Contribution ID: **103** Type: **Poster**

STUDY TO DETERMINE THE GROWTH REDUCTION DOSE 50 (GR50) FOR GAMMA RAYS INDUCED MUTAGENESIS IN CARROT (DAUCUS CAROTA L.)

A study was initiated with the aim to develop new carrot varieties with good nutritive content using nuclear techniques. Mutation using gamma irradiation was selected to induce genetic variability for carrot cultivar improvement. Radio-sensitivity study of carrot to gamma irradiation was investigated to determine the dose which causes 50% growth reduction (GR50) for an indication of the optimal mutagenic irradiation treatment to be applied. After moisture stabilisation, carrot seeds were first subjected to gamma radiation doses of 25, 30, 35, 40, 45 Gray (Gy) and then in a second experiment the doses were increased from 450, 500, 550, 600, 650, 700, 750 Gy using a 137-Caesium radioisotope. These doses were not effective in inducing growth reduction and mortality. It was concluded that the indicative carrot seeds had to be exposed to gamma irradiation doses higher than 750 Gy. Carrot seeds were subjected to dosages of 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400 and 1500 Gy of gamma irradiation. The GR50 was determined based on growth reduction in parameters such as root length and plant height. GR50 was determined to be 1075 Gy using plant height as the more appropriate parameter. Based on this radio-sensitivity study, the local carrot seeds were subjected to the determined GR50 dose for induction of mutation by gamma irradiation and it was followed by field sowing and evaluation. Mutant line with improved agronomic characteristics will be selected for further evaluation.

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Track Classification: Enhancing agricultural biodiversity through new mutation induction techniques