Development of salt-tolerant plant and its application to high salinity soil

Shinjiro Yamamoto and Shintaro Furusaki
Department of Applied Life Science, Sojo University,

Summary

Accumulation of salts has been observed at soil surface due to water evaporation from the ground, which causes a salinity problem. The soil containing the accumulated salt reduces the crop productivity and/or damages on irrigated agricultural lands. This salinity problem exists in agriculture throughout the world. Development of salt-tolerant plants is considered to be one of the promising methods to solve the problem. In addition, since a worldwide food shortage with increasing population is anticipated, the salt-tolerant plants will contribute to solve these problems as well. Genetically modified plant, which is transformed with salt-tolerant genes to from compatible solutes such as proline and D-mannitol, is useful.

In this research we surveyed plants suitable for this purpose and chose *Pueraria lobata owl* (Kuzu in Japanese), which is famous for production of starch *in vivo* and propagates extensively in every condition. Moreover, Kuzu is considered to be utilizable for greening the dessert where the salt is concentrated in the soil.

The preparation of cells is necessary for obtaining a stable transformed Kuzu. First of all, we tried to induce Kuzu callus, which is useful to introduce the target genes. Callus induction by combining plant hormones such as auxin and cytokinin was examined. 2, 4-dichlorophenoxyacetic acid (2, 4-D, 0-40 ppm) as auxin and kinetin (0-4 ppm) as cytokinin were used. Kuzu seeds were used for callus induction. The seeds, which were partially cut and sterilized, were placed on solid agar containing the Murashige-Skoog (MS) medium with the defined concentrations of 2, 4-D and kinetin. From this experiment 10 ppm 2, 4-D and 1 ppm kinetin, and 20 ppm 2, 4-D and 2 ppm kinetin were effective to induce the callus. In addition, the MS medium containing these hormones was effective to increase the callus growth on the solid agar.

Culture conditions for redifferentiation of the callus and procedure for target gene introduction to the callus are under investigation.