

1. The scientific question that we aimed to solve in this study is to understand the geochemical behavior of gold (Au) and silver (Ag) in relation to each other and to their host rocks in the Rudabánya area. This area is known to host sediment-hosted Pb-Zn-Ag deposits, but previous studies have failed to find gold in the classic ore hosts.

2. The methods used in this study included:

- Sampling of soil and drill core samples from the Rudabánya area, following a systematic grid pattern acquired during explorations of base metals and barite in the period from 2008 to 2019 by Rotaqua KFT.
- Analysis of the samples using various geochemical methods, including Au-ICP21, ME-ICP41, and ME-MS41 by Rotaqua KFT.
- Statistical analysis of geochemical data using software such as ioGAS including correlation analysis, PCA, and statistical and spatial distribution analysis
- Geological interpretation of the data using downhole plots and statistical analyses.

3. The results of this study support the following:

- The Nr1 and Nr 2 soil geochemical datasets were sampled with the same methodology but produced different mean values of the assayed elements. Despite the differences in the mean values, the multi-element correlations for Au and Ag give similar patterns in each dataset.
- Gold has no meaningful correlation with any of the elements in either dataset (in our model, >0.6 was considered as the threshold or the lowest level of a meaningful element correlation). Interestingly, it gives a non-constant varying correlation with Ba, Mn, Fe, Mo, and Hg in the borehole dataset (Nr3).
- Silver, on the other hand, has a strong correlation with a number of elements in both datasets, such as Pb, Sb, Hg, and Cd. We interpret these correlations as a similarity with the sedimentary hosted stratiform Pb-Zn-Ag deposit style in the Nr1 area, and epigenetic, hydrothermal sulfide mineralization in the Nr 2 area.
- The results demonstrate that the gold is poorly concentrated in the surface samples but has drill intersections in some boreholes (with concentration going up to 1.28 ppm). From that point, it should be studied mineralogically in the future. Moreover, gold enrichment is not linked to silver enrichment either in the surface or underground exploration suggesting different origins.
- The results pave the way for future comprehensive research of gold and silver in the area.