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Gamma irradiation effect on some morphological and chemical characters of Sudani and Masri Roselle varieties

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Abstract: Roselle or Karkadaih (*Hibiscus sabdariffa* L.) is one of the most important medicinal plants used for various nutritional, medicinal and pharmaceutical purposes. Seeds of two Roselle varieties (Sudani and Masri) were sown for the plant parent generation, then the harvested seeds were exposed (in dry and in soaked seed categories) to gamma rays with different doses. The irradiated seeds were re-sown for M_2 and M_3 generations to evaluate the responsibility to gamma radiation. All the studied morphological characters indicated significant variability between varieties in the plant parent generation except the number of main branches/plant. The Sudani plant parents exhibited the higher values for all characters than of Masri variety. Moreover, in the M_2 and M_3 generations all the morphological characters were affected significantly by the seed categories (dry or soaked) radiation doses and their interaction as well as the varietal variation. Gamma rays improved the values of all morphological traits than of control. The dose of 40 Gray in the soaked seed category and 240 Gray in the dry seed category stimulated the highest trait values. Furthermore, genotypic and phenotypic coefficients of variation, broad sense heritability and expected genetic advance estimation presented higher values in M_2 than M_3 for most characters. On the other hand, the phytochemical screening of Roselle sepals showed greater acidity, anthocyanins, phenolics and antioxidant activity for Sudani than Masri variety. The responsibility of soaked seed category was more sensitive than of dry seed category. Total soluble solids and pH values had slight responsibility to gamma rays. Irradiation dose of 60 Gray in soaked seed category and 240 in dry seed category stimulated the highest values for most evaluated chemicals in Masry variety. While 20 Gray gave the highest sugars, anthocyanins and antioxidant activity and 60 Gray gave the maximum acidity and phenolics at the soaked seed category. No characterized doses effects were noticed in the dry seed category of Sudani variety. All the morphological and chemical results indicated that there is a store of genetic variability between the studied varieties that can be exploited for the improvement of Roselle yield through the selection and/or the hybridization between Sudani and Masri to produce a new variety that can share the valuable characters.

Key words: Roselle, *Hibiscus sabdariffa*, varieties, generations, Gamma irradiation, sepals phytochemical screening.

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