

Effects of wetting and drying cycles on release of some elements from bentonite in presence of organic acids

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Abstract: The study of drying and wetting cycles in soils is important due to their effects on plant nutrition and soil fertility as well as environmental issues. Therefore, a laboratory experiment was set up with a completely randomized design and factorial arrangement in three replications to identify the influence of wetting and drying cycles in combination with or without application of organic acids on release of silicon, magnesium, and iron from bentonite mineral. Treatments included two organic acids (citric, oxalic) and five drying and wetting cycles (0, 1, 3, 6 and 9). The concentration of Si was measured using colorimetry and those of Mg, and Fe were measured by atomic absorption spectrometry (GBC Savant AA machine). Results showed that the amount of released elements is highly affected by the type of organic acids, and drying and wetting cycles. Among the organic acids, the amount of Mg released from bentonite in citric acid treated samples was greater than those from oxalic acid samples. However, oxalic acid was found to be more effective for extraction of Si and Fe from the bentonite. Results obtained from the wetting and drying experiments showed that with increasing the number of wetting and drying cycles the release of all elements was considerably increased. However, organic acids increase the release of all elements from the mineral. Based on the results, citric and oxalic acids are suggested for extraction of Mg and Fe from the mineral structure of bentonite, respectively.

Keywords: *Smectite, oxalic, citric, chemical weathering.*

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