

Effect of aluminum and silicon in rhizosphere on the grass tolerant to sodic condition in north eastern area of China

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Abstract

The aim of this research was to examine the effect of aluminum (Al) and silicon (Si) in the rhizosphere on the absorption of the elements by the plant “Shiochigaya” tolerant to the sodic condition. Concentrations of elements of the plant grown hydroponically under alkaline or sodic condition whose pH was 10.0 were measured by PIXE (Particle induced X-ray emission) comparing with those of barley. In both of the plants, growth was repressed by the addition of Al to the root medium. On the other hand, growth of barley was enhanced by the addition of silicate to the medium. Furthermore, repression of the growth of barley and shiochigaya was retrieved by the addition of silicate to the medium. In the analysis of elements of the plant shoots, it was shown that shiochigaya had the function to activate the absorption system of potassium (K) and phosphorus (P) under the sodic condition, but concentration of K and P in barley shoots were reduced under sodic condition. It was suggested that the difference of the response in absorption and translocation of elements to the shoots under sodic condition may result in the difference of the intensity of tolerance to sodic condition.