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Comparison of ginseng planting field soil to solve a murder case

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A dead body was found near a stream at the countryside of Changchun city, Jilin province, northeast of China on 10th September, 2015. Soil was found adhering to the clothes of the body, which was different from the soil at the stream site. It was concluded that the body was transferred from another place. The soil was important to give a clue to where the body came from. In the soil, some tiny plant roots were observed under the microscope. They were examined by the technique of DNA profiling. In addition, pollens were extracted from the soil and examined using a biological microscope and environmental scanning electron microscope. The plant roots were proven to be ginseng tiny roots. And the pollen, a combination of *sinopteridaceae, picea, tilia, betula, athyriaceae, pinus, corylus* and fungi were found in the soil, which was very typical and complied with the characteristics of pollen expected to be in the woods of the northeast part of China. It was strongly indicated that the soil could come from a place that was near the woods in the northeast part of China and where ginseng was planted. By the effort of the police, the first burial site of the body was located at the suspect's ginseng plantation field.

Besides pollen and plant DNA analysis, mineral and elemental examination was carried out for further comparison. X-ray diffraction was performed for mineral identification. To improve the detection sensitivity of the mineral present in trace amounts, the fine part of the soil was dispersed in water, then transferred to the sample holder overnight for x-ray diffraction (XRD) analysis. Chlorite, vermiculite, kaolinite, amphibole, silicon and feldspar were all identified in both samples. Semi-quantitative chemical analysis was carried out by x-ray fluorescence (XRF) spectrometry. The elements and percentage weight detected in the two soil samples were indistinguishable. Coupled with the DNA and pollen analysis results, soil chemical analysis also indicated that both soil samples came from the same source.

The suspect admitted the fact that he murdered the victim and buried him first in his ginseng plantation field and several days later dropped the body near the stream, which eventually confirmed the results.