

MITOTIC AND MEIOTIC CONSEQUENCES OF GAMMA IRRADIATIONS ON DRY SEEDS OF *NIGELLA SATIVA* L. (BLACK CUMIN)

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Abstract: Dry seeds (moisture content :19.04%) of *Nigella sativa* L. (Family: Ranunculaceae; common name - black cumin, spice of commerce) were gamma irradiated (50, 100,150, and 200 Gray doses) and M₁ (germination frequency, seedling length, lethality, injury, mitotic index, mitotic aberration frequency; meiotic abnormalities, pollen fertility and seed sterility) parameter and M₂ mutation (macromutants) frequency were studied with an objective to assess mutagenic sensitivity as a pre-requisite for mutation breeding experiment. LD₅₀ was found to be between 50 Gy and 100 Gy. Results obtained are discussed.

Keywords: Gamma irradiations, M₁ parameters, mitotic & meiotic aberrations, *Nigella sativa*.

REFERENCES

- Badary, O.A.** (1999). Thymoquinone attenuates ifosfamide-induced Fanconi syndrome in rats and enhances its antitumour activity in mice. *Journal of Ethnopharmacology*, **67**: 135-142.
- Burtis, M. and Bucar, F.** (2000). Antioxidant activity of *Nigella sativa* essential oil. *Phytotherapy Research*, **14**: 323-328.
- Datta, A.K. and Biswas, A.K.** (1983). X-rays sensitivity in *Nigella sativa* L. *Cytologia*, **48**: 293-303.
- Datta, A.K.; Biswas, A.K. and Sen, S.** (1986). gamma radiation sensitivity in *Nigella sativa* L. *Cytologia*, **51**: 609-615.
- Evans, H.J. and Sparrow, A.H.** (1961). Nuclear factors effecting radiosensitivity II. Dependence on nuclear and chromosome structure and organization. *Brookhaven Symposium Biology*, **14**: 101-127.
- Evans, H.J.** (1965). Effects of radiation on meristamatic cells. *Radiation Botany*, **5**: 171-182.
- Gaul, H.** (1964). Mutations in plant breeding. *Radiation Botany*, **4**: 155-232.
- Ghosh, A. and Datta, A.K.** (2006). Karyotyping of *Nigella sativa* L. and *Nigella damascena* L. by Image Analysing System. *Cytologia*, **71**: 1-4.
- Gunckel, J.E. and Sparrow, A.H.** (1954). Aberrant growth in plants induced by ionizing radiations. *Brookhaven Symposium Biology*, **6**: 252-277.
- Konzak, C.F.; Nilan, R.A.; Wagner, J. and Foster, R.J.** (1965). Efficient chemical mutagenesis. *Radiation Botany*, **5**: 49-85.
- Marks, G.E.** (1954). An aceto-carmin glycerol jelly for use in pollen-fertility counts. *Biotechnic and Histochemistry*, **29**: 277-278.
- Moutschen, J.H.** (1968). Some implication of radio-induced structural changes of chromosome in *N. damascena*. *Nucleus*, **11**: 177-188.
- Morsi, N.M.** (2000). Antimicrobial effects of crude extracts of *Nigella sativa* on multiple antibiotics – resistant bacteria. *Acta Microbiologica Polonica*, **49**: 65-74.
- Read, J.** (1959). Radiation Biology of *Vicia faba* in Relation to General Problem. *Black-well Scientific publications, Oxford*, pp. 270.
- Rang, S.K. and Datta, A.K.** (1998). Influence of some physical and chemical factors on gamma radiation sensitivity in *Nigella sativa* L. (black cumin). *Journal of National Botanical Society*, **52**: 17-22.
- Saha, A. and Datta, A.K.** (2002). Gamma-rats induced reciprocal translocation in black cumin (*Nigella sativa* L.). *Cytologia*, **67**: 389-396.
- Saha, A. and Datta, A.K.** (2008). Black cumin (*Nigella sativa* L.) – A model plant for cytogenetical studies. *Plant Archives*, **8**: 1-5.
- Sax, K.** (1942). The mechanisms of X-ray effects on cells. *The Journal of General Physiology*, **25**: 533-537.