algerian medicine. The investigation of the cytotoxic effect of plant extracts was carried out using the MTT assay on two ovarian A2780 and SKOV3 cell lines, the melanoma B16F10 and the mammary EMT6 tumor cell lines. A PI staining has been done for the study of apoptosis and cell cycle. The results showed a great cytotoxic potential against A2780, SKOV3 and B16F10 cells with IC₅₀ values of 10 µg/ml, 18 µg/ml and 56.40 µg/ml, respectively. Moreover, these extracts exhibited an increase in G1 and S phases for SKOV3 and B16F10 cells. Furthermore, *P. lentiscus* and *F. angustifolia* extracts, exhibited a promising anti-diabetic activity in streptozotocin (STZ)-induced diabetic rats, by the reduction of blood glucose level, a result confirmed by the inhibition of alpha-amylase *in vitro*. In addition, the results of the anti-inflammatory activity of *P. lentiscus* and *F. angustifolia* showed significant reduction of the paw edema induced by carrageenan. *P. lentiscus* extracts showed a significant reduction of pro-inflammatory cytokines (IL-1β) on activated macrophages. Moreover, the extracts of *F. angustifolia*, significantly inhibited ear edema induced by single and multiple doses of 12-O-tetradecanoylphorbol 13-acetate (TPA). *In vivo*, the vesicles loaded with the crude extract of *F. angustifolia* and especially PEVs (Penetration Enhancer-containing Vesicles) inhibited oxidative stress in human keratinocytes and attenuated edema and leukocyte infiltration. HPLC-MS analyses allowed the identification of new phenolic compounds. Overall, results indicate that *Pistacia lentiscus* and *Fraxinus angustifolia* extracts could be beneficial in the treatment of inflammatory conditions and diabetes complications, as evidenced by the present study.

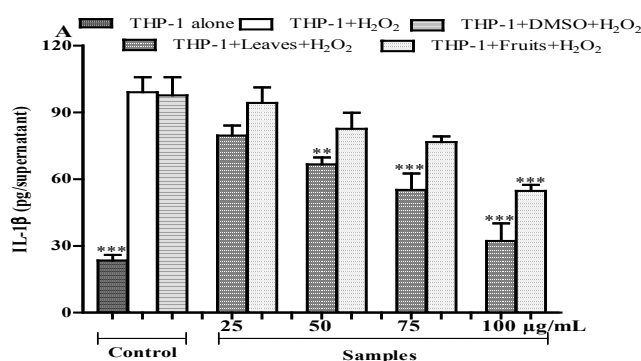


Figure 1: Anti-inflammatory effects of *P. lentiscus* extracts against H₂O₂-induced inflammation in cell culture. Data are representative of three independent experiments reported as the mean ± SEM. The results were considered statistically significant at *p<0.05, **p<0.01 and ***p<0.001.

Biography

Djebbar Atmani is a Senior Lecturer at the Faculty of Nature and Life Sciences, University of Bejaia (Algeria). He obtained his Master of Science degree from California State University, Los Angeles (USA) in 1987 and his PhD from the University of Sétif (Algeria) in 2004. His research interest is natural products from medicinal plants. He has published more than 30 papers in high impact scientific journals and has also attended several seminars and symposia worldwide.

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