Biological weathering of sepiolite clay mineral as affected by the activity of an earthworm species (Eisenia foetida)

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(Received: 30/9/2019, in revised form: 7/1/2020)

Abstract: Sepiolite is an Mg-rich fibrous clay mineral which occurs in agricultural soils of arid regions. Although many investigations have been carried out on the formation and stability of this clay mineral, no information is yet available on the mineralogical changes of this mineral by earthworms. Therefore, this study was conducted to examine the effect of Eisenia foetida earthworms on sepiolite weathering using two factors including the presence or absence of earthworm and also various time periods (90, 135 and 180 days). Upon the completion of the experiment, the amount of available Mg was measured and the mineralogical changes were studied using an X-ray diffractometer and a field emission scanning electron microscope (FESEM). The results indicated that sepiolite was partially weathered to kaolinite in the treatments with earthworm. The results also indicated that the amount of Mg in all samples decreased with time. Since the amount of dolomite increases with time, it could be concluded that dissolved Mg, released as a result of sepiolite weathering, may combine with dissolved Ca ion to produce dolomite.

Keywords: Sepiolite; weathering; Eisenia foetida; fibrous mineral.

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