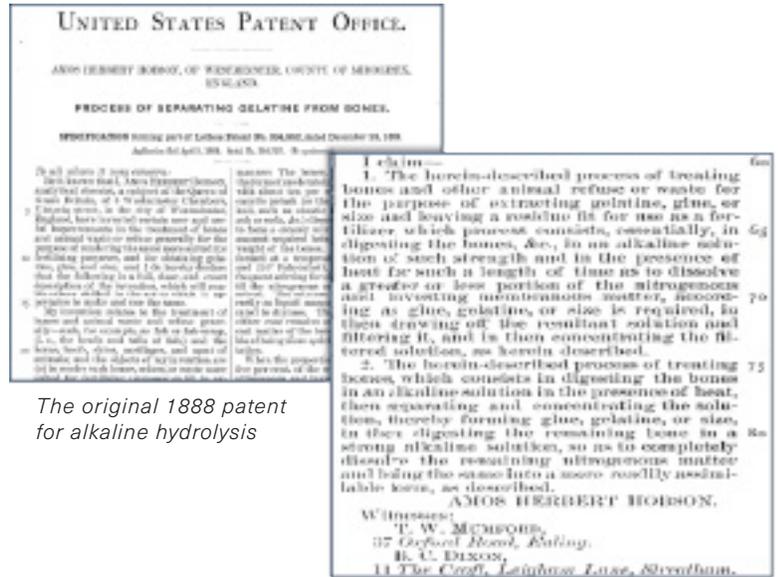


What is alkaline hydrolysis?

Alkaline hydrolysis was originally patented in the United States Patent Office by Amos Herbert Hobson of Middlesex, England. His patent No. 394,982 was issued on December 25, 1888.

While Amos was concentrating on the removal of nitrogenous materials from the bones to make a suitable fertilizer and by-products, he saw the benefits of alkaline hydrolysis as a process to treat animal carcass materials.

In the mid-1990's, doctors brought the process into the 21st century. Confronted with the expensive disposal of animals that was used in radioactive research, Dr. Gordon Kaye, professor of Pathology and Laboratory Medicine at Albany Medical College and his colleague, Dr. Peter Weber, Professor of Biochemistry and Molecular Biology, theorized that alkaline hydrolysis could separate the radioisotopes into the liquid fraction - completely removed from the bone remnants. With this, the modern tissue digester was born.



The original 1888 patent for alkaline hydrolysis

Today, tissue digesters are in use all over the world in leading hospitals and research laboratories. The first unit was placed in Albany Medical College. Shands Hospital at the University of Florida (Florida State Anatomical Board) purchased the first commercial system for the disposition of human remains donated for medical research. Units were sold to SmithKline Beecham in Rennes, France and Collegeville, Pennsylvania as well as a large unit (3,000 pound capacity) sold to University of Florida Vet Diagnostic Lab. All of the original units are still in use today.

Overview

Alkaline hydrolysis (AH) is an alternative to flame-based cremation and burial. The process uses heat and a solution of 95% water and 5% alkali (Potassium Hydroxide) to reduce all organic material, leaving only the skeletal remains.

Human bodies donated to medical science have been processed by Alkaline Hydrolysis in renowned research institutions:

- Shands Hospital at the University of Florida - 1995 as part of their willied body program
- Mayo Clinic in Rochester, Minnesota - 2006 for their donated body program
- UCLA in Los Angeles California - 2012 for donated body program



How does it work?

To begin the process for human disposition, the deceased is placed into a stainless steel vessel to which an alkali solution is added. The process works by slowly circulating a heated solution of 95% water and 5% alkali around the body for an extended period of time. Alkaline hydrolysis is a proven sterilization technology in which all pathogens are destroyed, as well as all chemotherapy and embalming agents (if present in the body). Any mercury in the amalgam of the teeth (from dental fillings) is not vaporized through this process like it is with flame cremation. These dental fillings remain unaltered and are safely recycled to prevent release to the environment.

All that remains at the end of the process are the final bone remains and any medical implants. The medical implants are clean and ready for recycling. Just as with flame-cremation, the final bone remains are processed into a fine powdered ash for return to the family in an urn.



Quick Facts

- A recent published, peer-reviewed study concluded that alkaline hydrolysis had the least environmental impact of current funeral technologies by a large margin. (1)
- There are no direct emissions of harmful greenhouse gasses from this process. (1,2)
- The process offers up to 90% energy savings when compared to flame-based cremation. (1,2)
- The carbon footprint is significantly less than the carbon footprint of traditional flame cremation or burial. (1,2)
- Alkaline hydrolysis is the preferred method of sterilization for pathogenic biological waste.

1. Keijzer, Elisabeth. "The Environmental Impact of Activities after Life: Life Cycle Assessment of Funerals." *The International Journal of Life Cycle Assessment*, vol. 22, no. 5, 2017, pp. 715–730.

2. Olson, Philip R. "Flush and Bone." *Science, Technology & Human Values*, vol. 39, no. 5, 2014, pp. 666–693.

Fire cremation versus aquamation / alkaline hydrolysis: aquamation is a term that has been widely adopted for the scientific process known as alkaline hydrolysis. It is essentially an accelerated version of what takes place in natural decomposition. In a sense, it is the opposite of burning by fire. Burning is an oxidative process where alkaline hydrolysis is a reductive process.

Where is it approved?

- **Canada:** Saskatchewan, Ontario, Quebec, Newfoundland/Labrador and the Northwest Territories
- **United States:** over 19 states with many more pending approval
- **Globally:** Mexico, South Africa, Australia, Puerto Rico, Netherlands, UK to name a few

