DEGRADATION OF EXTRACTED DNA FROM HUMAN MALE SPERM CELLS BY UV RADIATIONS AND EXPOSURE TIME

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Deoxyribonucleic acid (DNA) degrades rapidly when exposed to the environmental factors such as free radicals, high temperature, relative humidity, and various intensities of radiations, etc. These studies were conducted to investigate the trend of DNA degradation when known amount of extracted human semen samples were exposed to UV-A, UV-B, and UV-C radiations for different time of exposure. Forensic techniques utilized included organic DNA extraction from human male sperm cells, human male DNA quantitation using Quantifiler®Y kit on ABI 7500 Real-Time PCR. Human male DNA was amplified by using AmpFlSTR®Yfiler® Kit as per manufacturer recommended protocol. Amplified products were electrophoretic separated by the ABI PRISM® 310 Genetic Analyzer through capillary electrophoresis. GeneMapper® ID v3.2.1 was used to analyze data with a peak height detection threshold of 100 relative fluorescence units. Genetic analysis of human male included monitoring the level of DNA degradation for 17 Y-Short Tandem Repeats (Y-STR) markers. The data collected from the samples exposed to solar radiation showed that after 100 minutes of exposure resulted in no viable DNA remaining. The data from UV-A (365 nm) exposure indicated no notable loss or damage of DNA up to 120 minutes. However, the human semen samples exposed to UV-C (254 nm) and UV-B (302 nm) radiations appeared to be inconclusive. This study can be helpful to establish the limitations of human identification utilizing Y-STR markers in sexual assault forensic cases.