

THE RESTORATION AND CONSERVATION OF NEOLITHIC POTTERY DECORATED WITH A BLACK MIXTURE OF BIRCH BARK AND NATURAL BITUMEN

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REZUMAT: *Lucrarea prezintă aspecte legate de operațiunile de restaurare și conservare a unor suprafețe ceramice pictate cu mixtură de gudron din coajă de mesteacăn și bitum natural (gudronul din coajă de mesteacăn este preponderent). Compoziția stratului pictural a fost determinată prin analiza GC-MS (cromatografie de gaze cuplată cu spectrometrie de masă) și FT-IR (spectroscopie în infraroșu cu transformată Fourier). Operațiunile de restaurare au constat în pensurarea ușoară pe suprafețe reduse de ceramică pictată sau cu urme de pictură cu Paraloid B 72 dizolvat în toluen. După emoliere depunerilor, a urmat îndepărtarea solului până la suprafața stratului de pictură. Aplicarea stratului de Paraloid B 72 a avut un dublu rol: de emoliere a depunerilor de sol și fixarea a stratului pictural.*

CUVINTE-CHEIE: *restaurare; ceramică neolitică pictată; bitum natural; gudron din coajă de mesteacăn; Paraloid B 72.*

ABSTRACT: *The paper presents aspects related to the restoration and conservation operations of some ceramic surfaces painted with a mix from birch bark tar and natural bitumen (birch bark tar is predominant). The composition of the pictorial layer was determined by GC-MS analysis (gas chromatography coupled with mass spectrometry) and FT-IR (Fourier transform – infrared spectroscopy). The restoration operations consisted of light brushing on small surfaces of painted ceramics or with paint traces with Paraloid B 72 dissolved in toluene. After the deposits were emoliated, the soil was removed from the surface of the painting layer. The application of the Paraloid B 72 layer had a dual role: to emulate soil deposits and to fix the pictorial layer.*

KEYWORDS: *restoration; Neolithic painted ceramic; natural bitumen; birch bark tar; Paraloid B 72.*

1. INTRODUCTION

The preventive archeological researches which had taken place between 2002–2012 in the Neoeolithic site from Porț-Corău, in Sălaj county (N-W part of Romanian)¹ brought out to daylight many pottery fragments painted with a black, shiny substance, of a bituminous nature. Any attempt to remove the mold deposits from the surface of the fragments could compromise the bituminous pictorial layer.

2. MATERIALS AND METHODS OF INVESTIGATIONS

Between 2011 and 2013, Polixenia-Georgeta Popescu from Brukenthal National Museum altogether with other colleagues from research centres from Romania analyzed the composition of the pictorial black layer from the surface of some ceramic fragments from Porț-Corău. Analyses using spectroscopic methods GC-MS (Gas Chromatography-Mass Spectrometry) and FT-IR (Fourier Transform

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¹ Băcuet-Crișan 2008, p. 6–13; Matei *et alii* 2003, p. 246–248; Bejinariu *et alii*, 2004, p. 245–247; Băcuet-Crișan *et alii* 2011, p. 220–223; Băcuet-Crișan *et alii* 2012, p. 173–174.

Infrared Spectrometer)² for a few pottery fragments painted with a black, shiny substance, of a bituminous nature, brought us to the identification of the composition of the pictorial layer.

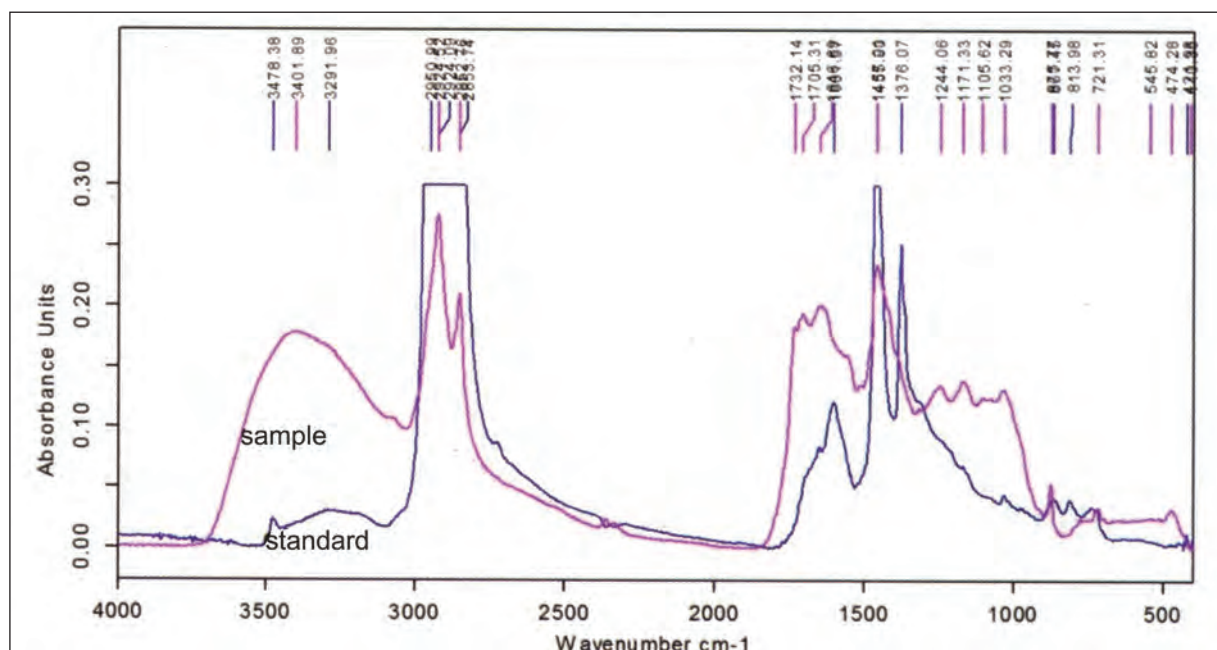
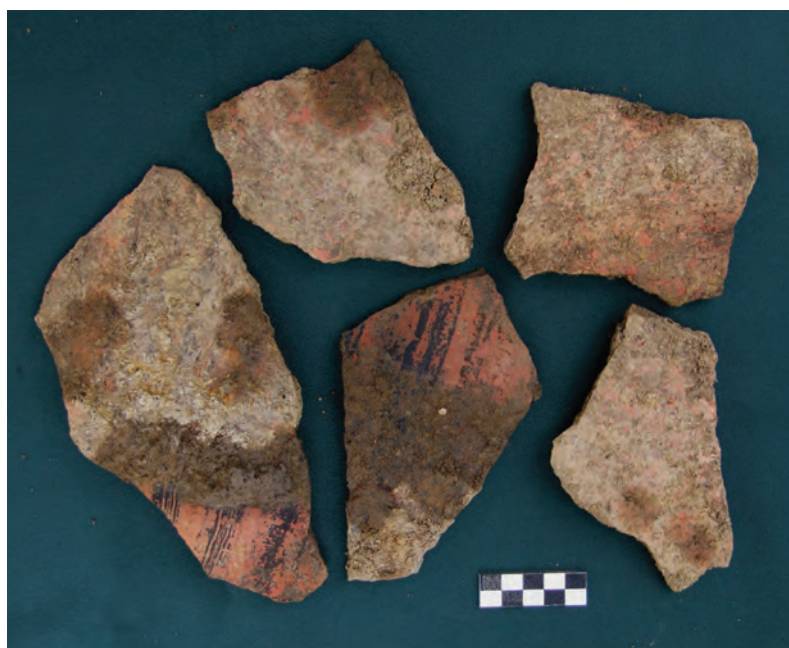


Image 1. FT-IR spectrum of the pictorial layer sample. In comparison with the reference sample of the natural bitum (by Polixenia Georgeta Popescu 2014, p. 439).

3. RESULTS AND DISCUSSION

The analysis using spectroscopic methods for ceramic fragments painted with a black mixture discovered at Porț-Corău, confirms that the material used in decorating the pottery was a mixture of birch bark tar and natural bitumen³.



Picture 1. Ceramics fragments decorated with a mixture of birch bark tar with natural bitumen (during restoration).

The result of the analyzes had a very special importance in the activity of restoration and preservation of ceramic artifacts decorated with the mixture of birch bark tar with natural bitumen discovered at Porț-Corău Neolithic archaeological site.

The removal of soil deposits was done by gently brushing small ceramic surfaces with Paraloid B 72 dissolved in toluene, followed in a relatively short time span (7–10 seconds)⁴ using a scalpel blade (Picture 1).

² Popescu 2014, p. 433–446.

³ Popescu *et alii* 2012, p. 470–474.

⁴ Pripon 2014, p. 564.

According to the thickness of the pictorial layer and the type of decoration, there were cases in which the pictorial layer was spread on extended, dense surfaces, but also situations in which only the trace (imprint) of the decorations was preserved (Picture 2).



Picture 2 – 3. Porringer fragments (left) and amphora fragments (right) decorated with a mixture of birch bark tar with natural bitumen (during restoration).



Picture 4. Neolithic amphora decorated with a mixture of birch bark tar with natural bitumen (after restoration).

4. CONCLUSIONS

The results of the investigations made by spectroscopic methods GC-MS and FT-IR made it possible to apply an efficient treatment in the restauration of the Neolithic ceramic fragments decorated with a black colored layer, a mixture of birch bark tar and natural bitumen.⁵

Vessels decorated with this mixture of birch bark and natural bitumen were restored in the last years were an amphora (Foto 3)⁶, a porringer⁷ (Foto 4), and a pot (Foto 5)⁸. This method of work was useful for me and other colleagues in restoration of a bowl⁹ and a Neolithic pot: type „kneading-trough”¹⁰.

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⁵ Pripon 2014, p. 563 – 569.

⁶ Pripon 2011a, p. 15.

⁷ Pripon, 2011b, p. 16.

⁸ Elekes 2018, p. 13.

⁹ Pripon 2018, p. 14.

¹⁰ Elekes 2019, p. 11.



Picture 5. Neolithic porringer decorated with a mixture of birch bark tar with natural bitumen (after restoration).



Picture 5a. Neolithic porringer decorated with a mixture of birch bark tar with natural bitumen (after restoration).



Picture 6. Neolithic pot decorated with a mixture of birch bark tar with natural bitumen (after restoration).