

IS36. DIAGNOSIS OF MESOTHELIOMA FROM HUMAN BLOOD SERUM VIA INFRARED SPECTROSCOPY COUPLED WITH CHEMOMETRICS

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Malignant pleural mesothelioma (MPM) is an aggressive and rare cancer that develops on the lining of the lungs called pleura. The disease is primarily caused by the inhalation of microscopic asbestos fibers. Mesothelioma can only be diagnosed in the advanced stage, because early symptoms of it are often mistaken as other respiratory diseases. Hence, the present study aimed to develop a rapid and operator independent method with high specificity and sensitivity for MPM diagnosis from human blood serum by Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy and chemometrics. FTIR spectra of the samples collected from patients diagnosed with malignant pleural mesothelioma (MPM), lung cancer (LC), and healthy control (C) were recorded and analyzed with Perkin Elmer Spectrum program. Spectral analysis indicated significant differences in lipid structure and function, such as lipid order and fluidity respectively, protein, nucleic acid and glycogen content of MPM patients. Both unsupervised (Principal Component Analysis, PCA and Hierarchical Cluster Analysis, HCA) and supervised (Soft Independent Modeling by Class Analogy, SIMCA) chemometric analyses were applied to classify MPM patients based on the spectral differences. PCA results revealed an obvious clustering of C, LC and MPM groups. Successful differentiations with 71-94% sensitivity and 80-94% specificity were obtained from serum by HCA. Moreover, 83% accurate classification of groups was obtained with supervised SIMCA method. This study demonstrated that ATR-FTIR spectroscopy coupled with chemometrics has great potential to diagnose MPM disease with higher sensitivity, specificity and accuracy.

*This work was supported by the Scientific and Technical Research Council of Turkey (TUBITAK), SBAG-113S294 Research Fund.

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