

[P2] Farming System

Thu. Sep 9, 2021 12:15 PM - 2:00 PM Room 2 (Poster) (Farming System)

12:15 PM - 1:00 PM

[P2-23] Production of Nitrogen Fixed Nutrient Solution for Hydroponic Culture by Flow Plasma System

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The flow plasma system we have developed can fix atmospheric nitrogen as nitric acid in water. If this plasma-treated water can be used as a nutrient solution, the amount of nitrogen required for crop cultivation can be supplied anytime and anywhere when needed, realizing agriculture with a low environmental load. In order to verify this possibility, leaf lettuce (*Lactuca sativa* var. *crispa*) was hydroponically cultivated using this plasma-treated water, and its growth and components were investigated. As a result, a large amount of nitrogen was taken into the plant grown in nutrient solution containing the plasma-treated water, and the size and weight of the plant increased significantly. These indicate that the plasma-treated water can be a nitrogen fertilizer. However, it was clarified that Mo in the electrodes eluted into the plasma-treated water and was accumulated in high concentration in the plant. In addition, Mo in the nutrient solution inhibited the absorption of S and Fe into the plant, while was not affected that of other minerals. Since the large amount of Mo and the inability to ingest S and Fe are harmful to the human body, it is necessary to modify the composition of the nutrient solution and improve the electrodes. On the other hand, it was shown that the plasma-treated water had a bactericidal effect on *Escherichia coli* and algae. Controlling this system might bring the nutrient solution with sterilizing capacity while supplying nitrogen.