

## Potential Health and Environmental Effects of Trace Elements in Karapinar (Turkey) Coals

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### Summary

This study aims to determine environmental impact of Pliocene Karapinar coal units, Konya, Turkey by documenting presence of toxic elements and their possible contamination risks. Karapinar coals show low-grade transformation due to low lithostatic pressure. Therefore, these coals are classified as subbituminous, corresponding to low maturity. The organic fraction of the coals is mainly attributed to increases in the humic group, and to a lesser extend inertinite and liptinite groups. On the basis of sedimentological and organic geochemical analysis, the Karapinar coals are interpreted to have been deposited in a limnic environment.

Based on XRD (X-Ray Diffraction) analysis, amorphous organic matter, calcite, quartz, feldspar, mica, gypsum, mica, aragonite and clay minerals (e.g., kaolinite, smectite, illite and chlorite) are determined in selected samples of the coaly units. Among the average values of major and trace element concentrations of As, Cs, Ni, Sr, U and V exceed the documented threshold values when compared to most world coals. These values are critical as they may cause risks for public health. For example, silica, smectite and kaolinite granules may cause certain diseases in organic tissues. Nickel is extremely toxic, cancerous, and harmful on the cardiovascular system and is irritant on the skin. Arsenic is destructive on the respiratory, cardiovascular, urinary and nervous systems, causing cancer and diabetes. Vanadium is also poisonous, causing red eye, nosebleed, coughing, broncho spasm and erythema. As Karapinar coals are not exposed and not commercially produced, they have the potential to cause similar effects particularly when the groundwater is contaminated.