



Changes in the mineralogical composition of bentonite clay under the cyanobacterial activity

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The aim of the present work was to investigate the possible changes in the mineralogical composition of bentonite clay under the cyanobacterial activity. The research was carried out with two cyanobacterial cultures with different morphological and physiological properties – *Microcoleus chthonoplastes* and *Rhabdoderma sp.* The experiments with *Microcoleus chthonoplastes* have been done with light and in the darkness. The fossilization process was studied with scanning electron microscope (SEM) with microprobes facilities. Mineralogical investigations included X-ray diffraction, Mossbauer spectroscopy and magnetic measurements. The duration of the experiments was 100 days. The bentonite clay used in the experiments contains predominantly montmorillonite (65 %) and additionally muscovite (25 %), kaolinite (10 %) and traces of quartz and feldspars. The composition of the medium, containing NaCl and NaHCO₃, influenced the properties of bentonite clay: d_{001} value of montmorillonite decreased from 16.4 Å to 12.4–13.2 Å at the end of 40 days experiment. By the 100th day of the experiment with *Microcoleus chthonoplastes* subsequent increasing of d_{001} value of montmorillonite to 15.6 Å was observed. The bentonite incubation with *Microcoleus chthonoplastes* and *Rhabdoderma sp.* resulted in different trends of its transformation. The observed processes were fast and completed within the first 40 days of the experiments. The incubation with *Rhabdoderma sp.* leads to almost complete destruction of the montmorillonite structure. The transformation product contained besides muscovite, quartz and feldspars, the visible quantity of amorphous material. The influence of *Microcoleus chthonoplastes* on the composition of bentonite was visibly weaker. In the experiments performed with the light the synthesis of calcium carbonate (calcite) was observed starting from 7th day of the experiment.