

Time-Dependent Vibrational Spectral Analysis of Malignant and Benign Human Cancer Cells and Tissues under Synchrotron Radiation

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In the current study, we have experimentally and comparatively investigated and compared malignant human cancer cells and tissues before and after irradiating of synchrotron radiation using Fourier Transform Infrared (FTIR) Spectroscopy, Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) Spectroscopy, Micro-Attenuated Total Reflectance Fourier Transform Infrared (Micro-ATR-FTIR) Spectroscopy, Macro-Attenuated Total Reflectance Fourier Transform Infrared (Macro-ATR-FTIR) Spectroscopy, Two-Dimensional Infrared Correlation Spectroscopy, Linear Two-Dimensional Infrared Spectroscopy, Non-Linear Two-Dimensional Infrared Spectroscopy, Atomic Force Microscopy Based Infrared (AFM-IR) Spectroscopy, Infrared Photo dissociation Spectroscopy, Infrared Correlation Table Spectroscopy, Near-Infrared Spectroscopy (NIRS), Mid-Infrared Spectroscopy (MIRS), Nuclear Resonance Vibrational

Spectroscopy, Thermal Infrared Spectroscopy and Photo thermal Infrared Spectroscopy. It is clear that malignant human cancer cells and tissues have gradually transformed to benign human cancer cells and tissues under synchrotron radiation with the passage of time (Figures 1-15) [1-148]. It should be noted that time-dependent vibrational spectral analysis of malignant and benign human cancer cells and tissues under synchrotron radiation are presented and illustrated in (Figures 1-15). Furthermore, in the current study, we have investigated Bladder cancer, Lung cancer, Brain cancer, Melanoma, Breast cancer, Non-Hodgkin lymphoma, Cervical cancer, Ovarian cancer, Colorectal cancer, Pancreatic cancer, Esophageal cancer, Prostate cancer, Kidney cancer, Skin cancer, Leukemia Thyroid cancer, Liver cancer and Uterine cancer, respectively. Moreover, more than one hundred thousand cancer patients showed similar results and findings in these tests.

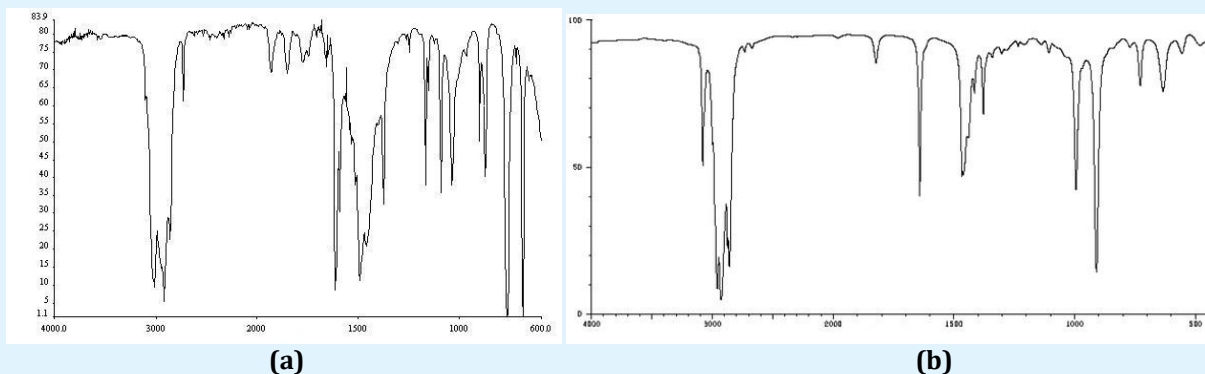


Figure 1: Fourier Transform Infrared (FTIR) Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

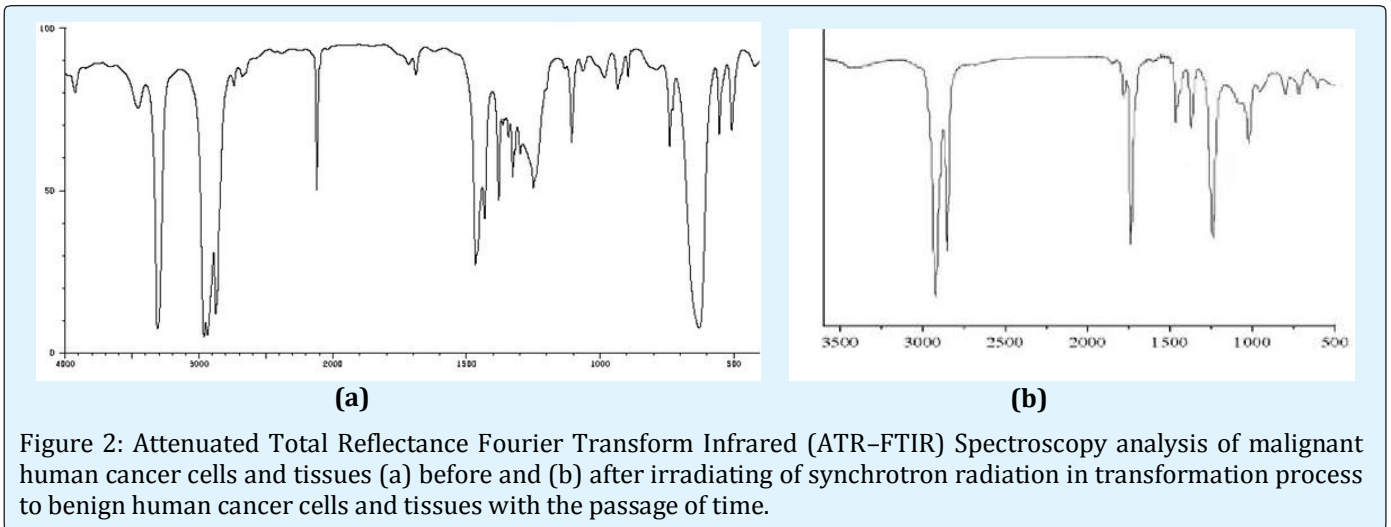


Figure 2: Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

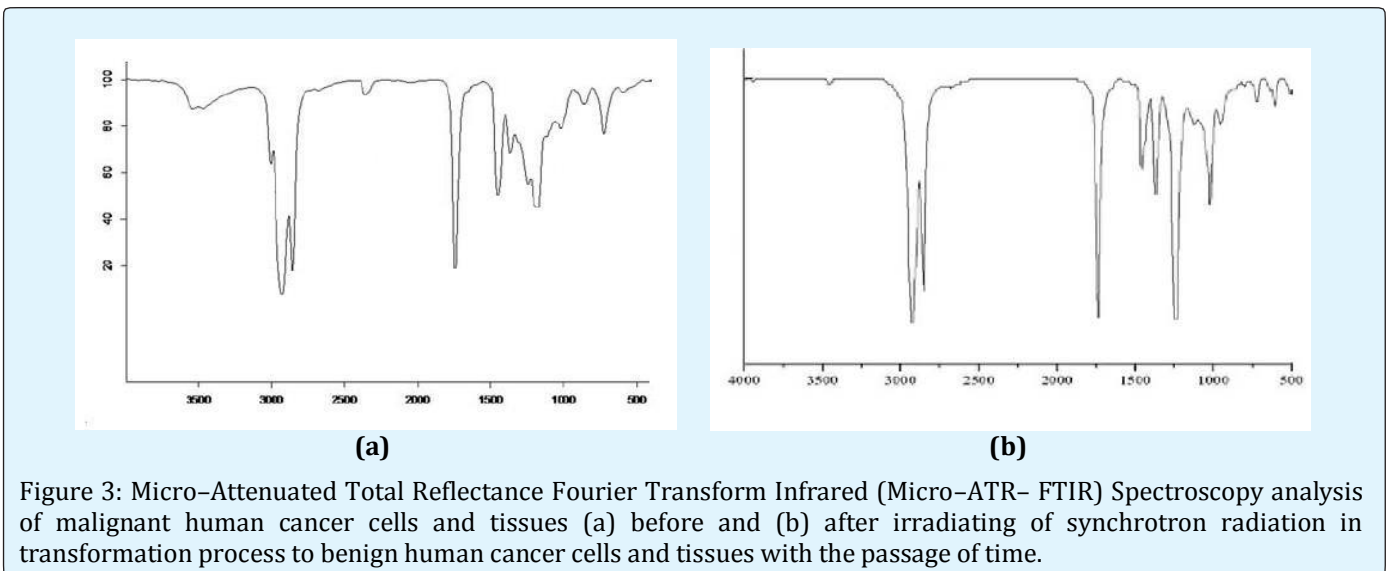


Figure 3: Micro-Attenuated Total Reflectance Fourier Transform Infrared (Micro-ATR- FTIR) Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

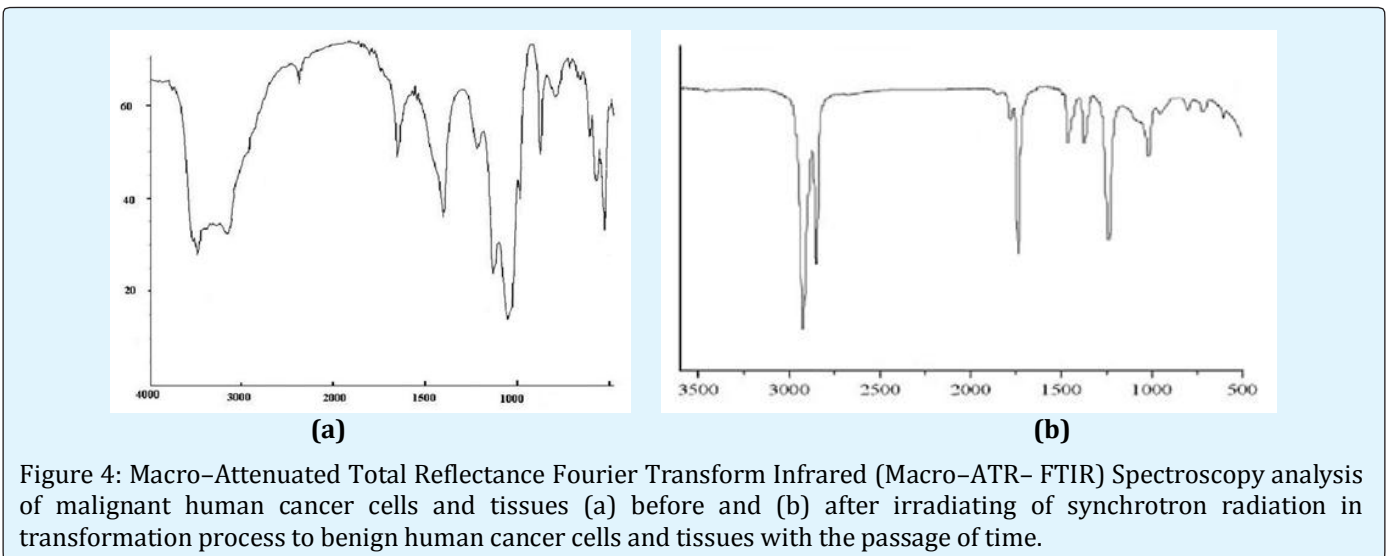


Figure 4: Macro-Attenuated Total Reflectance Fourier Transform Infrared (Macro-ATR- FTIR) Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

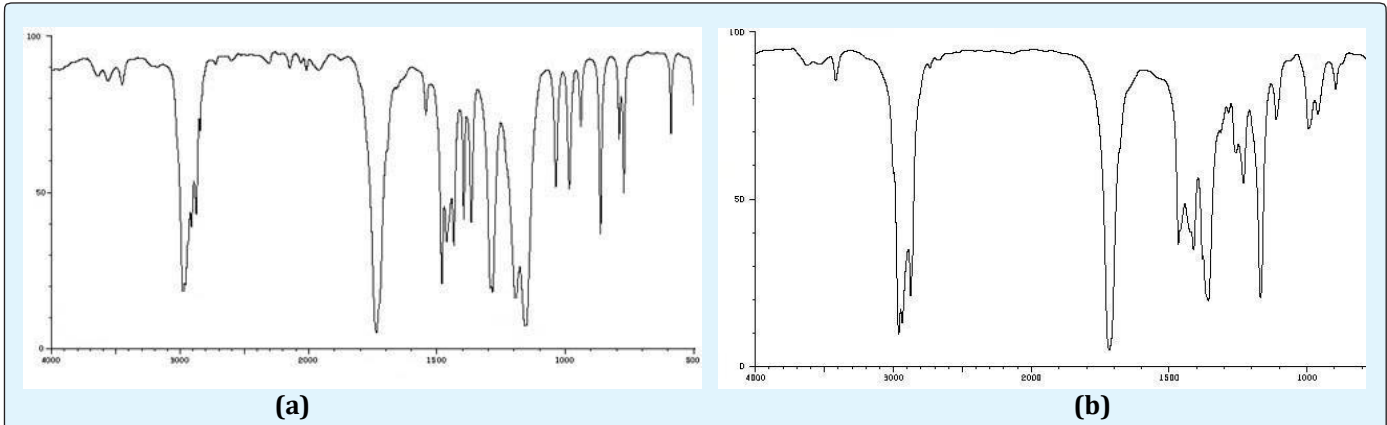


Figure 5: Two-Dimensional Infrared Correlation Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

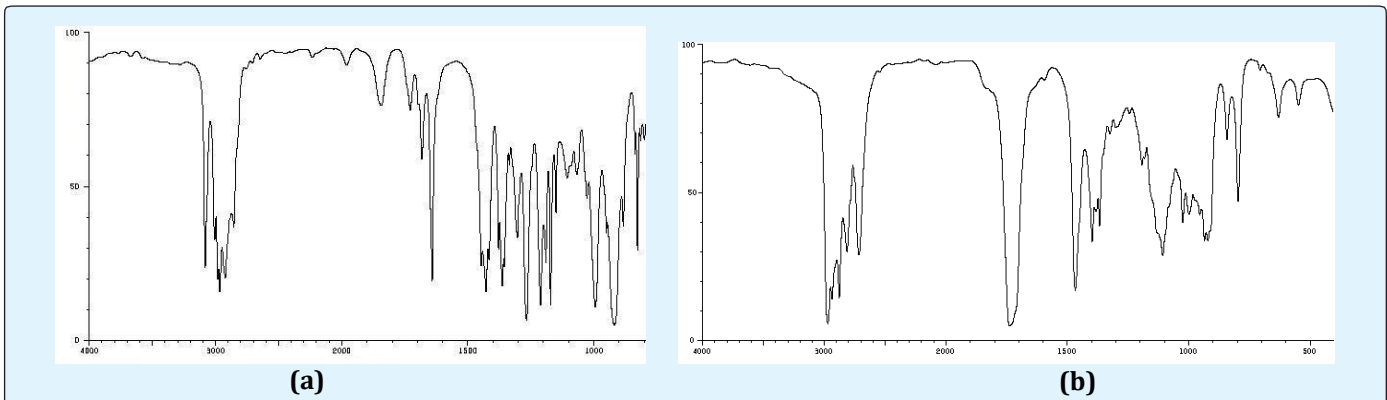


Figure 6: Linear Two-Dimensional Infrared Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

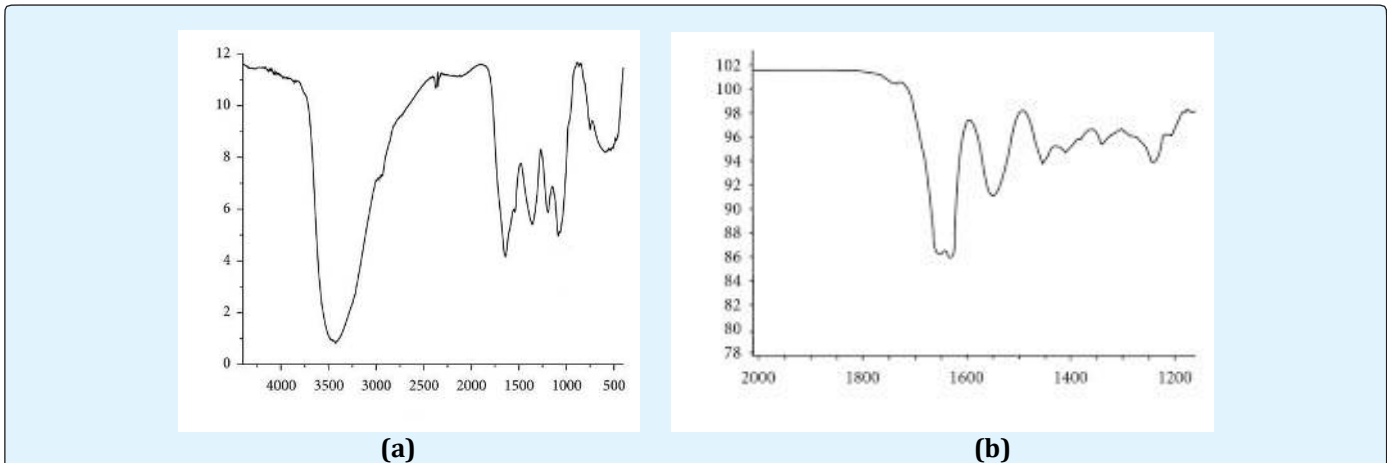
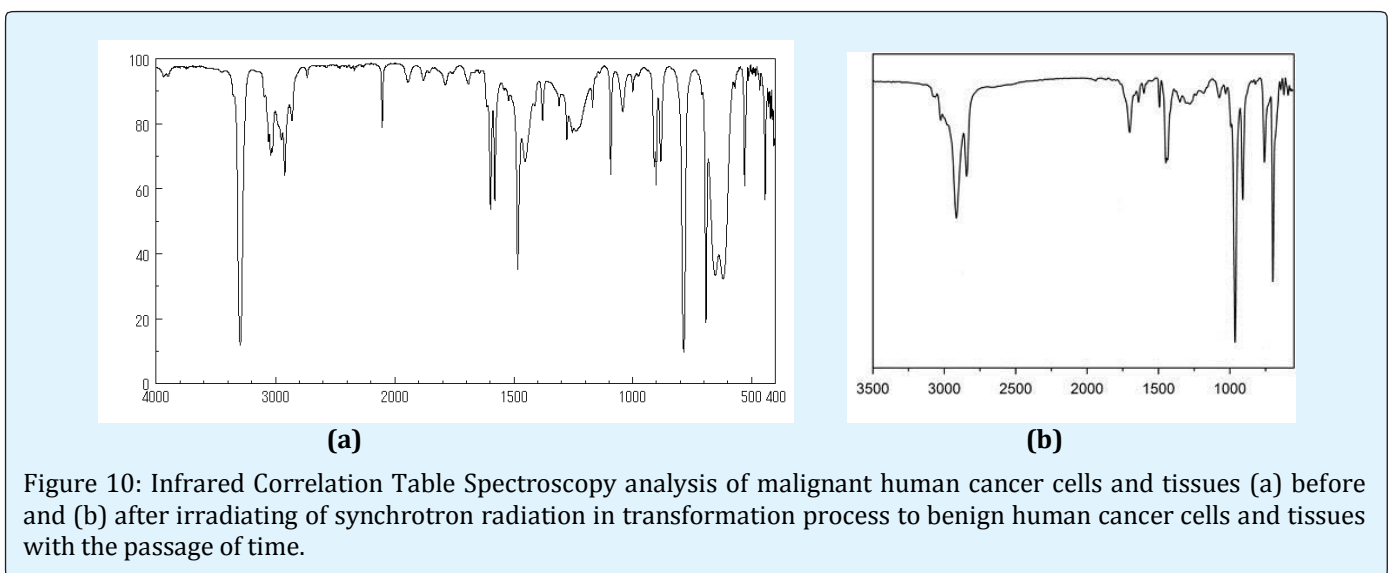
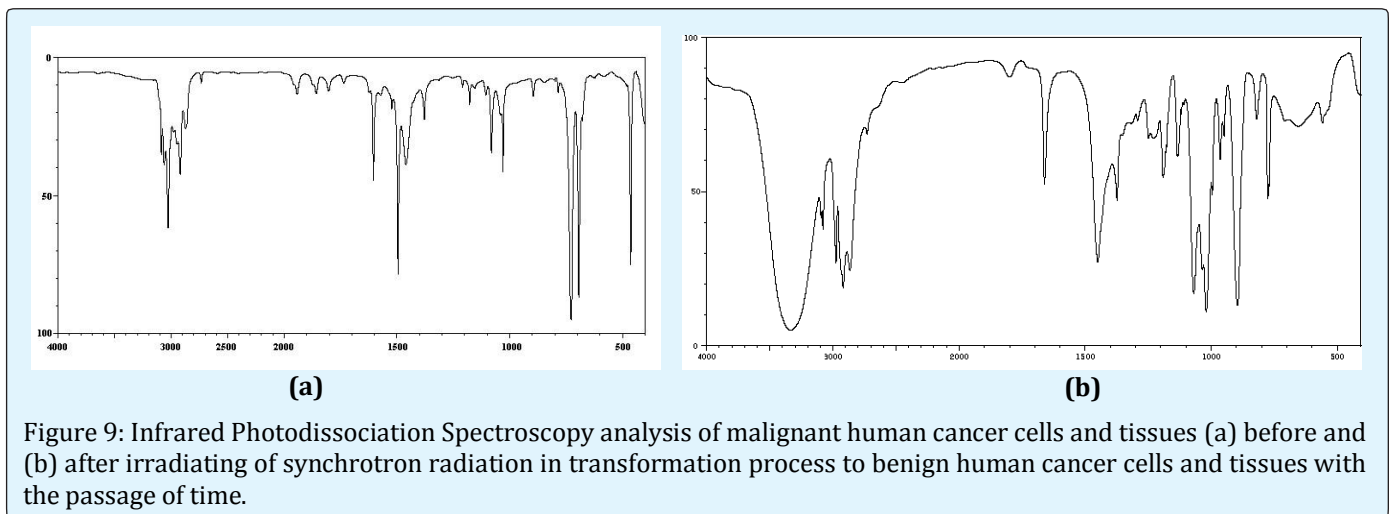
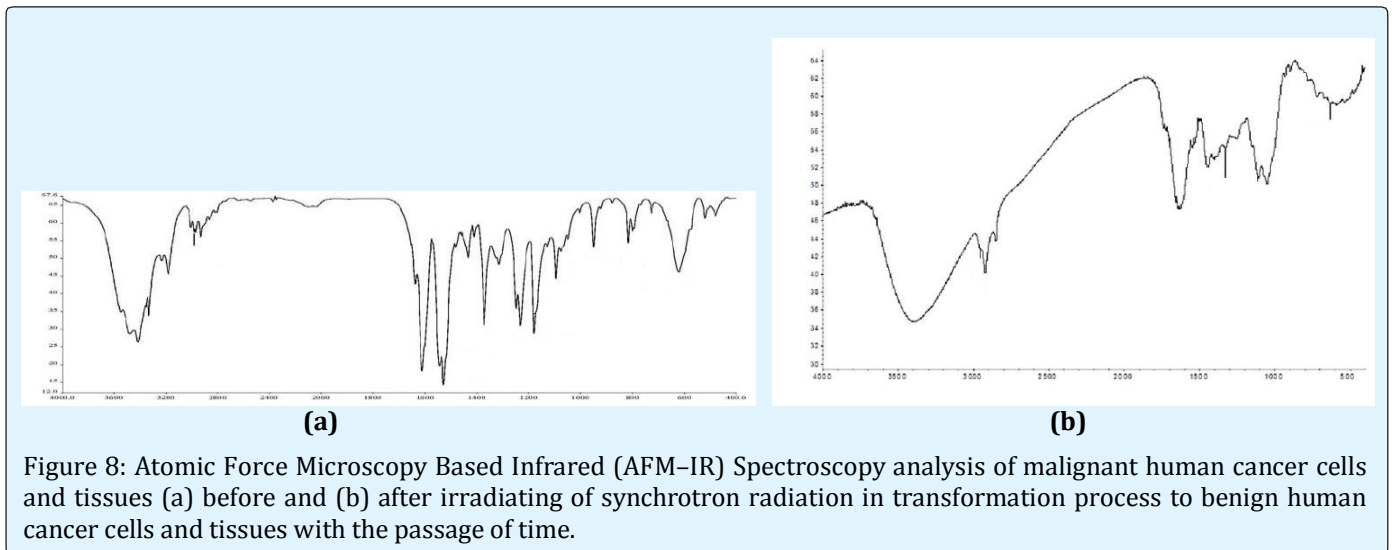


Figure 7: Non-Linear Two-Dimensional Infrared Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.



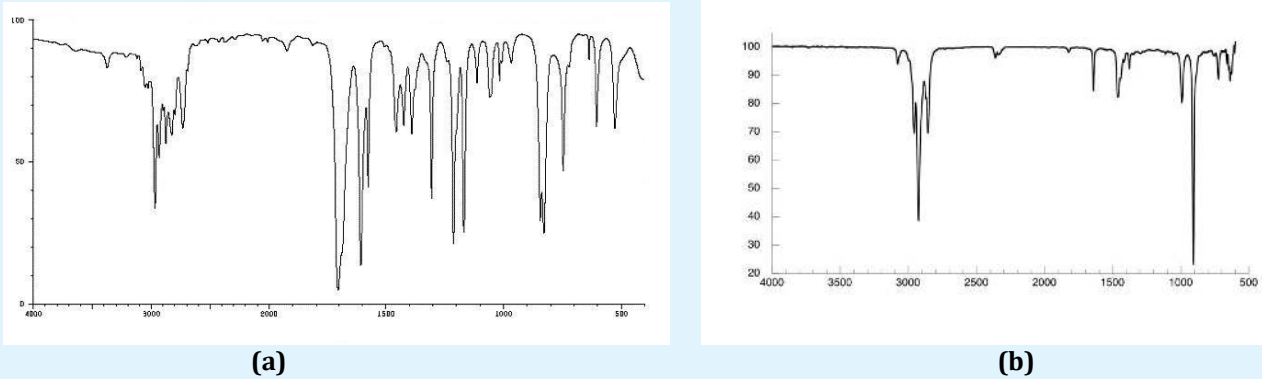


Figure 11: Near-Infrared Spectroscopy (NIRS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

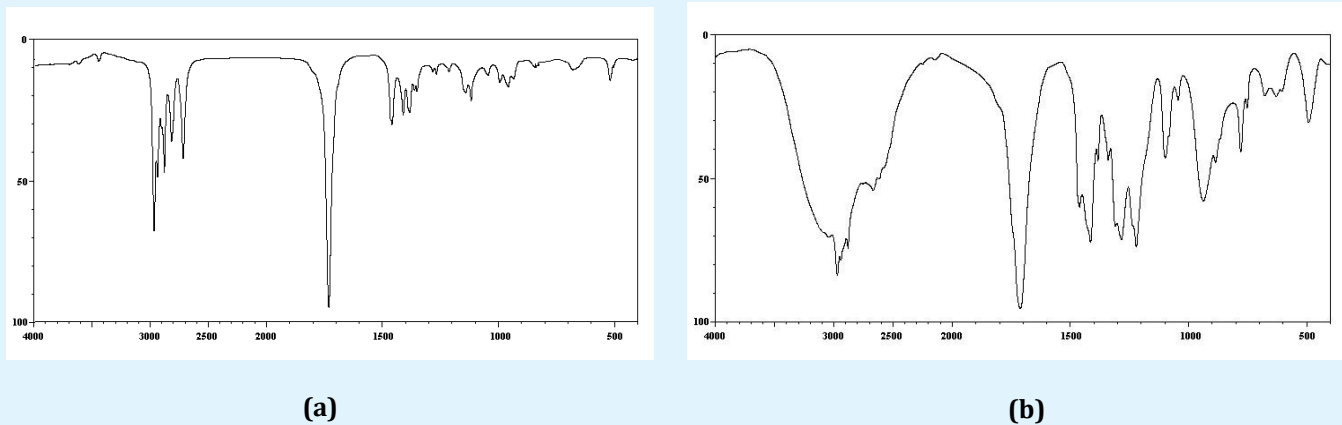


Figure 12: Mid-Infrared Spectroscopy (MIRS) analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

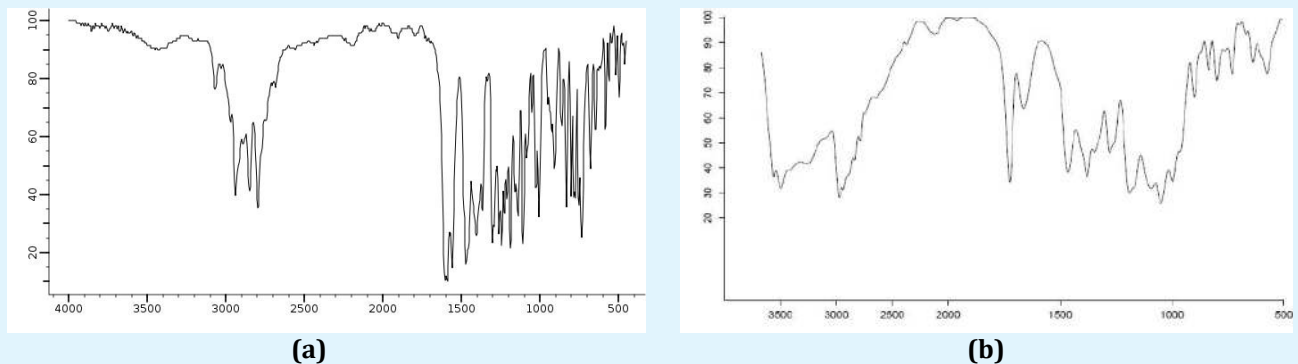


Figure 13: Nuclear Resonance Vibrational Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

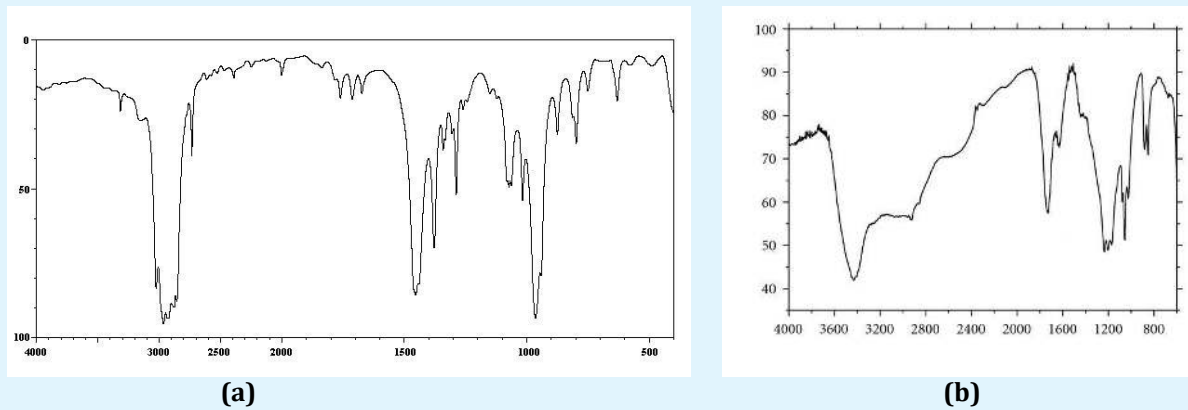


Figure 14: Thermal Infrared Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

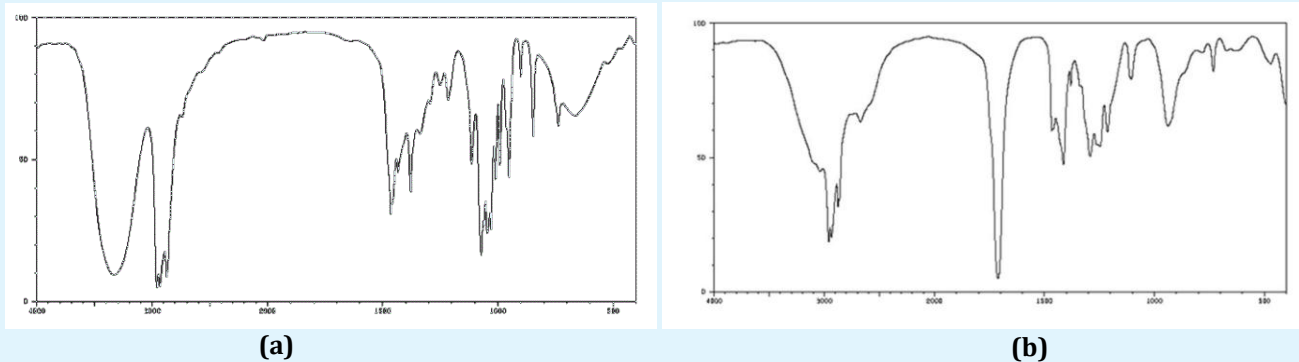


Figure 15: Photo thermal Infrared Spectroscopy analysis of malignant human cancer cells and tissues (a) before and (b) after irradiating of synchrotron radiation in transformation process to benign human cancer cells and tissues with the passage of time.

It can be concluded that malignant human cancer cells and tissues have gradually transformed to benign human cancer cells and tissues under synchrotron radiation with the passage of time.

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- Au144(SR)60, Au68(SR)36, Au30(SR)18, Au102(SPh)44, Au38(SPh)24, Au38(SC2H4Ph)24, Au21S(SAdm)15, Au36(pMBA)24 and Au25(pMBA)18 Nano Clusters. *J Surgery Emerg Med* 1: 21.
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