

**Deposition Pattern of Hydrogen Peroxide in Pumpkin  
(*Cucurbita ficifolia* Bouché) Seedlings Exposed to Gamma Ray**

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Pumpkin seedlings exposed to gamma ray showed a growth inhibition and a premature senescence in leaf, petiole, and hypocotyl. This phenomenon was clearly observed on the leaf after treatment of gamma ray. On the other hand, the cotyledon of pumpkin exposed to gamma ray was slowly processed senescence more so than that of control. According to the results of the phenotype changes and light microscopic observations after gamma irradiation, the sensitivities of the pumpkin tissues against gamma ray were observed. A previous study has reported that the  $H_2O_2$  level was remarkably increased by a water radiolysis derived from gamma ray. Therefore, it is necessary to investigate in detail the different sensitivities on a cellular level in term of  $H_2O_2$ .  $H_2O_2$  was detected cytochemically using its reaction with cerium chloride to produce cerium perhydroxide [ $Ce(OH)_2OOH$ ], a fine electron-dense precipitate, which is easily viewed by transmission electron microscopy (TEM). The patterns of cerium perhydroxide deposition on the tissues in both control and plants irradiated with gamma ray (PIG) were typically present in plasma membrane and cell wall. However, the intensities of cerium perhydroxide deposits (CPDs) were remarkably increased in plasma membranes and cell walls of all tissues, especially in the leaf by gamma irradiation except the vessel of cotyledons. After gamma irradiation,  $H_2O_2$  content in all tissues except PIG cotyledon was higher than that in control samples, although the  $H_2O_2$  level in PIG cotyledon was lower than that in control. It seems that the increased appearance of CPDs could be due to an enhancement of  $H_2O_2$  by gamma radiation. The accumulation of  $H_2O_2$  mainly increased on the plasma membrane and the middle lamellae by gamma ray, and parenchyma cells were more sensitive than the vessel elements to gamma ray, in terms of  $H_2O_2$  production. In conclusion, the accumulation of  $H_2O_2$  varied depending on the different cell and tissue types of pumpkin. Further studies are needed to examine why a senescence in cotyledon was delayed after gamma irradiation.