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IN VITRO MUTAGENESIS AND PRODUCTION OF AGRONOMICALLY USEFUL POTATO VARIANTS

In vitro grown shoot cultures of two Indian potato varieties 'Kufri jyoti' and 'Kufri Chandramukhi' were subjected to gamma irradiation at 20 and 40 Gy. The irradiated shoot cultures were subcultured to yield a generation of plantlets. After 4-6 weeks of incubation, these shoots were transferred onto MS medium supplemented with benzylaminopurine, BAP (10mg/1) and sucrose (8% w/v) and incubated at 20^0C. The M_1V_3 plants were screened *in vitro* for late blight resistance by detached leaf method [4; 5]. The resistant plants were screened in M_1V_4 generation by artificial inoculation of sporangial inoculum on the pot sown plants. Chlorophyll persistence is a simple screening method for heat tolerance [3]. Chlorophyll persistence of different plantlets showed that the percentage of injury was less in the case of plants, which had been obtained from irradiated material. In the case of control plants, there was one hundred-percent damage to the plants. The mutation frequency was calculated for characters like late blight resistance and heat tolerance (*in vitro* microtuberisation and chlorophyll persistence). The gamma ray dose of 40 Gy was observed to produce a higher mutation frequency (Tab. 1).

Table 1. Radiation induced mutation frequency in potato microtuber progeny

Variety	Character	Treatment	Variation observed (%)
Kufri Chandramukhi	Late blight resistance	40 Gy	26.3
		20 Gy	14.5
Kufri Jyoti		40 Gy	17.6
		20 Gy	20.0
Kufri Chandramukhi	Heat tolerance	40 Gy	28.0
	(*in vitro*)	20 Gy	12.0
Kufri Jyoti		40 Gy	22.0
		20 Gy	8.0
Kufri Chankdramukhi	Heat tolerance	40 Gy	46.3
	(Chlorophyll resistance)	20 Gy	28.0
Kufri Jyoti		40 Gy	34.0
		20 Gy	30.6

Among the two cultivars studied Kufri Chandramukhi was observed to be more amenable to induction of mutations as it showed a higher mutation frequency than Kufri jyoti. A dose of 100-200 Gy was sufficient to induce mutations *in vivo* while for *in vitro* the dose was considerably reduced to 30-50 Gy [2]. The mutation frequency observed in the present investigation ranged from 1.2% to 46.34%. The mutation frequency was different for two doses of irradiation for the two cultivars. Hence genotypic differences were detected with regard to the response to mutation induction. A mutation frequency of 4.2 to 9.4 percent for various characters, after plantlet irradiation *in vitro,* has been observed and a small population was found to be sufficient to get useful variants through this technique [1].

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EFFECT OF *IN VITRO* MUTAGENESIS ON PLANT REGENERATION IN *Citrus aurantifolia* S.

Callus was induced from different explants excised from *in vitro* raised seedlings on MS medium enriched with naphthalene acetic acid (NAA) (10 mg/l) and kinetin (0.2 mg/l). The cultures were maintained on the same media for 30 days. Part of the 30-day-old calli were exposed to gamma radiation (5 and 10 Gy) and the rest were treated with ethyl methanesulphonate (EMS) (0.1 to 0.4%) for 8 hours. All the treated calli were immediately transferred to regeneration medium [1/2 MS+Benzyl Amino Purine (BAP) (5 mg/l)] along with the untreated control. The cultures were maintained under conditions of 25± 2°C, 16/8 hours day and night regime and 2500-3000 lux light intensity. The results indicated a significant effect of mutagenic agent on callus regeneration (Fig. 1 and 2) and regenerants' morphological features. The same phenomenon was observed in *Triticum aestivum* and *Zea mays* [1; 2]. Regenerated mutants showed variation in morphological traits like, plant height, leaf length and breadth. Moreover, the mutants are being screened for resistance against citrus canker. However, the genetic origin of the mutants has not been determined.