

COMBINED EFFECT OF UVC AND SOIL ON DNA BLOODSTAIN QUALITY AND QUANTITY IN CRIME SCENE LIFESPAN ESTIMATION

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ABSTRACT

The principal aim of this thesis project was to study the combined effect of UVC and soil on DNA bloodstain quality and quantity in crime scene lifespan estimation. The concept was built on the natural environment of which forensic biological sample (DNA) are always found to be impacted with a number of environmental factors. To attain the targeted aim, the study was approached through a quasi-time series experimental design at biophysics and Human Genetic Lab, UNAIR in June 2018. 20 bloodstain enrolled were extracted by DNAzol. Spectrophotometry was then followed by electrophoresis at D21S11 and D16S539 primers & mini-primers for DNA quality and quantity after a combined UVC and soil effect on 1, 3, 5 day exposure time. Resulted findings demonstrated that, exposure time trend from day 1, 3 and 5, increased UVC with an initial dose of 6556.41 mJ/cm² in combination with Soil (200g). The impacted DNA concentration was twice after 3rd day from 681.1 to 1274.7 then to 1090.6 at 5th day with steadily purity decline from 1.4398 to 1.2379. The electrophoretic reaction was irresponsive with no band formation hence failed DNA molecule typing from day one of exposure. Statistically, the relationship between exposure time against DNA purity and concentration by $\alpha = 0.001$ (1%) was significant at P value less than 0.001 and P equal to 0.001 ($0.001 \leq 0.001$) respectively. Obtained correlation was calculated at 0.77 for DNA concentration and -0.850 for purity. Linearly, DNA purity depicted inverse relation coefficient of $R^2 = 0.723$. Then, the purity value estimated lifespan of viable DNA detection to maximum of 19 days post exposure. Conclusively, there is an influential effect between combined UVC and Soil effect on DNA bloodstain quality and quantity.

Keywords: Combined effect, Crime scene lifespan, DNA quality and quantity, Soil, UVC.