King Midas' funeral feast

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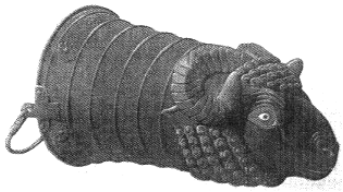
Can we know what was in the menu at a feast 3000 years ago? Yes, we can!
In 1999 archaeologists discovered in Minor Asia, in land of ancient Frigia, a tomb full of precious objects of all kinds: pearls, noble stones, expensive materials and subtle bronze dishes. The richness of the funeral indicated the high rank of the dead man, and the place and age of the tomb pointed at a similarity with ancient Greek cultures. Almost, almost King Midas' tomb.



At the bottom of the bronze cups (called *situla*), formed in the shape of a sheep's head, there were some remains, almost invisible to the naked eye. The remains from the funeral feast? However, there was too little (and slightly out of date!) to taste it. But the appetite increased!

Luckily there is modern Science. It will tell you (and the police) not only how much you have drunk but also what kind of alcohol! Different techniques used to find out what was eaten during King Midas' funeral feast are commonly called **spectroscopy** (from the Greek word *spectrum* meaning a ghost).
It was a rich feast, that of Midas at his funeral: inside over 100 cups and plates the scientists found 16 different kinds of alcohol: among them, good quality wine, barley beer and fermented bee's honey. On the dishes there were found the remains of at least 14 kinds of meat, mainly sheep and goat. First, the meat was grilled, then detached from the bones, and next mixed with Mediterranean herbs and spieces. Wines and beer were mixed in different proportions and served in elegant cups. The remains were loaded for King's Midas road through Styx river.

Well, well, such a funeral feast is enough to take a place in **mythology** forever!

P.E. McGovern, D.L Glusker, R.A. Moreau, A. Nunez, C.W. Beck, E. Simpson, E.D. Butrym, L.J. Exner, E.C. Stoutt, *A funerary feast fit for King Midas*, "Nature", 23–29/12/1999, p. 863.

/from *Foton* 92/

Spectroscopy is the study of **spectra** i.e., the dependence of physical quantities on **frequency**.

Spectroscopy is often used in physical and analytical chemistry for the identification of substances, through the spectrum of emitted or absorbed radiation. A device for recording a spectrum is a **spectrometer**.

Spectroscopic methods used in the analysis of the remains of the funeral feast of king Midas:

1. **Infrared (IR) absorption analysis** – enables the identification of certain functional chemical groups in chemical compounds – the vibrational frequencies of paricular groups of atoms depend on their mass and chemical bond type, just like the frequencies of a mechanical oscilator depend on the spring constant of the spring.

2. **Mass spectroscopy** – enables measuremenst of charge-to-mass ratio of chemical compounds or their fragments (after their ionization); to avoid fragmentation of complicated organic compounds ionization with proton exchange or electrospray ionization is used.

3. **Chromatography** – division of different liquid (or gas) fractions in a column due to different diffusion constants of the molecules.

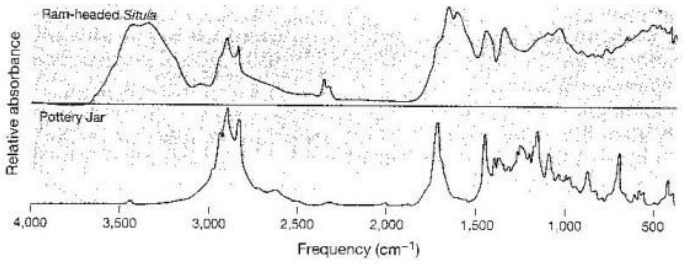


Fig. 1. Infrared spectrum of the content of a *situla* (cup in the shape of a sheep's head) and food remains from the ceramic bowl

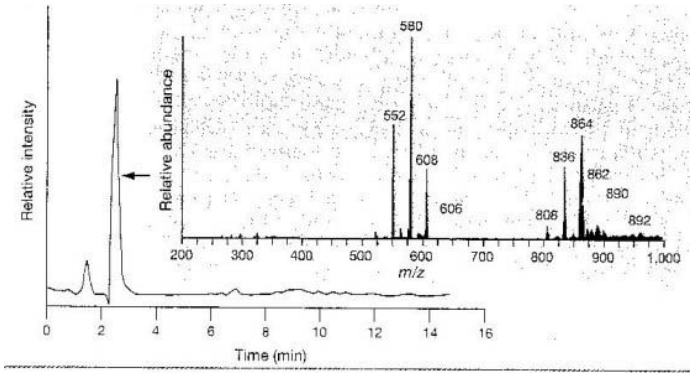


Fig. 2. Chromatogram of the food remains. In the inner pannel – the mass spectrum of the remains