

Neuroprotective and Antioxidant Activities of Algerian *Punica granatum* L. Peel Extracts

Author(s): [Naila Chaabna*](#)^{ID}, [Oumaima Naili](#)^{ID}, [Nafissa Ziane](#)^{ID}, [Chawki Bensouici](#)^{ID}, [Saliha Dahamna](#)^{ID} and [Daoud Harzallah](#)^{ID}

Volume 19, Issue 3, 2023

Page: [202 - 210]

DOI: [10.2174/1573408019666230626142826](https://doi.org/10.2174/1573408019666230626142826)

Link: <https://www.eurekaselect.com/article/132688>

Abstract

Background: Oxidative stress is implicated in many neurodegenerative disorders, such as Alzheimer's disease. As an alternative, *Punica granatum* peels are widely used in the treatment of several ailments. To date, this is the first study on the anti-acetyl/butyrylcholinesterase effects of diethyl ether extract from Algerian pomegranate peels.

Objective: This research aimed to evaluate the content of total phenolics, flavonoids, flavonols, and tannins in *Punica granatum* peel crude extract and its fraction diethyl ether, as well as to assess its antioxidant and neuroprotective activities.

Methods: The total phenolic, flavonoid, flavonol, and tannin contents in the extracts were evaluated using spectrophotometric methods. The inhibitory effects on acetyl/butyrylcholinesterase were assessed using the *in vitro* models. In addition, several methods were used to investigate the antioxidant capacity of extracts, including 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonate) (ABTS) free radicals scavenging, phenanthroline, reducing power and cupric ion reducing antioxidant capacity (CUPRAC) assays.

Results: Phytochemical analysis revealed that the diethyl ether extract recorded the highest content of total phenolics, flavonoids, flavonols, and tannins with values of 643.3 ± 9.96 $\mu\text{gGAE/mg}$, 78.97 ± 9.97 $\mu\text{gQE/mg}$, 31.32 ± 1.79 $\mu\text{gQE/mg}$ and 96.6 ± 13.65 $\mu\text{gTAE/mg}$, respectively. Moreover, the diethyl ether extract exhibited the strongest activity in the DPPH scavenging assay ($\text{IC}_{50}=3.36 \pm 0.11$ $\mu\text{g/mL}$), ABTS scavenging assay ($\text{IC}_{50}=1.46 \pm 0.10$ $\mu\text{g/mL}$), CUPRAC assay ($\text{C}_{\text{A}0.5}=3.62 \pm 0.36$ $\mu\text{g/mL}$), phenanthroline assay ($\text{C}_{\text{A}0.5}=1.04 \pm 0.10$

µg/mL), reducing power assay ($C_{A0.5}=4.14 \pm 0.32$ µg/mL), antiacetylcholinesterase assay ($IC_{50}=114.86 \pm 13.66$ µg/mL), and anti-butyrylcholinesterase assay ($IC_{50}=147.00 \pm 10.41$ µg/mL).

Conclusion: The present study has shown the extracts from *Punica granatum* peel to be a rich source of bioactive compounds, potent antioxidants, and cholinesterase inhibitors. They could be considered as natural agents that can be used in anti-neurodegenerative pharmaceutical formulations.

Keywords: Anti-cholinesterase, neuroprotective activity, enzyme inhibitory activity, antioxidant activity, *Punica granatum*, peel extract, bioactive compounds.