

METHODS AND TECHNIQUES OF ANIMAL MUMMIFICATION IN ANCIENT EGYPT

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Abstract

Mummification stands as one of the most defining characteristics of ancient Egyptian civilization, intrinsically tied to the notion of eternity and the preservation of the body as a suitable vessel for the soul's return in the afterlife—a belief deeply rooted in the worldview of the ancient Egyptians. This emphasis on preservation and renewal reflected not only their metaphysical understanding of existence beyond death but also their perception of continuity within earthly life. Although human mummification attracted the greatest focus, the Egyptians also extended this practice to animals, which occupied a central role in their religious beliefs and ritual practices.

Certain animals were venerated as earthly manifestations of sacred deities: cats were associated with the goddess Bastet, falcons with the god Horus, the ibis with the god Thoth, and bulls with the god Apis. Other animals, however, were offered as votive sacrifices in temples as part of devotional rituals.

The study of methods and techniques of animal mummification sheds light on an essential dimension of ancient Egyptian religious, economic, and social thought. Mummification was not merely a spiritual rite; it was also an organized profession involving workshops and temples dedicated to the craft. This institutionalization endowed the practice with technical and cultural significance that merits further scholarly investigation.

This research is structured around four main themes. The first provides a definition of mummification and the concept of the mummy; the second examines the methods and techniques of animal mummification in ancient Egypt; the third addresses the subject of animal mummies in the ancient Egyptian context; and finally, the fourth discusses the tools and materials used in the embalming process.

Keywords: Methods and techniques of mummification, Animal mummies, Tools and materials used in embalming

Introduction:

Among the defining characteristics of ancient Egyptian civilization, mummification stands out as one of its most remarkable and enduring practices. Far more than a mere method of bodily preservation, mummification was deeply intertwined with the Egyptian conception of life, death, and immortality. The process reflected a fundamental belief in the soul's journey beyond death and the necessity of maintaining the body as a suitable vessel for the spirit's eventual return in the afterlife.¹ This understanding of preservation and renewal permeated not only their metaphysical worldview but also their perceptions of continuity and regeneration in the material world.

While the mummification of human beings has long captured the attention of historians and archaeologists, the ancient Egyptians also extended this practice to animals—a reflection of the profound role animals played within their religious and cultural systems. Certain species were venerated as earthly manifestations of deities: cats symbolized the goddess Bastet, falcons represented Horus, ibises embodied Thoth, and bulls were revered as incarnations of Apis². At the same time, other animals were prepared as votive offerings in temples, embodying acts of devotion intended to secure divine favor. The study of animal mummification thus provides crucial insight into the religious symbolism, social organization, and economic structures that shaped ancient Egyptian life.

Animal mummification was not solely a spiritual act but also a highly specialized craft. Workshops and temple complexes were dedicated to the process, reflecting a systematic and technically sophisticated industry³. This organization points to the existence of well-trained embalmers, networks of material procurement, and standardized procedures, many of which have been confirmed through modern archaeological and biochemical analyses. The materials employed—ranging from locally sourced resins and linen to imported bitumen and oils—demonstrate not only the Egyptians' advanced technological capabilities but also their connections with neighboring regions through trade and cultural exchange⁴.

This research explores the practice of animal mummification in ancient Egypt through four main axes. The first defines the concept of mummification and its religious underpinnings. The second examines the methods and techniques employed in the mummification of animals. The third considers the symbolic and ritual significance of animal mummies within the broader Egyptian worldview. Finally, the fourth discusses the tools and materials used in the embalming process. Through this multidimensional analysis, the study seeks to illuminate the complex intersection of religion, technology, and economy that underpinned this distinctive practice.

Ultimately, the phenomenon of animal mummification reveals the depth of ancient Egyptian religious thought and the central role animals occupied within it. It highlights not only spiritual devotion but also a highly organized craft industry sustained across centuries. Continued interdisciplinary research—combining archaeological evidence, textual interpretation, and modern scientific methods—promises to deepen our understanding of how this intricate practice reflected and reinforced the Egyptian vision of eternal life.

First: Definition of Mummification

Mummification is defined as a method of preserving the body from decay and deterioration, with the preserved body referred to as a *mummy*. One of the earliest terms associated with the science of body preservation in ancient Egypt was the word (*wt*) or (*wty*), which meant “wrapping,” referring to the act of covering the body with linen bandages—considered the first stage of the mummification process.

The most widely recognized term, however, is the Arabic word *tahniṭ* (mummification), derived from *hanūṭ*, which referred to aromatic preservative substances used by Arab embalmers to anoint both the bier and the corpse. Such substances included amber, musk, and camphor. From the word *hanūṭ* was also derived the term *ḥanūṭī*, denoting the individual who carried out the embalming process.¹

In general, the process of mummification commenced immediately after death. The embalmers were summoned to the deceased's house, where they placed the body on a table before taking it to their master. The place in which mummification was performed was a tent known as the “Place of Purification” (*Makan al-Tathir*) or the “Good House” (*al-Manzil al-Tayyib*). The procedures of embalming generally lasted for about seventy days (70 days). According to the belief of the ancient

¹ Saleh, Ahmed. *Mummification: The Philosophy of Immortality in Ancient Egypt*. Hor Cultural Society Press, Egypt, 2000, p. 17

Egyptians, the first being to undergo the process of mummification² was the god Osiris (*Usir*)³. The earliest confirmed evidence of mummification dates to the Fourth Dynasty (3649–2513 BCE), when an alabaster chest containing the viscera of Queen Hetepheres, the mother of King Khufu, was discovered. The body had been immersed in a natron solution. This funerary ritual was practiced primarily by the royal family of the pharaohs, the priesthood, high officials, and the wealthy elite. The practice was not embraced by the poorer classes until a later period, when they became familiar with simpler and less costly methods more suited to their circumstances⁴.

Recognizing the sanctity of animals within their worldview, the ancient Egyptians sought to safeguard and preserve them in much the same way as they did humans. This veneration stemmed from deeply held religious convictions, wherein animals were regarded as living manifestations of the creator god. By honoring these tangible embodiments of the divine, the Egyptians sought a closer connection to the sacred.⁵

Second: Methods and Techniques of Animal Mummification

The majority of animals were embalmed using methods comparable to those applied to humans, though certain species required specialized procedures tailored to their anatomical features in order to ensure the effectiveness of the mummification process.

The body was desiccated by removing its fluids to inhibit bacterial growth and prevent decomposition. The viscera were extracted through an incision in the abdominal wall; at times, they were discarded without preservation, while in other cases they were treated and reinserted into the abdominal cavity, particularly in food animals. To date, canopic jars have been discovered only for sacred calves. Larger animals, however, were embalmed like humans: the brain was extracted either by removing the cervical atlas vertebra or through the nasal passage. The duration

² Černý, Jaroslav. *Ancient Egyptian Religion*. Translated by Ahmed Qadri. Dar al-Shorouk Press, Cairo, 1996, p. 143.

³ Definition of the God Osiris (Osiris): One of the most revered and renowned deities of ancient Egypt, Osiris was the god of resurrection, life after death, and ruler of the netherworld (*Duat*) in Egyptian mythology. Considered a legendary king who reigned over Egypt in its earliest times, he brought civilization, agriculture, and justice to humankind. However, he was slain by his brother Seth, the god of chaos and desert. His wife Isis, together with his sister Nephthys and aided by the god Thoth, reassembled his dismembered body and restored him to life, whereupon he became lord of the dead and a symbol of eternal rebirth. Osiris was typically depicted as a mummy-like figure, wearing the Atef crown (the white crown of Upper Egypt flanked by two ostrich feathers), and holding the crook and flail as symbols of royal authority. His cult spread widely from an early period, with Abydos serving as his sacred burial site. Annual festivals (the “Osiris Mysteries”) reenacted his death and resurrection. For further details see: Adib, Samir. *Encyclopedia of Ancient Egyptian Civilization*. Al-Arabi Publishing and Distribution, Cairo, 2000, p. 209 ff.

⁴ Mehran, Mohammed Bayoumi. *Ancient Egyptian Civilization (Literature and Sciences)*. Dar al-Ma'rifa al-Jami'iyya Press, Alexandria, 1989, Vol. 1, p. 447.

⁵ Al-Agha, Wisam and Sanaa Hassan Younis. “The Motives for Animal Mummification in Ancient Egypt.” *Turath al-Rafidain Journal*, University of Mosul – College of Heritage, Vol. 6, No. 1, 2021, p. 215.

of mummification depended on the size of the animal, with the Apis bull being embalmed almost identically to humans.⁶

The mummification of sacred animals was carried out in three principal stages, following a sequential process. **In the first stage**, the officiating priest injected the animal with cedar oil through the rectum. **In the second stage**, the body was desiccated while still containing the oil. **In the third stage**, the oil was withdrawn after the drying period had ended, after which the body was salted with natron and wrapped in linen bandages. On occasion, a funerary mask was also placed upon the mummified animal, and it was interred within a coffin in a manner resembling human burials.⁷

Birds, on the other hand, were preserved by being immersed in boiling resin or bitumen before being wrapped in linen bandages. The mummies were then enveloped in further layers of linen that contained protective amulets, accompanied by the recitation of incantations and spells. Frequently, the outermost layer of wrappings was executed with great precision and artistry, particularly during the early Roman period (30 BCE–641 CE).⁸

In the final stage, the mummy was placed within a container. Unlike sacred animals, which were buried with splendor—covered with finely crafted masks, surrounded by amulets, and laid in coffins, with some of their viscera preserved in canopic jars—pet animals were interred in special coffins. Animals offered as votive sacrifices, along with certain food animals, were placed in a variety of receptacles, including wooden, stone, or ceramic coffins, cartonnage casings, or even baskets made of reeds, rushes, or papyrus, and at times without any container at all.⁹

Certain species of fish were also mummified, most notably the Nile perch (known as *Lates*), which gave its name to the city of Latopolis (modern Esna). Several kilometers west of the city, a vast necropolis of Nile perch was uncovered, containing innumerable specimens of all sizes in a remarkably well-preserved state. At Saqqara, a small, mummified fish was discovered placed within its wooden coffin, measuring only 10 cm in length.¹⁰

Once mummified, animals were laid to rest in tombs specifically dedicated to them, where funerary rituals were conducted in much the same way as those for humans. In Egypt, numerous necropoleis devoted to animals have been discovered, such as the cemeteries of rams in Aswan. In the area of Tuna al-Gebel, near Minya, archaeologists have uncovered hundreds of catacombs containing mummified monkeys and birds, particularly ibises, symbolizing the god Thoth, the deity of wisdom and knowledge. Excavations have also revealed subterranean galleries hewn into the rock, extending for several kilometers, that were dedicated to the burial of monkeys and ibises as part of the cult of Thoth.¹¹

Third: Animal Mummies

There are four categories of animal mummies

⁶ Badr, Saleh. *Pharaonic Egypt and the Life Sciences*. Academic Library, Cairo, 2005, p. 70.

⁷ Saleh, *Mummification: The Philosophy...*, p. 81.

⁸ Badr, *Pharaonic Egypt...*, p. 71.

⁹ Badr, *Pharaonic Egypt...*, p. 71.

¹⁰ Lichtenberg, Roger, and Françoise Dunand. *Egyptian Mummies: From Death to Immortality*. Translated by Maher Juwihati. Dar al-Fikr for Studies, Publishing, and Distribution, Cairo, 1997, Vol. 1, p. 109.

¹¹ Al-Agha, *The Motives for Animal Mummification...*, p. 215.

1. The first of which comprises *pets buried alongside their owners*. These animals were reared to assist and protect humans, and among the most significant were dogs (often associated with the jackal), cats, and monkeys¹². Such pets were interred either within the coffin of their owner or in a separate coffin placed in the same tomb. If the animal died during the lifetime of its owner, it was mummified and preserved until the owner's death; conversely, if it died after its owner, it was likewise mummified and buried in the same tomb. Some pets were afforded sumptuous burials, placed in elaborately inscribed coffins, and even offered funerary offerings.¹³
2. **Food Animal Mummies:** These were animal mummies intended to provide sustenance for the tomb owner in the afterlife. All examples of such mummies discovered to date originate from the necropoleis of Thebes (modern-day Luxor). They typically consisted of portions of animal limbs containing meat, or of whole birds, carefully wrapped in linen bandages. Most were placed within small sycamore-wood coffins fashioned in the shape of the meat joint or the bird itself. In some cases, slices of meat appear as though they had been cooked, since the skin was removed and the joints carefully dissected¹⁴.
3. **Sacred Animal Mummies:** The mummification of sacred animals was a natural practice, as these creatures were regarded as living manifestations of deities and thus imbued with sanctity. Archaeologists have uncovered hundreds of thousands of such mummies. It appears that most of these animals were bred within temple precincts, later ritually slaughtered, mummified, and sold to pilgrims as votive offerings to the gods. The mummies were then stored in vast subterranean galleries (catacombs)¹⁵. By contrast, animals revered as divine incarnations during their lifetimes were interred with great pomp upon their death and treated with honors comparable to those accorded to kings. Notable examples include the Apis bull, the Mnevis bull, the Buchis bull, and the ram of Mendes.¹⁶

One of the early scholars provides us with fascinating information concerning the rearing of sacred animals and the rituals surrounding their burial, as conveyed in the following text:

“Each species of sacred animal was allocated land sufficient to generate the income necessary for its care and provision of food. When one of these animals died, it was wrapped in fine linen, while mourners struck their chests in lamentation. The body was then transported to the place of mummification, where it was treated with resin, cedar oil, and aromatic substances intended to ensure long-lasting preservation. Finally, it was interred within consecrated coffins.¹⁷

4. **Votive and Offering Animal Mummies:** These were animals consecrated as offerings to specific deities and buried within subterranean galleries or crypts (catacombs) attached to temples. Their function may be likened to that of candles lit in churches today. These animals were not left to die naturally; some were deliberately killed before mummification—by breaking their spines or necks, or by crushing their skulls. Examples

¹² Al-Agha, *The Motives for Animal Mummification...*, p. 216.

¹³ Badr, *Pharaonic Egypt...*, p. 68.

¹⁴ Badr, *Pharaonic Egypt...*, p. 68.

¹⁵ Lichtenberg et al., *Egyptian Mummies...*, Vol. 1, p. 108.

¹⁶ Badr, *Pharaonic Egypt...*, p. 70.

¹⁷ Lichtenberg et al., *Egyptian Mummies...*, Vol. 1, p. 108.

include cats, ibises, and birds of prey. Some scholars believe that certain birds were killed by immersion in hot resin, boiling pitch, or poisoning.¹⁸

The eldest son was traditionally responsible for presenting the funerary offering to his father, a practice regarded as the highest model of filial piety and devotion. However, the son was not the sole participant in this duty. Evidence indicates that the king himself was actively involved in presenting offerings to the deceased from very early times, for the pharaoh was considered the supreme authority over all offerings. As king of all things, he was the axis and foundation of Egyptian life.

The offering formula—‘an offering given by Anubis,’ the god of embalming who presided over the realm of the dead—reinforces this idea. Anubis was entrusted with sustaining those under his protection, mirroring the reciprocal relationship between master and servant, in which the master’s foremost duty was to provide sustenance to his dependents in return for their service.¹⁹

In addition to the four categories of animal mummies mentioned above, additional examples housed in the Graeco-Roman Museum reveal an exceptional level of craftsmanship in their external wrappings. Their shrouds were arranged in strips woven into intricate geometric patterns, a feature particularly evident in the case of mummified birds and animals. Subsequent CT scanning, however, revealed that many of these were in fact *false animal mummies*, containing no actual mummified remains within. Among such specimens are examples of the ibis—symbol of the god Thoth—and a mummified fish (see Fig. 1).²⁰

Fourth: The Tools and Materials Used in Mummification

The embalmers employed a variety of substances and medicinal compounds in mummification to protect the body from decay and decomposition. This is confirmed both by chemical analyses conducted on mummified remains and by the accounts of ancient historians, notably Herodotus (485–425 BCE), who visited Egypt around 445 BCE, and later Diodorus Siculus, who traveled to Egypt approximately four centuries after Herodotus.²¹

The instruments of mummification included the following:

- A mummification brush made from palm fronds, measuring 10 cm in length.
- Bronze scissors, 6.8 cm in length.
- A pair of tweezers, 7.5 cm in length.
- Two awls, one with a wooden handle and the other without.
- A bronze needle threaded with linen.
- A bronze chisel.
- A bronze forceps with a locking mechanism, dating to the Roman period.
- A bronze spatula, 13.5 cm in length.

¹⁸ Badr, *Pharaonic Egypt...*, p. 70.

¹⁹ Al-Khatib, Mohammed. *Egypt in the Time of the Pharaohs*. Dar ‘Ala’ al-Din Publishing, Damascus, 2001, p. 109.

²⁰ Al-Mirghani, Samia, and Yahya Osman Mahmoud. “The Use of Modern Techniques in Identifying Mummification Materials.” *Journal of Arts and Humanities*, Minia University, Egypt, Vol. 3, No. 6, 2020, p. 67.

²¹ Al-Salmani, Jamal Nada Saleh. “Mummification in Ancient Egypt: Why and How.” *Journal of the College of Arts*, University of Baghdad, No. 104, 2013, p. 308.

- A bronze spoon.
- Two scalpels, one measuring 17 cm and the other 14.7 cm in length

Most of these instruments, as observed, were made of bronze, except for the mummification brush, which was woven from palm fronds. Their association with the practice of embalming is strongly supported by the fact that they were found among embalming debris both within and outside tombs (see Fig. 2).²²

As for the materials and substances employed in mummification, these included:

- **Water:** Used by the embalmer as a purifying agent for two purposes. The first was symbolic, representing rebirth; the second was practical, serving to cleanse the body of impurities and dirt.²³
- **Natron (salt):** A substance composed primarily of sodium bicarbonate, usually in an impure form²⁴. The term *natron* was derived from the ancient Egyptian word *ntr*, meaning “divine” or “sacred,” a reference to the sanctity of salt in the life of the ancient Egyptians. Over time, the word evolved phonetically into *benr* and *natr*, eventually becoming *natron*. Archaeological evidence of natron has been found in jars and containers within tombs, as well as on bodies and wrappings themselves. Its principal sources were three key regions: Wadi al-Natrun, the vicinity of Edfu, and Nekrash in the Delta. The Egyptians recognized natron as an essential agent for desiccating corpses, both internally and externally, and had already become familiar with its use by the Fourth Dynasty.²⁵
- **Aromatic Substances (Resins):** These fragrant materials contained astringent compounds and aldehydes (such as cinnamic aldehyde), as well as volatile oils. Their primary function was to repel insects and suppress unpleasant odors. A variety of such substances were employed, including bark from the cinnamon tree, myrrh, frankincense, resin from the mastic tree, and aromatic wood shavings.²⁶
- **Bitumen (Pitch):** This refers to natural asphalt, a substance not native to Egypt but imported, according to Greek, Roman, and some Arab authors, from the Levant—particularly from Palestine and the Dead Sea—as well as from Babylonia. Bitumen came into evident use from the Twenty-First Dynasty onward, when it was employed to fill the cavities of human and animal bodies. Its preservative properties made it highly effective in preventing decomposition and putrefaction.²⁷
- **Gum-based substances:** These comprised two types. The first was resinous gum, a natural emulsion extracted from pine trees²⁸ in the form of thick oil. It was employed in binding the papyrus rolls used to wrap corpses or mummies. This material was also obtained from several other tree species, including the acacia tree, which grew abundantly in Egypt,

²² Saleh, *Mummification: The Philosophy of Immortality...*, p. 55.

²³ Saleh, *Mummification: The Philosophy of Immortality...*, p. 62.

²⁴ Al-Salmani, *Mummification in Ancient Egypt...*, p. 309.

²⁵ Saleh, *Mummification: The Philosophy of Immortality...*, p. 62.

²⁶ Saleh, *Mummification: The Philosophy of Immortality...*, p. 62.

²⁷ Al-Khatib, *Egypt in the Time of the Pharaohs...*, p. 185.

²⁸ Saleh, *Mummification: The Philosophy of Immortality...*, p. 63.

indicating that its production was local²⁹. The second type was beeswax, which was used to seal the bodily cavities.³⁰

- Oils and fats: These were primarily derived from certain plants, such as cedar oil, which was extracted from the berries of the juniper tree after being soaked in animal fat, and castor oil, which was later employed as a substitute for cedar oil due to its scarcity. In addition, bull fat was used; it was boiled and then poured into the cranial cavity as well as over the exterior surface of the body.³¹

Conclusions

From the foregoing research material, several key conclusions can be drawn:

- The practice of mummification in ancient Egypt was not limited to human bodies but extended to a wide range of animals, to which the Egyptians devoted considerable care, making no essential distinction between human and animal remains.
- The motives for animal mummification varied: in some cases, it was rooted in religious sanctity, in others, it reflected personal status. Similarly, the purposes of mummification differed—some animals were embalmed as offerings for earthly religious devotion, while others were intended for the afterlife, serving as guardians of the deceased or as provisions for sustenance in the next world.
- Most of the materials and tools employed were locally available, while a smaller portion was imported from neighboring regions. This underscores the significance of animal mummification in ancient Egyptian culture. Archaeological and chemical analyses further reveal the diversity of substances used—both local and imported—reflecting extensive exchange networks and a highly organized system of embalming workshops.
- The mummification of animals offers a rich picture of the depth of Egyptian religious thought and the central role of animals in its belief system. It also highlights important economic and artisanal dimensions that contributed to the longevity of this practice over centuries. This field remains open to further in-depth study, integrating archaeological texts with modern scientific analyses, to arrive at a more comprehensive understanding of ancient Egyptian civilization.

²⁹ Al-Khatib, *Egypt in the Time of the Pharaohs...*, p. 185.

³⁰ Saleh, *Mummification: The Philosophy of Immortality...*, p. 63.

³¹ Saleh, *Mummification: The Philosophy of Immortality...*, p. 63.

Appendices



(Figure 1) Symbol of the god Thoth and a mummified fish



(Figure 2) Mummification tools

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