FUNCTIONAL GENOMIC ANALYSIS FOR *MORINGA OLEIFERA* LAM ACTIVE INGREDIENTS TREATED WITH γ- IRRADIATION

By

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B.Sc. Agric. Sc. (Genetics), Ain Shams University, 2003

M.Sc. Agric. Sc. (Genetics), Ain Shams University, 2010

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ABSTRACT

Hanan Mohamed Mansour Abdel-Azez: Functional Genomic Analysis For *Moringa olefira* Lam. Active Ingredients Treated With γ- Irradiation. Unpublished Ph.D. Thesis, Department of Genetics, Faculty of Agriculture, Ain Shams University, 2017.

One of famous medicinal plant, *Moringa oleifera* tree were exposed to different gamma radiation doses; 0, 20, 40 and 60 Gy, from a ^{60}Co gamma ray source. The effect of gamma rays on a number of yield-related traits and some phytochemical analysis were studied on individual plants. The fresh and dried weights of both leaves, stem and roots showed significant increase using gamma irradiation. Total phenols contents showed significant increase in all used doses compared with the control. Amino acids content were influence widely by gamma doses especially with 20 and 40 GY doses. GC-MS analysis was used to identified the chemical profile of Moringa leaves ethanol extraction, New chemical components were detected only in irradiated extraction samples such as 5-hydroxymethylfurfural (5-HMF) and 2,3-Dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-one (DDMP). SCoT marker technique was used to detect markers that associated to the new chemical compounds in the ethanol extraction of irradiated leaves. The effect of gamma irradiation on the activity of five antioxidant enzymes was studied; two of them were examined for their isozymes electrophoresis pattern.

Keywords: Gamma irradiation, *Moringa oleifera*, Yield-related traits, Phytochemical analysis, Antioxidant enzymes, GC-MS and SCOT marker.

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LIST OF ABBREVIATIONS

AFLP	Amplified Fragment Length Polymorphism
CAT	Catalase enzyme
C^{60}	Cobalt-60
DDMP	2,3-Dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-one
γ	Gamma
GC-MS	Gas chromatography–mass spectrometry
Gy	Gray
5-HMF	5-hydroxymethylfurfural
ISSR	Inter-Simple Sequence Repeat
Kr	Kilo rad
PAL	Phenylalanine ammonia lyase enzyme
POD	Peroxidase enzyme
PPO	Polyphenol oxidase enzyme
RAPD	Random Amplification of Polymorphic DNA
RFLP	Restriction Fragment Length Polymorphism
RT	retention time
SCoT-Marker	Start Codon Targeted Marker
SOD	Superoxide dismutase enzyme
SSRs	Simple Sequence Repeat
TPC	Total phenols content