Keynote Speaker

Hydroponic Culture System Using Microorganism Symbiosis to Plants

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Abstract

All living organisms respond to stimuli from the external environment and as a result demonstrate various adaptive behaviors. Cells in multicellular organisms communicate with each other so that the entire organisms can make an integrated response. Such communication occurs not only between cell and cell but also between an organism and its environment.

The Arbuscular mycorrhizal fungi (AMF) symbiosis to plants is thought to have been instrumental for the colonization of land by plants and is more than 460 million years old as revealed by fossil records. This suggests that AMF were present at a time when the land flora most likely consisted only plants like mosses, and that played a crucial role in facilitating the colonization of the land by plants under a harsh environment. The formation of AMF symbiosis to plants requires the co-ordinate development of both AMF and plants. As AMF spores are capable only of germination and limited hyphal growth in the absence of the plant root, it seems likely that signals from plants are essential for the initial stages of the symbiosis. The successful establishment of mutualistic association consists in a strategy to improve nutritional status for both partners. AMF receive fixed carbon compounds from the host plant, while AMF symbiosis plays a crucial role in improving plant growth and yield, also takes part in stress tolerance, bioremediation, food safety and sustainable crop production.

In this presentation, we report the new energy conservation hydroponic plant system to produce safe and secure agricultural products using AMF, symbiotic bacterium to AMF and organic liquid fertilizer without any agricultural chemicals. We also propose future research plans to analyze signal transduction system between AMF and plant roots.