

ATR-IR Spectroscopy Application to Diagnostic Screening of Advanced Endometriosis

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Streszczenie

Endometriosis is one of the most common gynecological diseases among young women of reproductive age. Thus far, it has not been possible to define a parameter that is sensitive and specific enough to be a recognized biomarker for diagnosing this disease. Nonspecific symptoms of endometriosis and delayed diagnosis are impulses for researching noninvasive methods of differentiating endometriosis from other gynecological disorders. We compared three groups of individuals in our research: women with endometriosis (E), patients suffering from other gynecological disorders (nonendometriosis, NE), and healthy women from the control group (C). Partial least squares discriminant analysis (PLS-DA) models were developed based on selected serum biochemical parameters, specific regions of the serum's infrared attenuated total reflectance (FTIR ATR) spectra, and combined data. Incorporating the spectral data into the models significantly improved differentiation among the three groups, with an overall accuracy of 87.5%, 97.3%, and 98.5%, respectively. This study shows that infrared spectroscopy and discriminant analysis can be used to differentiate serum samples among women with advanced endometriosis, women without this disease, i.e., healthy women, and, most importantly, also women with other benign gynecological disorders.

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