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RESEARCH ARTICLE

Mutagenic response of isabgol (*Plantago ovata* L. Forsk) to gamma-rays

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SUMMARY

The fresh seeds of isabgol variety RI-87 were subjected to 15, 30, 45, 60, 75, 90, 105,120 and 135 Kr doses at Co_{60} gamma-rays and lab as well as field experiment was carried out during rabi 2002-03 and 2003-04. The effects of gamma-rays were studied on different parameters such as germination percent, seedling height, seedling dry weight and pollen fertility in M_1 generation and frequency and spectrum of chlorophyll and viable mutants, mutagenic efficiency and effectiveness in M_2 generation with employing nine doses of gamma-rays and one control. Reduction of germination, seeding height, seedling dry weight and pollon fertility in the M_1 generation was observed with increases doses of gamma-rays. In general the frequencies of chlorophyll mutations increased in linear fashion at low and medium doses and were erratic reduction at higher doses. The spectrum of chlorophyll mutants included albina, xantha, chlorina, viridis, tigrina and others. The frequency of these mutants varied with treatments. The 105 kR doses of gamma-rays produce highest frequency of viable mutants. Occurrence of major viable mutants from seedling to adult growth stages were varied *viz*., broad and narrow leaves, paired spikes, coxcomb spikes, ball mutants, gappy spikes, partial and complete sterile. A dose rate of 90 kR and 105 kR were most effective as well as efficient treatments.

Key Words : *Plantago ovata* L., mutations, chlorophyll and viable mutants, mutagenic effectiveness, mutagenic efficiency

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Isabgol (*Plantago ovata* L. Forsk) constituents one of the most important indigenous drug plants of India for their seed and husk which used in stomach disorders such as diarrhea,ulcers, gonorrhoea, pileas, cough, chronic dysenteries of amoebic and bacillary origin and also use for treating constipation and intestinal disorders in ayurvedic medicines. Due to the presence of mucilaginous it has diversified uses not only in medicine but also in small scale industries (Dalal and Sriram, 1995). India is the sole exporter of psyllium to the world market and about 80 to 90 per cent produce is exported but is not able to meet global demand on account of low production and productivity. The possible constraints that limit the yield are many and varied. However, narrow genetic base and account of low chromosome number (n=4) and small chromosome size with 60 per cent constitutive heterochromatic nature are the major constraints (Stack, 1984 and Sareen *et al*., 1999). Because of small size and closely born florets and small stature of the plants, emasculation and artificial pollination is difficult and mutation techniques as a single tool to generate desirable variability (Dalal and Sriram, 1995 and Kumar and Ramesh, 2004). The important and most essential task in mutation breeding is the use of appropriate mutagens. Several investigators have pointed to the usefulness of ionizing radiation for inducing mutation in psyllium (Bhagat and Hardas, 1980, Sareen and Kaul, 1991, Lal and Sharma, 2002 and Jain *et al*., 2005). The usefulness of any mutagens in plant breeding depends not only on its mutagenic effectiveness but also on its efficiency (Krishna *et al*., 1984, Kharkwal, 1998 and Jain, 2004).

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