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Bioactive strawberry fruit (*Arbutus unedo* L.) extract remedies paraquat-induced neurotoxicity in the offspring prenatally exposed rats

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Abstract

Background: Paraquat (1,1'-dimethyl-4,4'-bipyridinium dichloride) exposure is well-established as a neurotoxic agent capable of causing neurological deficits in offspring. This study aimed to investigate therapeutic effects of *Arbutus unedo* L. aqueous extract (AU) against paraquat (PQ) exposure. **Methods:** For that the phytoconstituents of AU was determined by LC/MS, and then its antioxidant potential was assessed by DPPH and ABTS assays. The assessment included its impact on cell viability and mitochondrial metabolism using N27 dopaminergic cells. Additionally, we evaluated the effects of prenatal PQ exposure on motor coordination, dopamine levels, trace element levels, and total antioxidant capacity (TAC) in rat progeny. **Results:** The phytochemical profile of AU extract revealed the presence of 35 compounds, primarily phenolic and organic acids, and flavonoids. This accounted for its strong in vitro antioxidant activities against DPPH and ABTS radicals, surpassing the activities of vitamin C. Our findings demonstrated that AU effectively inhibited PQ-induced loss of N27 rat dopaminergic neural cells and significantly enhanced their mitochondrial respiration. Furthermore, daily post-treatment with AU during the 21 days of the rat's pregnancy alleviated PQ-induced motor deficits and akinesia in rat progeny. These effects inhibited dopamine depletion and reduced iron levels in the striatal tissues. The observed outcomes appeared to be mediated by the robust antioxidant activity of AU, effectively counteracting the PQ-induced decrease in TAC in the blood plasma of rat progeny. These effects could be attributed to the bioactive compounds present in AU, including phenolic acids such as gallic acid and flavonoids such as quercetin, rutin, apigenin, glucuronide, and kaempferol, all known for their potent antioxidant capacity. **Discussion:** In conclusion, this preclinical study provided the first evidence of the therapeutic potential of AU extract against PQ-induced neurotoxicity. These findings emphasize the need for further exploration of the clinical applicability of AU in mitigating neurotoxin-induced brain damage. Copyright © 2023 Ait Lhaj, Ibork, El Idrissi, Ait Lhaj, Sobeh, Mohamed, Alamy, Taghzouti and Abboussi.

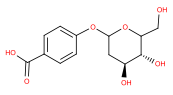
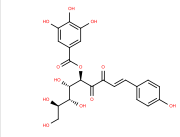
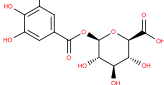
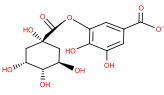

Author keywords

*Arbutus unedo*L; dopamine; neurotoxicity; paraquat; redox balance

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