The Study of Microbial Communities of Rudkhan Castle

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Abstract

Rudkhan Castle, one of the most valuable monuments in Iran, belongs to the Sasanian Empire, and nearly all of the parts are made of bricks. The castle had been exposed to physicochemical and biological factors over the years. Locating in a humid environment and possessing porous surface has made it appropriate substrata for microorganisms’ colonization. This study is an attempt to identify the major microorganisms involved in biodeterioration of Rudkhan Castle. The samples were taken from brick surfaces and were sub-cultured onto culture media. Scanning electron microscope (SEM), stereomicroscope and Periodic Acid Schiff (PAS) staining were also employed to illustrate the growth and pattern of penetration into the substratum. Energy dispersion X-ray analysis (EDX) and X-ray diffraction (XRD) were used to show alteration of elements of deteriorated brick samples, which are caused by microorganisms’ activities. First, Samples were identified by morphological characteristics. Next, some of the isolates were identified according to molecular methods, polymerase chain reaction (PCR). The first step to protect the cultural heritage is identification of deteriorating agents.

Keywords: Algae, biodeterioration, cyanobacteria, fungi, lichen, Rudkhan Castle

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