

Online resource for:

Understanding preservation and identification biases of ancient adhesives through experimentation

Authors:

Paul R. B. Kozowyk^{ab*}; Annelou L. van Gijn^a, Geeske H. J. Langejans^{b,c}

^a Faculty of Archeology, Leiden University, 2333 CC Leiden, The Netherlands

^b Faculty of Mechanical, Maritime and Materials Engineering, Delft University of Technology, 2628 CD Delft, The Netherlands

^c Palaeo-Research Institute, University of Johannesburg, Johannesburg 2092, South Africa

*Corresponding author

Email: p.r.b.kozowyk@tudelft.nl

Telephone: +31 649850659

Table 1. Results of 0.5 year Horsterwold surface experiments. Surface area was recorded when visible staining occurred, although these could not obtain a score higher than 3 if no physical residues were present.

Adhesive	Object type	Preservation index	% Residue remaining	Staining?	Haft remaining
acacia gum	hafted	0			N
acacia gum	hafted	Missing			N
acacia gum/ochre	hafted	Missing			N
acacia gum/ochre	hafted	3	73	Y	N
beeswax	hafted	5	96		Y
beeswax	hafted	5	95		Y
birch tar	hafted	5	101		Y
birch tar	hafted	5	99		Y
bone glue	hafted	0			N
bone glue	hafted	0			N
hide glue	hafted	0			N
hide glue	hafted	0			N
pine resin	hafted	4	80		Y
pine resin	hafted	4	77		Y
pine resin/beeswax	hafted	5	97		Y
pine resin/beeswax	hafted	4	87		Y
pine resin/beeswax/ochre	hafted	5	102		Y
pine resin/beeswax/ochre	hafted	5	108		Y
pine tar	hafted	5	91		Y
pine tar	hafted	5	94		Y

Table 2. Results of 3 year Horsterwold surface experiments. Surface area was recorded when visible staining occurred, although these could not obtain a score higher than 3 if no physical residues were present.

Adhesive	Object type	Preservation index	% Residue remaining	Staining	Haft remaining
acacia gum	hafted	Missing			
acacia gum	hafted	Missing			
acacia gum	non-hafted flake	0			
acacia gum	non-hafted flake	1	1		
acacia gum/ochre	hafted	Missing			
acacia gum/ochre	hafted	3	17	Y	N
acacia gum/ochre	non-hafted flake	0			
acacia gum/ochre	non-hafted flake	2			
beeswax	hafted	4	84		Y
beeswax	hafted	4	76		Y
birch tar	hafted	5	99		Y
birch tar	hafted	5	98		Y
birch tar	non-hafted flake	4	49		
birch tar	non-hafted flake	5	99		
bone glue	hafted	1	41		N
bone glue	hafted	0			N
hide glue	hafted	3	55	Y	N
hide glue	hafted	2	25	Y	N
hide glue	non-hafted flake	0			
hide glue	non-hafted flake	1			
pine resin	hafted	Missing			
pine resin	hafted	4	85		3226 Y
pine resin	non-hafted flake	4	10		
pine resin	non-hafted flake	4	17		
pine resin/beeswax	hafted	4	84		Y
pine resin/beeswax	hafted	4	84		Y
pine resin/beeswax/ochre	hafted	Missing			
pine resin/beeswax/ochre	hafted	5	96		Y
pine resin/beeswax/ochre	non-hafted flake	4	69		
pine resin/beeswax/ochre	non-hafted flake	4	77		
pine tar	hafted	5	91		Y
pine tar	hafted	4	86		Y
pine tar	non-hafted flake	3	59	Y	
pine tar	non-hafted flake	1			

Table 3. Results of 0.5 year Horsterwold buried experiments. Surface area was recorded when visible staining occurred, although these could not obtain a score higher than 3 if no physical residues were present.

Adhesive	Object type	Preservation index	% Residue remaining	Staining?	Haft remaining
acacia gum	hafted	0			N
acacia gum	hafted	0			N
acacia gum/ochre	hafted	3	4	Y	N
acacia gum/ochre	hafted	4	16		N
beeswax	hafted	4	89		Y
beeswax	hafted	5	95		Y
birch tar	hafted	5	98		Y
birch tar	hafted	5	100		Y
bone glue	hafted	1			N
bone glue	hafted	0			N
hide glue	hafted	0			N
hide glue	hafted	0			N
pine resin	hafted	5	96		Y
pine resin	hafted	5	101		Y
pine resin/beeswax	hafted	5	93		Y
pine resin/beeswax	hafted	5	94		Y
pine resin/beeswax/ochre	hafted	Missing			
pine resin/beeswax/ochre	hafted	5	105		Y
pine tar	hafted	5	97		Y
pine tar	hafted	5	103		Y

Table 4. Results of three year Horsterwold buried experiments. Surface area was recorded when visible staining occurred, although these could not obtain a score higher than 3 if no physical residues were present.

Adhesive	Object type	Preservation index	% Residue remaining	Staining	Haft remaining
acacia gum	hafted	0			N
acacia gum	hafted	0			N
acacia gum	non-hafted flake	0			
acacia gum	non-hafted flake	1			
acacia gum/ochre	hafted	2	48	Y	N
acacia gum/ochre	hafted	2	67	Y	N
acacia gum/ochre	non-hafted flake	1			
acacia gum/ochre	non-hafted flake	2			
beeswax	hafted	4	44		N
beeswax	hafted	4	52		N
birch tar	hafted	5	98		Y
birch tar	hafted	5	112		Y
birch tar	non-hafted flake	5	98		
birch tar	non-hafted flake	5	104		
bone glue	hafted	0			N
bone glue	hafted	0	25		N
hide glue	hafted	Missing			
hide glue	hafted	0			N
hide glue	non-hafted flake	1			
hide glue	non-hafted flake	0			

pine resin	hafted	5	91		Y
pine resin	hafted	4	84		Y
pine resin	non-hafted flake	4	21		
pine resin	non-hafted flake	4	13		
pine resin/beeswax	hafted	5	97		Y
pine resin/beeswax	hafted	5	92		Y
pine resin/beeswax/ochre	hafted	4	88		Y
pine resin/beeswax/ochre	hafted	5	92		Y
pine resin/beeswax/ochre	non-hafted flake	4	56		
pine resin/beeswax/ochre	non-hafted flake	4	64		
pine tar	hafted	4	88		Y
pine tar	hafted	5	91		Y
pine tar	non-hafted flake	4	12		
pine tar	non-hafted flake	3	100	Y	

Table 5. Two year surface preservation experiment results from FARF. Surface area was recorded when visible staining occurred, although these could not obtain a score higher than 3 if no physical residues were present.

Adhesive	Preservation index	% Residue remaining	Staining?	Haft remaining
pine tar	Missing			
pine tar	Missing			
birch tar	5	106		Y
birch tar	5	114		Y
acacia gum	1			N
acacia gum	1			N
pine resin	4	73		N
pine resin	4	74		Y
beeswax	3	11	Y	N
beeswax	3	2	Y	N
acacia gum/ochre	3	52	Y	N
acacia gum/ochre	3	45	Y	N
pine resin/beeswax	4	65		N
pine resin/beeswax	Missing			
pine resin/beeswax/ochre	5	97		Y
pine resin/beeswax/ochre	4	90		N
hide glue	2			N
hide glue	2			N
bone glue	1			N
bone glue	1			N

Table 6. Two year buried preservation experiment results from FARF. Surface area was recorded when visible staining occurred, although these could not obtain a score higher than 3 if no physical residues were present.

Adhesive	Preservation index	% Residue remaining	Staining?	Haft remaining
acacia gum	1			N
acacia gum	Missing			
acacia gum/ochre	3	29	Y	N
acacia gum/ochre	3	44	Y	N
beeswax	4	54		Y
beeswax	3	5	Y	N
birch tar	Missing			
birch tar	5	106		Y
bone glue	Missing			
bone glue	Missing			
hide glue	2			N
hide glue	Missing			
pine resin	Missing			
pine resin	4	5		N
pine resin/beeswax	4	63		N
pine resin/beeswax	5	90		N
pine resin/beeswax/ochre	Missing			
pine resin/beeswax/ochre	5	90		Y
pine tar	3	56	Y	N
pine tar	Missing			