



Pathology Biology Section – 2011

G82 Decomposition in a Closed Vehicle Environment in Southern Ontario

Shari L. Forbes, PhD, Helene LeBlanc, PhD*, Katelynn Perrault, BSc, and Alicia Buetter, BSc, University of Ontario Institute of Technology, 2000 Simcoe Street North, Oshawa, ON L1H7K4, CANADA*

After attending this presentation, attendees will understand the importance of chemical and entomological evidence associated with decomposing remains concealed in a closed vehicle environment. This

presentation will impact the forensic community by providing new information regarding the decomposition process in a vehicle trunk in southern Ontario and providing more accurate estimates of time since death in this unique environment.

A body placed in a closed vehicle environment will undergo a distinctly different process and rate of decomposition than a body placed in an outdoor environment. A closed vehicle has the potential to significantly affect decomposition processes by reducing entomological access to the body, increasing ambient temperatures, and promoting desiccation and mummification of the remains. In Canada, there is currently no published literature which has studied the effect of a closed vehicle environment on entomological activity and the chemical processes which occur during soft tissue decomposition. This information would be valuable to forensic pathologists and coroners when estimating time since death in forensic investigations involving decomposed remains recovered from a vehicle.

The goal of this study was to investigate the chemical process of soft tissue decomposition and the entomological evidence associated with a body placed in the trunk of a vehicle. The study was conducted in the southern region of Ontario, Canada during the summer months of June and July. Two pig carcasses of similar biomass were used in the study. The experimental carcass was placed in the trunk of a dark-colored vehicle and sealed. The control carcass was placed on the soil surface approximately ten meters from the vehicle. A data logger was placed in the vehicle to record temperature and humidity. A weather station was placed near the control carcass to record ambient temperature, humidity, and rainfall. Soft tissue samples were collected from the upper and lower torso region of the carcasses. Entomological evidence was collected directly from the carcasses and from pitfall traps surrounding the carcasses. Samples were collected at regular intervals until the carcasses reached the skeletonization or dry remains stage.

Decomposed soft tissue was analyzed using gas chromatography-mass spectrometry to determine the lipid degradation process and resulting fatty acid content within the samples. Unsaturated and saturated long-chain fatty acids were identified at all stages of the decomposition process. Variations in the lipid degradation pathways were evident between the experimental and control carcasses. Adult and immature insects were collected from the carcasses in order to determine the succession throughout decomposition. An important delay of insect colonization was observed in the vehicle as well as a significant decrease in species composition.

Observational measurements confirmed that the decomposition process was distinctly different in the closed trunk of the vehicle when compared to the decomposition process on the soil surface. The chemical, entomological, and environmental data provided additional confirmation of the distinct process in which a decomposing body will undergo in a closed vehicle environment. This information will be valuable to law enforcement agencies and forensic pathologists and may aid in providing more accurate estimations of time since death.

Forensic Entomology, Decomposition Chemistry, Closed Vehicle Environment