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Secondary metabolites from *Cassia fistula*: Increasing stress resistance and anti-inflammatory effects using mouse model

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Background: Oxidative stress and neuroinflammation are important characteristic features that lead to neurotoxicity in several neurodegenerative disorders like Alzheimer's and Huntington's diseases. There is an increasing attention towards studying phytochemicals from plant origin and demonstrating their potential in increasing stress resistance and mediating neuroprotection in different model organisms. Plant extracts, containing a wide array of phytoconstituents, show promising results in neurodegenerative disease with complex pathogenesis in different model organisms, due to their chemical structures that allow them to act as multitarget drugs.

Methodology: In the current study, a variety of phenolic secondary metabolites were identified in the total hydroalcoholic extract from the medicinal plant *Cassia fistula* using HPLC/ESI/MS-MS. The extract was tested for its *in vitro* antioxidant capacities using DPPH (2,2- diphenyl -1-picrylhydrazyl) and CUPRAC (cupric reducing antioxidant capacity) assays. Furthermore, *in vivo* effects on increasing stress resistance and decreasing inflammation were studied using trimethyltin (TMT)-induced neurotoxicity mouse models.

Results: *Cassia fistula* extract was able to show promising antioxidant effects both *in vitro* and *in vivo*. Using TMT model of neurotoxicity in mice, the extract prevented the increase in malondialdehyde, superoxide dismutase and glutathione levels. Furthermore, the extract was able to show powerful antioxidant activity, with a proposed involvement of nuclear factor (erythroid-derived 2)-like 2/antioxidant response element (Nrf2/ARE) pathway through preventing the increase in heme oxygenase-1 levels. Moreover, anti-inflammatory activity was observed through preventing the elevation of TNF-α and NF-κB levels. The observed effects were comparable to that of the powerful antioxidant Epigallocatechin gallate, and are expected to be due to the phenolic constituents in the total extract.

Conclusion & Discussion: The present study suggests that *Cassia fistula* could be a valuable candidate to be studied for its use in food industrial fields. It could act as a contributor to healthy process of ageing and could be further used for the prevention of several neurodegenerative diseases.

Biography

Sara Thabit is working as a Postdoc and an Assistant Lecturer in Pharmaceutical Biology Department, Faculty of Pharmacy and Biotechnology, German University in Cairo, Egypt. Her main research interest is to explore the genetic pathways and mechanisms responsible for the development of neurodegenerative disorders like dementia, Alzheimer's and Huntington's using *in vivo* models as *Caenorhabditis elegans* and mice. She is also interested in natural products and evaluating their neuroprotective activities in neurodegenerative diseases. Moreover, she is focused on studying the anti-inflammatory and antioxidant effects of various secondary metabolites derived from plants.

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