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EFFECT OF POMEGRANATE EXTRACTS ON BRAIN ANTIOXIDANT MARKERS AND CHOLINESTERASE ACTIVITY IN HIGH FAT- HIGH FRUCTOSE DIET INDUCED OBESITY IN RAT MODEL

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Background: To investigate beneficial effects of pomegranate seeds oil (PSO), leaves (PL), juice (PJ) and (PP) on brain cholinesterase activity, brain oxidative stress and lipid profile in high-fat-high fructose diet (HFD) induced-obese rat.

Methods: *In vitro* and *in vivo* cholinesterase activity, brain oxidative status, body and brain weight and plasma lipid profile were measured in control rats, HFD-fed rats and HFD-fed rats treated by PSO, PL, PJ and PP.

Results: *In vitro* study showed that PSO, PL, PP, PJ inhibited cholinesterase activity in dose dependant manner. PL extract displayed the highest inhibitory activity by IC₅₀ of 151.85 mg/ml. For *in vivo* study, HFD regime induced a significant increase of cholinesterase activity in brain by 17.4% as compared to normal rats. However, the administration of PSO, PL, PJ and PP to HDF-rats decreased cholinesterase activity in brain respectively by 15.48%, 6.4%, 20% and 18.7% as compared to untreated HFD-rats. Moreover, HFD regime caused significant increase in brain stress, brain and body weight, and lipid profile disorders in blood. Furthermore, PSO, PL, PJ and PP modulated lipid profile in blood and prevented accumulation of lipid in brain and body evidenced by the decrease of their weights as compared to untreated HFD-rats. In addition, administration of these extract protected brain from stress oxidant, evidenced by the decrease of malondialdehyde (MDA) and protein carbonylation (PC) levels and the increase in superoxide dismutase (SOD) and glutathione peroxidase (GPx) levels.

Conclusion: These findings highlight the neuroprotective effects of pomegranate extracts and one of mechanisms is the inhibition of cholinesterase and the stimulation of antioxidant capacity.

BIOGRAPHY

Zahra Amri is Doctor of Biology and a Member of Biochemistry Laboratory, LR12ES05 Nutrition-Functional Foods and Vascular Health, Faculty of Medicine, University of Monastir (Tunisia). She has completed her PhD from Sfax University in April 2018, and she is looking for a postdoctoral research position. Her PhD subject is the investigation of the ability of bioactive compounds extracted from fruits to ameliorate symptoms associated with cardiovascular diseases and diabetes. She has published four papers in reputed journals. She obtained a master's degree in Molecular and Cellular Biology in 2012, and bachelor's degree in 2006.

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