Translocation of minor elements from soil in organically cultivated tomato plants -II-

Variation in the quantities of minor elements in tomato plant at different growth stages

Hayanori Takei, Makiko Takazawa[*1], Nobuyuki Terada[*2]

Personal Reseacher
Motoyoshida, Mito, Ibaraki 310-0836, Japan

[*1] Department of Health and Nutrition, Sendai Shirayuri Women's College
6-1 Honda-cho, Izumi-ku, Sendai 981-3107, Japan

[*2] Center for Life Science Research, University of Yamanashi
Tamaho, Nakakoma, Yamanashi 409-3898, Japan

Abstract

This study aims to determine the quantities of minor elements in different organs of tomato plant at different growth stages by PIXE analysis for the purpose of grasping the effects of an organic fertilizer in organic cultivation. In addition, a similar quantitative analysis was performed on tomato plants grown in different locations under the same fertilizing conditions and by the same cultivating methods to compare the contents of vitamin C and the like in fruit.

In order to grasp elemental concentrations at different growth stages of tomato plants, tomato plants were cultivated in the Ibaragi district this fiscal year. Elemental concentrations at different growth stages from tomato seed to tomato plant at the beginning of fruit harvesting period were determined by the PIXE analysis. The following were found from the result:

- Elements that were detected in all organs during the period are the following eleven: Mg, P, S, K, Ca, Mn, Fe, Cu, Zn, Rb, and Sr. Elemental concentrations varied in complex manners by element, organ, and growth stage.
- A survey on similarity among elemental distributions in each organ at the beginning of fruit harvesting period revealed that the distributions varied greatly among adjacent organs such as petiole, lamina, peduncle, and fruit.
- A comparison between the elemental distributions at the beginning of fruit harvesting period in this cultivation and those in hydroponics revealed that the elements except Mn and Fe showed similar tendencies. However, Mn and Fe showed different distributions due to different absorption characteristics.