SPECTRAL ASSEMESSMENT OF ORAL FLUID AFTER IN-OFFICE TEETH WHITENING PROCEDURE

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INTRODUCTION

Oral fluid assessment before and after the in-office whitening procedure was carried out using the Raman spectroscopy method. Spectral change in the oral fluid composition after the tooth whitening procedure related to the change in lipid organic composition was detected.

Objective: to evaluate the structural changes of oral fluid after office bleaching by Raman spectroscopy.

MATERIALS AND METHODS OF RESEARCH

Two systems of the in-office whitening procedure were used in the research: Opalescence Xtra BOOST and Philips Zoom White Speed.

Figure 1. The process of collecting oral fluid in a test tube

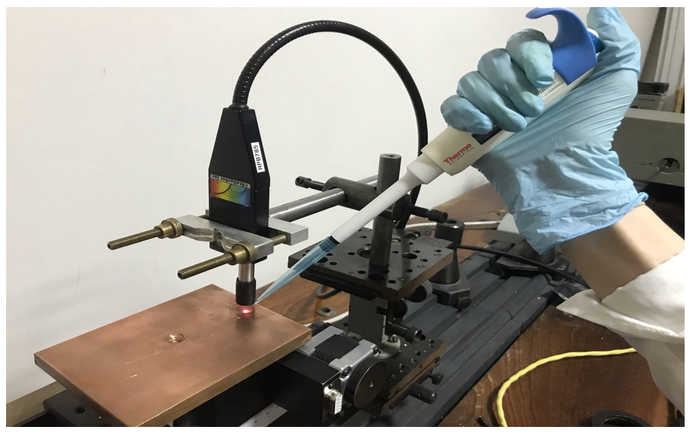

Figure 2. The process of introducing oral fluid into a copper mold for further research

Figure 3. Appearance of teeth before and after bleaching; a) before bleaching b) after bleaching

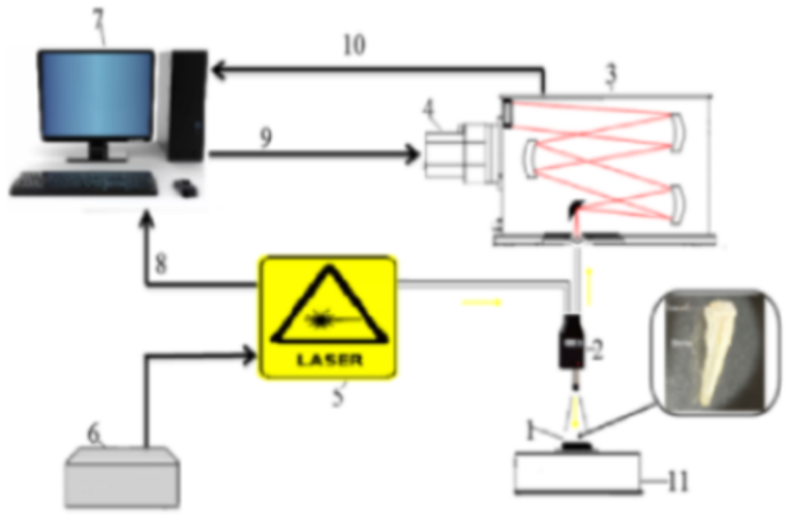

Figure 4. 1 – object under study;
2-Raman probe RPB785;
3-Shamrock sr-303i spectrometer;
4-built-in DV420A-OE cooled camera;
5 – LuxxMasterRamanBoxx-785.0 RB-04 laser module; 6 – power supply of the laser module; 7-computer;
8, 9, 10-information electrical cables;
11-coordinate table

RESULTS OF RESEARCH

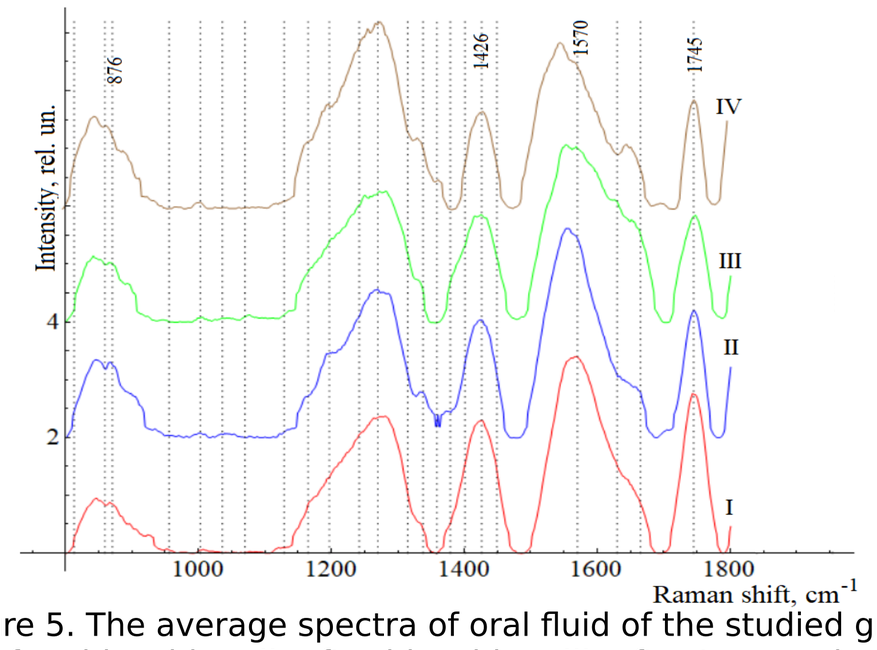

Figure 5. The average spectra of oral fluid of the studied groups I- IV, I- before bleaching, II- after bleaching, III- after two weeks of bleaching, IV- after one month of bleaching

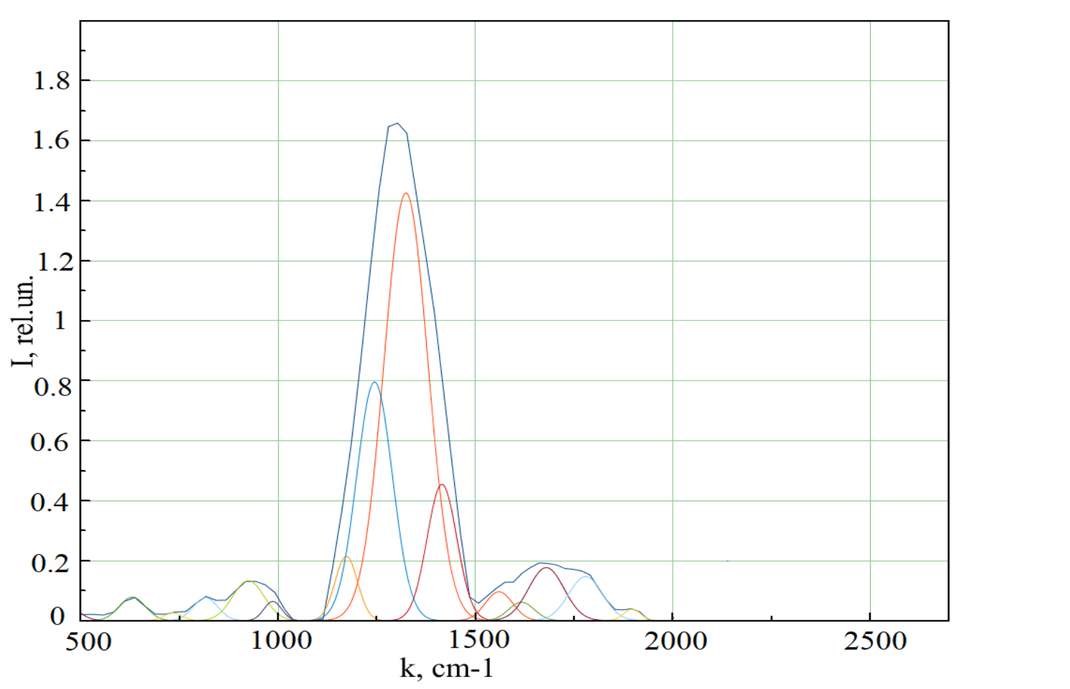

Figure 6. Spectral contour decomposition of the studied samples

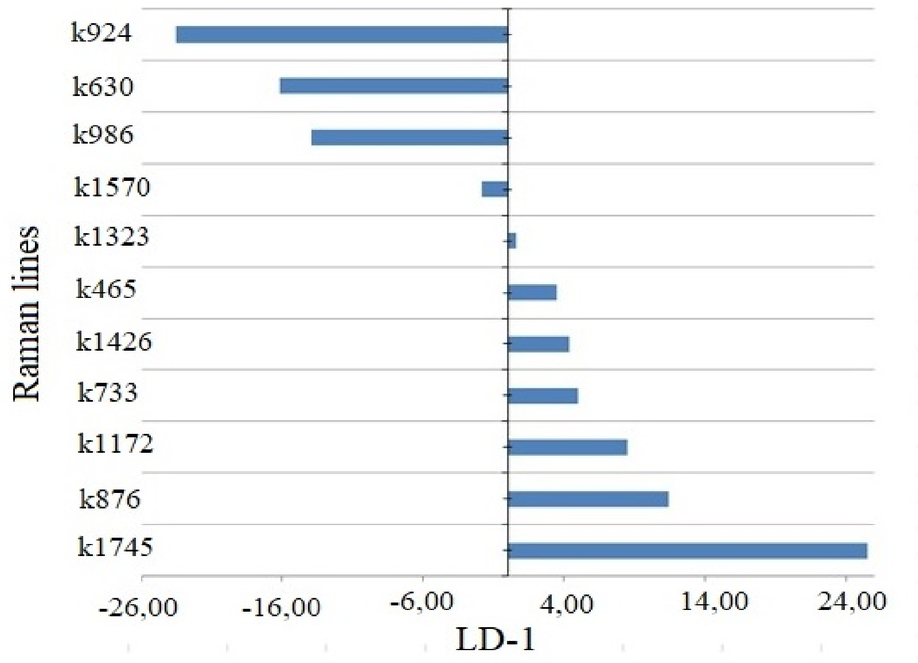

Figure 7. The values of factor structure coefficients

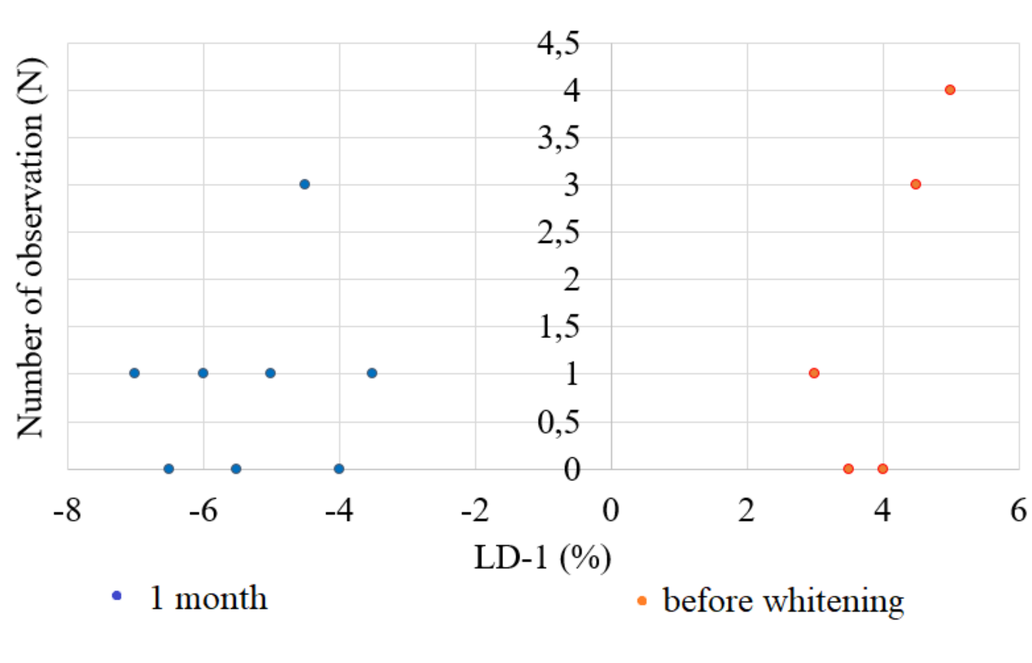

Figure 8. The chart of of the linear discriminant function values

CONCLUSION

Spectrum deconvolution using the method of spectral contour selection and Gauss function deconvolution in the software MagicPlotPro was made as a result of the study, which allowed undertaking expanded component analysis of oral fluid of the patients after the in-office whitening procedure. Spectral changes of oral fluid composition after the whitening procedure were found in the lines of 1745 cm^{-1} (phospholipids), 1426 cm^{-1} (CH2 scissoring vibration (lipid band)), 1570 cm^{-1} (COO-), 876 cm^{-1}; they were related to the change of lipid-organic composition.