

Effect of phlogopite size on potassium supply to plant under greenhouse conditions

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(Received: 24 Dec. 2012 ; Accepted: 13 March 2013)

Abstract

Micaceous minerals, including phlogopite, are frequently used as the growth medium with different commercial names for greenhouse plants. The objective of this investigation was to understand the effect of phlogopite size on the release and supply of potassium (K) under greenhouse conditions. A pot experiment was carried out with a completely randomized design using factorial arrangement and 3 replications. Treatments consisted of 4 particle sizes of phlogopite and a control, as well as 2 types of nutrient solution (with/without K). Alfalfa was the test plant which was grown on a mixture of sand and phlogopite for a period of 6 months. During the growing period, shoot was harvested 4 times and the root was collected at the end of the experiment and their K concentration was measured. Under the K-free nutrient solution, the K concentration and total uptake was highest in pots containing the smallest phlogopite size. As the size of mineral decreases, the conditions for mineral weathering seem to become more favorable and therefore, mica releases its K more quickly. Therefore, if the long term K supply is important, coarse-sized phlogopite should be used. In contrast, fine-grained phlogopite is suitable when K is to be supplied very quickly.

Keywords: Mica, Potassium release, Mineral size, Alfalfa.

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