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POTENTIAL APPLICATION OF A SEROLOGICAL SPECTRAL BIOMARKER FOR ALTERNATIVE DIAGNOSIS OF BREAST CANCER

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The objective of this study was to determine whether Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy can be used to discriminate patients with benign breast disease from malignant breast neoplasms according to specific characteristics of the spectral signature of its serologic molecular composition. The present study was conducted with 18 women with benign breast disease and 18 women with malignant neoplasms. Blood samples were collected and plasma was separated for further processing on a VERTEX 70/70v FTIR spectrometer coupled with ATR platinum diamond. All the spectra were corrected by the baseline and normalized by the mean vector. The quantitative variables were submitted to the Kolmogorov-Smirnov test to verify the degree of adherence to the normal distribution. Statistical analysis was performed using unpaired t-test (significance level $p < 0.05$) using Prism 7.0 software. The spectrum of serum of patients with breast neoplasm and benign breast disease showed several vibrational modes and from these, one vibrational mode was pre-validated as potential diagnostic spectral biomarker by ROC curve. The vibrational mode at $2937,2 \text{ cm}^{-1}$ of malignant breast neoplasms patient was lower ($p < 0.05$) than benign diseases. This vibrational mode demonstrated a sensitivity and specificity of 72.2 and 77.8%, respectively. Altogether, $2937,2 \text{ cm}^{-1}$ spectral serologic biomarker may provide a novel robust alternative for breast cancer diagnostics.