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Examining the Effects of Corrosive Household Chemicals on Bone and Tissue

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ABSTRACT
In popular media, criminals attempt to dispose of their victims by using various chemicals to dissolve the corpses. This research investigates the effects of household chemicals on the degradation of bone. Vertebrae from a domestic pig (Sus scrofa domesticus) will be immersed into five corrosive agents: drain-cleaner, lye, bleach, oven-cleaner, and cola. Tap water will serve as the control. Color, size, and weight of bones will be documented over time. I expect drain-cleaner, lye, and oven-cleaner to thoroughly degrade the bone, cola to cause mild degradation, and bleach and tap water to produce the least degradation.

INTRODUCTION
The ways in which perpetrators attempt to dispose of their victims range from carefully leaving the corpse in a shallow grave to total annihilation of the body through fire or even chemical means. Mexican-American drug cartels have been known to dispose of their victim's bodies by placing the corpses in containers and adding strong chemicals such as acids or lye to try to completely dissolve the bodies (Palmer, 2009). Even in popular media, such as books, movies, and television, disposal of bodies via the use of strong chemicals is a prevalent method. For example, in the second episode of the show Breaking Bad, the main characters attempt to dispose of a body using a bathtub and hydrofluoric acid. Unfortunately for the characters, the acid is so strong, it destroys the corpse, as well as the bathtub, the floor supporting the tub, and the floor below (Hilmesmente, 2008).
With all this media supporting the use of chemicals as a means of body disposal, I wondered just how accurate the information was. I decided to research a variety of corrosive, easily available household chemicals and test how well each one would destroy bone and soft tissue in a short period of time (24 hours). I chose to work with carbonated soda, bleach, sodium hydroxide, potassium hydroxide, and sulfuric acid. I briefly considered using hydrofluoric acid, but even splashing a small amount onto your skin can cause serious burns and death (24 hours). I chose to work with carbonated soda, bleach, sodium hydroxide, potassium hydroxide, and sulfuric acid.

MATERIALS
In a review of the literature, studies indicated that hydrofluoric acid is very effective in destroying soft tissue and bone. Sulfuric acid was considered the second most corrosive chemical (Barrett, Fulginiti, and Di Medica, 2011). Sodium hydroxide and potassium hydroxide are often employed by assassins as means of body disposal. One criminal, Adolph Luftgut, disposed of his wife's body by placing it into a boiling vat of lye in 1897, and then burned what was left (Palmer, 2009). Based on my findings and the availability to readily purchase the chemicals, I decided to conduct my experiment using the following: Carbonated soda, Bleach, Potassium Hydroxide, Sodium Hydroxide, Sulfuric Acid, and Water (as a control). I then conducted research on the MSDS (Material Safety Data Sheets) for each chemical to make sure I was taking the proper safety precautions (3: Company, 2012). I gathered supplies and materials, some of which I had at home and some purchased.

METHODS
I cut the pig vertebrae into pieces, trying to make them as similar in size as possible, leaving the flesh intact. Each specimen measured between 5-6" in length, 2.5-4" in width, and 1-2" in height. I washed, rinsed, dried, and labeled the buckets. I then measured each piece of vertebrae and recorded the height, width, and length of each specimen. I also took pictures and noted visual appearance. I placed each specimen into a labeled bucket and, making a note of the time, I added each corresponding chemical and placed the buckets in separate safe locations outdoors. I photographed the specimens in the chemicals and covered the buckets with poly sheeting.

RESULTS
Specimen 1: H2O (Control)
I then measured each piece of vertebrae and recorded the height, width, and length of each specimen. I also took pictures and noted visual appearance. I placed each specimen into a labeled bucket and, making a note of the time, I added each corresponding chemical and placed the buckets in separate safe locations outdoors. I photographed the specimens in the chemicals and covered the buckets with poly sheeting.

Specimen 2: Carbonated Soda

Specimen 3: Bleach

Specimen 4: Potassium Hydroxide

Specimen 5: Sodium Hydroxide

Specimen 6: Sulfuric Acid

CONCLUSIONS
The overall results of this experiment verified my hypothesis. Specimen 1 in the H2O (control) fell 3.5-5.5 inches in height, 2.5-4.5 inches in width, and 1-2 inches in length. Specimens 2 in the carbonated soda and 3 in bleach were visibly degraded. Specimen 4 in potassium hydroxide (figures 24-30) showed an almost complete mass weight gain. Specimen 5 in sodium hydroxide (figures 31-37) showed a slight decrease in height and close to half of the specimen was visibly degraded. Given another 48 hours, I believe the entire specimen would have completely eroded.

The results indicate that some chemicals may be used effectively by criminals to dispose of a body. The sulfuric acid is particularly potent. Because of its availability to the public, it is possible that criminals will continue to dispose of their victims with this easily attainable chemical. Law enforcement and legislative groups should consider requiring identification in order to purchase this dangerous substance to help track these dangerous criminals.

REFERENCES