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Effects of Salinity on Plant Development of *in vitro* Sweet Potato (*Ipomoea batatas*) Explants and Growth of Pakchoi (*Brassica rapa* var. *chinensis*) Seedlings

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ABSTRACT

Climate change has affected the Pacific Islands with increased sea levels, and the contamination of freshwater with saltwater, which has become a serious problem for plant development. Bioassays were performed to examine the effects of salinity on root and shoot development of *in-vitro* sweet potato (*Ipomoea batatas*), and effects on the seedling growth of pakchoi (*Brassica rapa* var. *chinensis*).

Sterilized stems with one or two nodes of sweet potato cv. Liberty were placed in *in-vitro* Murashige & Skoog solid media with NaCl concentrations of 0%, 0.5%, 1.0% and 1.5%. Newly emerged roots and shoots were recorded on the 18th days after initiation of the experiment. For the second bioassay, two pakchoi cultivars, 'Speedy' and 'Bino,' were tested for seedling development in 0%, 0.5%, 1.0%, and 1.5% NaCl solutions. The fresh weights of seedlings were recorded on the 15th day. Simple statistics and ANOVA were performed to compare plant growth.

Sweet potato explants generated more roots (14.8) in control (0%) than those in 0.5% (6.9), 1.0% (5.4), and 1.5% (5.2) ($n=12$, $p<0.05$). The number of shoots was greater with control (5.4) and 0.5% (5.2) than those in 1.0% (3.0) and 1.5% (3.8). Both pakchoi cultivars showed seedling growth only in 0% and 0.5% NaCl solutions. No growth was observed in 1.0% and 1.5% solutions. Seedling fresh weight of 'Bino' was greater than 'Speedy' ($n=5$, $p<0.05$). Tolerance level of pakchoi varied between two cultivars. Increasing salinity had a negative impact on plant growth.

Key Words: Sweet Potato, Pakchoi, Salinity, Bioassay, In-Vitro Culture

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