

Perturbation of pharmacologically relevant polyphenolic compounds in *Moringa oleifera* against photo-oxidative damages imposed by gamma radiation

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ABSTRACT:

Oxidative stress is a physiological state associated with almost all biotic and abiotic stresses in plants. This phenomenon occurs due to imbalances which result from the overproduction of reactive oxygen species (ROS). Plants, however, have developed sophisticated mechanisms to mitigate the effect of ROS. In this regard, plant polyphenolic metabolites such as flavonoids are known to possess high antioxidant activities. In the current study, changes in the levels of phenolic compounds from *Moringa oleifera* after gamma radiation treatment were investigated with reverse phase liquid chromatography and mass spectrometric techniques in combination with multivariate data models such as principal component analysis and orthogonal projection to latent structures discriminant analysis. Our results revealed several polyphenolic compounds such as hydroxycinnamoyl derivatives and flavonoid molecules to be down-regulated post-radiation treatment. Interestingly, other flavonoid molecules were found to be up-regulated post-radiation treatment, thereby suggesting a possible compensatory phenomenon. The existence and involvement of structurally similar metabolites (such as regio-isomers of chlorogenic acids) in *M. oleifera* towards mitigating photo-oxidative damages are in support of the proposed evolutionary existence of a large pool of polyphenolics which contribute to the state of readiness, aptly described as a "better safe than sorry" phenomenon. Our study thus reaffirms the involvement of phenolic compounds as a first line of constitutive/preformed protection against oxidative stress. Furthermore, the obtained data supports *M. oleifera* as a source of versatile and pharmacologically relevant metabolites that may be exploited for ameliorating the oxidative damages imposed by several metabolic disorders in humans.