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Optimization of hormonal combination for callus induction and regeneration in gamma irradiated rice

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SUMMARY

The present investigation was carried out with the rice varieties Ponni and White Ponni, treated with gamma rays at various doses producing the following eight treatments *viz*., PC, P10, WPC , W10,WP20, WP20D, WP40, WP40D and using anther as explant. Different growth hormone combinations were tried for optimizing the concentration of hormonal combination for enhancing the callus induction and regeneration. The results were studied through factorial completely randomized design. Among the combinations tested N6 + 2,4-D 2.50 mg/l + kin 1.00 mg/l was best for the anther callus induction. For P and WP the treatments and hormone highly significant for callus induction , while treatment –hormone interaction exhibited significance in callus formation only in P.The plant regeneration was maximum in the hormonal combination MS+. BAP1.00 + IAA 1.00 mg/l.High frequency of plant regeneration and in addition few albinos were also observed in WP10 and WP40. Significant difference was noticed in varying hormone levels, treatments and their interactions in regeneration of green plants.

Key words : Gamma rays, Anther explant, Growth hormone, Callus induction, Regeneration, Albino, Ponni, White ponni

Developments in plant tissue culture techniques offer possibilities of introducing variability into plants that could be utilized for crop improvement. Haploids with their unique genomic constitution, have potential for accelerating the production of homozygous new varieties. Plant growth hormones are the substances that when added in small quantity ,modify the growth of plants usually by stimulating the part of the natural growth system. Callus induction is the preliminary stage. The most commonly used growth hormone for callus induction in cereal tissue culture is 2,4-D(Abe and Futsuhara,1986 and Bregitzer *et al.*,1989). Many cereals express embryogenic competence in the presence of 2,4-D.Heyser *et al*. (1983) reported varying responses among rice varieties in producing competent culture with the use of 2,4-D.Though other auxins such as IAA, NAA, and PCPA of Benzolin are available .2,4-D either alone or in combination with any one of the above mentioned auxin were widely used by many scientists in callus culture.(Mandal and Bandyopadhyay,1996). Addition of cytokinins facilitated the callus initiation and maintanance (Mandal *et al.*,1998). A combination of auxins and cytokinins were found to be suitable for embryogenic callus initiation in cultivars of rice. A critical level of auxin and cytokinin was found to be essential for optimum levels of callus induction and plantlet regeneration.

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MATERIALS AND METHODS

The present investigation was carried out to find the optimum concentration of hormonal combination for enhacing callus induction in two rice varieties of Tamil Nadu. The gamma irradiated (10KR,20 KR,40KR) M3 generation anthers *viz*., P10, WP10, WP20, WP 20 dwarf, WP40 and WP40 dwarf and their parents, Ponni and White Ponni formed the base material for present study. All materials were obtained and the experiments carried out in the department of Plant breeding and genetics, Agricultural College and Research Institute, Madurai,

Details of the parents

Variety	Characters	Treatments gamma irradiation doses (KR)	Symbols used
Ponni	Normal	0	PC
		10	P10
White Ponni	Normal	0	WPC
		10	WP10
		20	WP20
		40	WP40
	Dwarf	20	WP20D
		40	WP40D