

COMPOSITION OF THE WRAPPINGS OF AN ANCIENT EGYPTIAN MUMMY

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The bandages of a mummy thought to have been wrapped about 2 000 years ago, have been analysed for the presence of preservative, adhesive or cosmetic substances, using techniques not previously employed in such studies.

The fabric used to wrap the mummy, the adhesive securing the ends of the bandages and the dark brown substance impregnating them were all examined. The fabric, not unexpectedly (Lucas, 1962), was found to be linen. The adhesive was a protein with amino-acid composition similar to that of gelatin, a result contrasting with previous reports that gum arabic (from Acacia species) was used to secure mummy wrappings (Baumann, 1960).

There are suggestions in the literature that Mummy wrappings were soaked in resins (coniferous resins or Chios turpentine), gum resins, e.g. myrrh or bdellium, or even benzoin and storax. Evidence for the presence of bitumen has also been reported (Baumann, 1960; Lucas 1962 and references therein). The wrappings examined in the present investigation had been treated with a complex mixture of substances of which there was evidence to suggest that beeswax, bitumen and galbanum were components. The identification of beeswax was based on TLC, GLC and MS comparison with authentic wax, while the detection of sulphur, molybdenum and vanadium in the ash of the bandage indicated the presence of Dead Sea bitumen in the bandages (Spielman, 1932). The use of galbanum was concluded from comparison of extracts of the bandage with those of galbanum by TLC and GLC, from the identification of the coumarin umbelliferone in extracts of the bandage and from the detection of the same monosaccharides (arabinose, galactose and two others) in hydrolysed aqueous extracts of both galbanum and the bandages. At all stages of the comparison a series of other gum resins and resins, including colophony, Chios turpentine, mastic, sandarac, olibanum, ladanum, myrrh, bdellium and storax were also compared with extracts of the bandages but none of these was detected.

The use of chromatographic and spectroscopic analysis has thus demonstrated that the linen of the mummy wrappings was impregnated with a mixture of substances, some of which are identifiable even after some 2 000 years of storage.

Baumann, B.B. (1960). *Econ. Bot.*, 14, 84-104.

Lucas, A. (1962). "Ancient Egyptian Materials and Methods", revised J.R. Harris, Edward Arnold Limited, London.

Spielman, P.E. (1932). *J. Egyptian Archeology*, 18, 177-180.