

IDENTIFICATION OF PROVENANCE OF ANCIENT AMBER BEADS FROM ROMANIA BY ^{13}C NMR AND FTIR SPECTROSCOPY

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Amber occurs in Romania along the length of the Carpathian Mountains. Chemical properties of Romanian amber was described by GHIURCA & VAVRA (1990). Until now many archaeological beads have been found in different parts of Romania, but their exact sources have not yet been investigated by modern spectroscopic methods.

Fragments of two archaeological beads, one (R14) found in the cave of Cioclovina and the other (R15) found in Piatra Cetii in Romania were studied by solid-state ^{13}C NMR and FTIR spectroscopy together with thirteen authentic samples of Romanian amber.

Solid-state ^{13}C NMR spectra of the samples were obtained using a Bruker MSL 300 spectrometer and the FTIR spectra were measured using a Perkin-Elmer 1760 FTIR spectrometer applying the KBr pellet method.

As far as the FTIR spectra of Romanian amber are concerned, the absorption bands in the region from 4000 to 1456 cm^{-1} are almost identical in all specimens and the main differences are observed in the region from 1374 to 870 cm^{-1} . It was noted that, in some cases, specimen of the same source, e.g. from Colti, can be recognised according to the pattern of their FTIR spectra in the region from 1347 to 870 cm^{-1} . This is also true for the specimen from Motoca.

The most significant results of the present investigation are the following. The solid-state ^{13}C NMR spectra of the samples R14 and R15 match the spectrum of Baltic amber (LAMBERT & FREY, 1982) and differ from those of the samples of Romanian origin. Similarly the FTIR spectra of R14 and R15 differ completely from those of Romanian amber and are the spectra of Baltic amber = succinite (Beck, 1986).

The present investigation proves for the first time that not all archaeological beads found in Romania are of Romanian origin but some of them, e.g. the beads R14 and R15 are of Baltic origin. According to BACHOFEN-ECHT (1949) an ancient trade route existed on the North and East side of the Carpathian Mountain range along which amber used to be transported to Southern Europe via Romania. Hence it may be assumed that the beads R14 and R15 were once brought to Romania either as finished products or as raw materials out of which they were made.

References

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