

Impact of decomposition on total carbon and total nitrogen content of soil beneath rabbit carcass

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Soil has its many attributes. These attributes offer the investigation for the police and environmental investigator on the crime scene and exhumation. Soil as a forensic evidence was pioneer work of Edmond Locar in 1910. Soil's morphological characters (color and minerals) were used for the forensic investigation earlier, now the techniques such as GC-MS, XRD, SEM-EDX, infrared spectroscopy, electron microscopy; XRF, elemental analysis etc. are playing an indispensable role in the forensic investigation. These techniques always support forensic science in the measurements of the physical and chemical properties of soil. For the forensic investigation of soil, experiment was conducted using rabbit carcass as research model, to estimate alteration in the total carbon and total nitrogen content of soil using various EL cube elemental analyzer. A rabbit carcass about 5 kg in weight was placed on soil surface in agricultural field, devoid of anthropogenic and other activities, during March 2016 with ambient temperature of $31\pm 2^{\circ}\text{C}$. Carcass took 9 days for complete decomposition and the process of decomposition is divided into five decomposition stages (fresh, bloated, active decay, dry decay and skeletal). Soil samples beneath the carcass were collected according to decomposition stages from top layer of soil i.e. 0 to 5 cm. Another soil sample taken from the same field was kept as control. In control soil sample, the total carbon, total nitrogen and C/N ratio was recorded as 1.67%, 0.25% and 6.80% respectively. In bloated stage of decomposition the total carbon, total nitrogen and C/N ratio was recorded as-1.63%, 0.21% and 7.71% respectively. In dry decay stage, total carbon, total nitrogen and C/N ratio was recorded as 2.0%, 0.34% and 5.96% respectively, whereas during active decay it was recorded as total carbon-3.29%, total nitrogen-0.46% and C/N ratio-7.18%. In skeletal stage these value were total carbon-2.719%, total nitrogen- 0.25% and C/N ratio- 6.80% respectively. Present study revealed that total carbon and nitrogen content were highest during active decay stage and lowest during bloated stage of decomposition, whereas the C/N ratio was recorded highest in the bloated stage and lowest in dry decay stage. The total C and N content in the active decay stage were high due to seepage of body fluids into the soil and these fluids had high content of proteins and hydrocarbons.

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