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AMINO ACIDS AND CYCOCEL APPLICATION TO ENHANCE CUCUMBER HAPLOID EMBRYOGENESIS WITH GAMMA IRRADIATED POLLEN

Polyamines and cycocel (CCC) play important roles in the regulation of embryogenesis. The present study was conducted to investigate the effect of different concentrations of putrescine and spermidine polyamines along with CCC on the number of somatic embryos formed from gamma irradiation of pollen grains in cucumber. The F1 hybrid cv. "Extreme" an Iranian pure line cv. "Dasjerd" were used as the mother plant and the pollen donor, respectively. Mother plants were sprayed with putrescine, spermidine, and CCC each at 0, 50, 500, and 5000 mg/l. Anthers were gamma irradiated at 300 Gy using a Cobalt-60 gamma ray source with an activity of 0.2 Gy/s. The irradiated pollen was used for pollination of isolated female flowers. Well-developed fruits were harvested at day 28 and then their embryos were rescued. Chromosome counting and flow cytometry were used to confirm haploidy induction. The highest number of haploid embryos were obtained when mother plants sprayed with putrescine at 500 mg/l (5.2 embryos/fruit), spermidine at 50 mg/l (4.8 embryos/fruit), and cycocel at 50 mg/l (5.2 embryos/fruit). The lowest haploid embryos were observed when 5,000 mg/l of spermidine (0.4 embryos/fruit) or cycocel (2.0 embryos/fruit) were applied. Spermidine at 50 mg/l also efficiently increased the conversion of derived embryos into fully developed plantlets (up to 100%). Ploidy analysis using flow cytometer indicated that all regenerated plantlets were haploid, i.e. contained the gametic chromosome number ($n=x=7$). Chromosome counting also confirmed the haploid nature of regenerated plantlets. The induction of haploid embryogenesis from unfertilized ovaries after pollination with gamma irradiated pollen and subsequent conversion of derived embryos into the plantlets could be improved in *C. sativus* L. when appropriate levels of putrescine, spermidine, and cycocel were applied.

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