CROSS-CHECKING OF AERIAL IMAGES AND RESULTS OF LOCAL SAMPLING OF GYÖNGYÖSOROSZI FLOTATION TAILING IMPOUNDMENT, NORTH-EASTERN HUNGARY

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Pyrite-containing ore mining wastes may seriously damage their surrounding environment. The phenomenon is the so-called Acid Rock Drainage (ARD) or Acid Mine Drainage (AMD). Oxidation of iron sulphides produces low pH-solutions and Fe(III) ions. The process is extremely complex, and heavily influenced by vital functions of sulphide oxidizing bacteria. Products of the oxidation among others are gypsum, jarosite, goethite, hematite, and lepidocrocite. Using hyperspectral or multispectral remote sensing methods, anomalies of these secondary mineral phases can be plotted (VIJDEA *et al.*, 2004).

In this study hyperspectral aerial photography of the flotation tailing impoundment (KARDEVÁN *et al.*, 2003) and results of local sampling were cross-checked. In the aerial picture, goethite and jarosite anomalies could be seen. In my local sampling programme nearly 100 samples were gathered from the surface of the tailing impoundment covering the whole area. Samples were analyzed by an HZG-3 powder diffractometer and a MOM Derivatograph C equipment.

The thickness of the vegetation, the roughness of the surface and the presence of mineral component enrichments may influence the quality of the reflected beam, which determines the detectable mineral phases in the aerial picture.

Samples, collected from any part of the tailing impoundment, were rich in jarosite. Nevertheless, on the aerial photography, jarosite anomaly on the surface of the older and heavily oxidized parts of the tailing impoundment covered by richer vegetation cannot be seen. The samples, collected from these areas, were rich in jarosite as well, but other mineral component enrichment could not be detected which should cover the reflected beam component of the jarosite in the near infra red and visible range of the spectrum. Surface roughness was the same all over the impoundment. The differences between the results of the two methods might be explained by the high sensitivity of the hyperspectral method to the thickness of the vegetation.

It might be concluded, that the results obtained by the two methods are comparable only on the non-vegetated areas. Data of remote sensing give valuable information about the mineral phases, but detailed and accurate sampling on the spot is indispensable.

References

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