Molecular modification of irradiated serpent venom by FTIR

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Fourier transform infrared spectroscopy (FTIR) is a technique commonly used to identify molecular species of complex substances. Crotamine, a toxin from *Crotalus durissus terrificus* (Cdt), is a highly basic polypeptide (pI-10.3), with myotoxic activity and molecular weight of 4882 Da. It is composed of 42 amino acids residues and reticulated by three disulfide bonds. It is known that ionizing radiation effects - direct and indirect - can change the molecular structure, affecting the biological properties of the biomolecule. In this study ionizing radiation has been employed to attenuate animal toxins of venom. The objective of this study is to evaluate the crotamine molecular change after ionizing irradiation through its infrared bands.
We used size exclusion and ion-exchange chromatography to purify Cdt crude venom. The pure crotamine was irradiated with 2.0 kGy by a ^{60}Co source. Native and irradiated crotamine were analysed using FTIR ThermoNicolet 6700 spectrometer, USA, in 650 - 4000 cm^{-1} range, 4 cm^{-1} resolution and 120 scans.
For lyophilized venom, it was observed bands related to the protein β-sheets of amide I and amide II (1490 - 1730 cm^{-1}), the protein triple helix (810 - 900 cm^{-1}), the DNA vibration (1000 - 1115 cm^{-1}) and the phosphate (1220 - 1300 cm^{-1}). The spectra were normalized and the area under the bands calculated. After that, all data were subjected to statistical analysis at 5% significance level.
The FTIR spectra showed a slight decrease on DNA components and mutation band of proteins β-sheets of amide I and amide II. In conclusion, high intensity ionizing irradiation promoted changes mainly on organic contents of the venom.