Decomposition of Animal Bodies

Decomposition of a corpse:

A continuous process that depends on the environment and spans from a week to years.

Using a pig as an example for decomposition:

Stages:

Stage 1: Live Pig

A live pig has microorganisms like protozoa and bacteria, which later contribute in the decomposition of its body.

Stage 2: Initial decay - 0 to 3 days after death

The cells rupture to release bacteria in the acidic environment created by carbon dioxide. The aforementioned bacteria, feeds on the intestine, then along with the digestive enzymes, begins to digest the internal organs. After the cells die, their enzymes break the connections between other cells. The bacteria and enzymes break out and consume the body's internal organs.

Likewise, houseflies and blowflies are attracted to the corpse. They lay eggs around the openings of the body. Their life cycle takes place in the corpse, it is affected by low temperature (slows down).

Immediately after the heart stops, blood stops flowing and pools in the lower portions of the body, contributing to a bruised appearance. This is called *livor mortis*.

Between 3 to 6 hours after the heart stops, ATP runs out. It causes myosin to be locked in the muscles, causing the muscle to be 'locked' in place. This is called *rigor mortis*. It happens 2 hours after death until 36 to 48 hours. Small blisters filled with fluid appear on internal organs and the skin's surface. The body will appear to have a sheen due to ruptured blisters, and the skin's top layer will begin to loosen.

Also from the time the heart stops, the body starts to cool at a rate of about 1.5 degrees per hour until it reaches the environmental temperature. This is called *algor mortis*. Without any oxygen intake, the carbon dioxide and water combine to form carbonic acid, which causes tissue to be destroyed.

Stage 3: Putrefaction - 4 to 10 days after death

The bacteria breaks down tissues and cells, this causes fluid to be released. They respire anaerobically, and release gases like hydrogen sulfide, methane, etc. These gases have the foul odor that makes corpses smell, but they attract insects. They also cause the body to inflate due to pressure, and the fluids are released into the body cavity. The smell is predominantly caused by Putrescine, or tetramethylenediamine, and Cadaverine or 1,5-pentanediaminethe. These chemicals are produced when amino acids in the body breakdown as part of autolysis.

The maggots then move throughout the body as a group, they spread bacteria, digestive enzymes and tear tissue. More insects like blowflies, flesh flies, beetles, mites and parasitoid wasps are attracted to the body. They feed on maggots, feed on decaying flesh and even carry out their life cycles.

Stage 4: Black putrefaction - 10 to 20 days after death

The body collapses as a whole. Its flesh gets a creamy consistency, the exposed parts are black in color and has a very strong odor. The fluids then goes into the surrounding soil, from which other insects feed. The insects and bacteria consume the flesh and eventually, the body. With several maggots and insects, many life cycles of different insects take place. They form a predator-prey relationship.

Most of the body mass is lost in this stage.

Stage 5: Butyric fermentation - 20 to 50 days after death

After all the flesh is consumed, the body dries out. It then has a cheesy smell, caused by butyric acid, attraction more organisms. As the body ferments, the part of the body in the ground gets covered with mold. The environment surrounding the body will show increase in soil nutrients such as phosphorous, potassium, calcium, magnesium, and nitrogen.

At this point, beetles begin feeding on the skin and ligaments. The cheese fly feeds on any remaining moist flesh.

Stage 6: Dry decay - 50-365 days after death

The body becomes dry, this causes the process to slow down. The hair disappears as organisms like tineid moths and bacteria feed on it, and only the dry skin, cartilage, and bones remain.

<u>Factors Affecting the Rate of Decomposition</u>

1. Heat
2. Rainfall
3. Location of Death
4. Availability of Insects
5. Acidity of Soil

Source: the Australian Musuem

https://www.chem.fsu.edu/chemlab/chm1020c/Lecture%208/03.php

https://www.georgiaclean.com/the-stages-of-human-decomposition/

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