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The Preservation Point at Which Peat Bogs Hinder Natural Decomposition in Organic Matter

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There are sphagnum peat bogs all around Northern Europe that have the ability to preserve organic matter. This is of forensic importance when the material being preserved could appear to be of evidentiary value i.e. a human body. The preservative properties of peat bogs are due to the Sphagnum (polysaccharides) that are present in the peat moss. When the moss slowly dies, it releases sphagnum which binds calcium and nitrogen (Alehouse-Green). This calcium and nitrogen inhibition turns the skin deep brown and dyes the hair red as well as the bones become soft and deformed. One of the most popular preserved bog bodies is named 'The Tollund Man' and was found in Northern Denmark in 1950. He was found with a noose around his neck which led law enforcement to believe the manner of death was homicide. After extensive research, it was found he actually lived during 4th century BC but because of the preservative agents in the peat bog, the decomposition was hindered (Alehouse-Green).

This research attempted to find an exact timeline of the decomposition stages in bog environments and tried to detect if any specific environmental variables contributed to the preservation. The main bog environment was set up in a large chest freezer and included water, lignin, sulfuric acid, and organic sphagnum peat moss. The goal was to mimic the conditions of a real peat bog, therefore the temperature was set at 4 degrees Celsius, the pH was around 3.5, and the oxygen level was the lowest it could possibly be which was achieved by boiling the water before use. There were three smaller bog environments created which included a higher acidic bog where the pH level was around 2.0, a room temperature environment, and a vacuum chamber environment. There was also a control environment set up using boiled deionized water which was held at 4 degrees Celsius. Gray squirrel carcasses, *Sciurus carolinensis*, were placed in each environment and were evaluated on a weekly basis for any changes.

The squirrel carcass that was placed into the room temperature bog environment started bloating within the first few days. After 3 weeks, the skin was dissolving and the decomposition levels were extreme. This led to the assumption that the low temperature of the bogs is one of the main factors that contributes to the preservation of the matter. The squirrel carcasses that were placed into the main bog environment showed no early signs of decomposition and were preserving as expected. The carcass in the vacuum chamber and the high acid environment mostly showed no signs of decomposition throughout the course of this project.

References

Alehouse-Green, Miranda. *Bog Bodies Uncovered: Solving Europe's Ancient Mystery*. Thames & Hudson, 2015.