

Proposed Analyses of Chemicals for finding the botanical origin of residues at Sibhudu

Letter

IN TERMS OF SECTION 41 OF THE KWAZULU-NATAL AMAFA AND RESEARCH INSTITUTE ACT (ACT 05 OF 2018)

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SAHRIS Object: Object Codes/References:

MOTIVATION FOR THE CHEMICAL ANALYSES

In the South African Middle Stone Age (MSA), adhesive substances form the perhaps most informative material class available to archaeologists. This is so because investigating the know-how involved in adhesive production may shed light on evolutionary concepts, such as complex cognition and the advent of cumulative culture. Adhesive must be produced with techniques that imply complicated thought processes and knowledge transfers. Previous work on adhesives from Sibhudu Cave (under permit 21038, see: Schmidt et al. 2024, <https://doi.org/10.1016/j.jhevol.2024.103578>) has shown that some of them were produced by pyrolysis, using the leaves of local plants. The production processes involved burning these leaves near flat stone surfaces, onto which the adhesives are deposited by condensation, and from where they can be collected by scraping with a stone tool. Podocarpus may have been one of those plants. This plant is part of the vegetation record at Sibhudu until the end of the Howiesons Poort at this site, around 62,000 years ago, but the resin has not yet been securely identified on the tools. Other plants may also have been used to produce adhesives. This opens important questions about these foragers' knowledge and understanding of their botanical environment. What was the botanical origin of these adhesives in different periods? Do they reflect the available plant resources at different times? Alternatively, did these foragers have an intimate knowledge of the available botanical resources and their potential for adhesive making, selecting them according to specific criteria? These questions can be answered by understanding which plant species were actually used for making adhesives at different times in the Sibhudu sequence, investigating the botanical environment available to the Sibhudu inhabitants and evaluating the potential quality of these plants for adhesive making. Our approach will be based on chemical readings that can be made in Tübingen (Gas Chromatograph-Mass Spectrometry, Infrared Spectroscopy). The methodology will aim at identifying chemical characteristics and biomarkers that are specific to plants found in the

Sibhudu environment. Further, the tools listed in this application have mineral residues visible on their hafting edges and these imply that mineral components were part of compound adhesives used at the site. We will therefore also conduct analyses of the binders (Raman Spectroscopy and X-Ray Diffraction), hoping to shed light on the complete set of raw materials used for adhesive making at Sibhudu.

For the analyses, the pieces will be transported to Germany, where the analytical competences are available. Technical difficulties in the Wits laboratories have made it impossible to analyse the material there. The results will be analysed together with Prof. Wadley who has extensive knowledge of local plants and the Archaeology of Sibhudu. Together, we project the publication of a peer-reviewed publication that makes available our dataset on the plant types and other raw materials used for adhesive making at two periods of the MSA, the Stillbay and the Howiesons Poort.

Case Discussion:

The intention is to analyse the material outside the country (Germany), the responsibility for issuing an export permit falls under SAHRA. The committee clarified that while they do not handle export applications, they must still grant permission for the analysis of the material.

Case Decision:

The intention is to analyse the excavated material in Tübingen, Germany. An export permit to export the material outside the country should be obtained from SAHRA.

Please be advised as follows:-

1. No deviation will be permitted without the prior written approval of KwaZulu-Natal Amafa and Research Institute.
2. It is the responsibility of the Applicant to ensure that artefacts are preserved in their original state while in his/her possession.
3. The KwaZulu-Natal Amafa and Research Institute does not issue an export permit for scientific analysis; however, it states clearly that the Institute supports the issuing of the export permit by the South African Heritage Resources Agency on condition that the Agency deems the application for export compliant.

4. FAILURE TO COMPLY WITH THESE CONDITIONS WILL RENDER ANY ACTIVITY CONDUCTED

UNLAWFULLY, AND THE KWAZULU-NATAL AMAFA AND RESEARCH INSTITUTE RESERVE THE RIGHT TO CANCEL THIS PERMIT AND INSTITUTE CRIMINAL AND/OR CIVIL ACTION AGAINST THE PERSON(S) RESPONSIBLE

Should you have any further queries, please contact the designated official using the case number quoted above in the case header.

Yours faithfully



Zola Daniels
Heritage Officer
KwaZulu-Natal Amafa and Research Institute

Amafa Terms & Conditions:

1. This approval does not exonerate the applicant from obtaining local authority approval or any other necessary approval for proposed work.
2. If any heritage resources, including graves or human remains, are encountered they must be reported to the Institute immediately.
3. The Institute reserves the right to request additional information as required.

ADMIN:

Direct URL to case: <https://sahris.org.za/382552>