



Universiteit
Leiden
The Netherlands

Molecular studies of organic residues preserved in ancient vessels
Oudemans, T.F.M.

Citation

Oudemans, T. F. M. (2006, November 30). *Molecular studies of organic residues preserved in ancient vessels*. Retrieved from <https://hdl.handle.net/1887/5418>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/5418>

Note: To cite this publication please use the final published version (if applicable).

Bibliography

Bibliography

- Abbink, A.A. 1985, 'Onderzoek naar handgevoemd aardewerk uit de Romeinse Tijd uit de nederzetting Uitgeest Groot-Dorreegeest: de relaties tussen vorm, functie en technologie', in M.C.P. Levendig-Snijders, J.F. van Regteren Altena & W.J.H. Willems (eds), *Jaarverslag over 1983 van de Rijksdienst voor Oudheidkundig Bodemonderzoek, Amersfoort*, Rijswijk, 27-28.
- Abbink, A.A. 1999, 'Make it and Break it: Cycles of Pottery. A study of the technology, form, function and use of pottery from settlements at Uitgeest-Groot Dorreegeest and Schagen-Muggenburg 1, Roman period, North-Holland, the Netherlands', Leiden University, Leiden.
- Ackman, R.G. 1964, 'Fundamental groups in the response of flame ionisation detectors to oxygenated aliphatic hydrocarbons', *Journal of Gas Chromatography*, vol. 2, 173-179.
- Arnold, D.E. 1985, *Ceramic Theory and Cultural Process*, Cambridge University Press, Cambridge.
- Arnold, D.E. 2000, 'Does standardization of ceramic paste really mean specialization?' *Journal of Archaeological Method and Theory*, no. 7, 333-375.
- Aronson, M., Skibo, J.M. & Stark, M.T. 1994, 'Production and Use Technologies in Kalinga Pottery', in W.A. Longacre & J.M. Skibo (eds), *Kalinga Ethnoarchaeology - Expanding Archaeological Method and Theory*, Smithsonian Institution Press, Washington, 83-111.
- Arthur, J.W. 2002, 'Pottery use-alteration as an indicator of socioeconomic status: an ethnoarchaeological study of the Gamo of Ethiopia', *Journal of Archaeological Method and Theory*, vol. 9, 331-355.
- Beck, M.E., Skibo, J.M., Hally, D., J. & Yang, P. 2002, 'Sample selection for ceramic use-alteration analysis: the effects of abrasion on soot', *Journal of Archaeological Science*, vol. 29, 1-15.
- Besteman, J.C. 1990a, 'North Holland A.D. 400-12000', in J.C. Besteman, J.M. Bos & H.A. Heidinga (eds), *Medieval Archaeology in the Netherlands, Studies presented to H.H. van Regteren Altena*, IPP, Amsterdam, 91-121.
- Besteman, J.C. 1990b, 'Uitgeest', *Archaeologische Kroniek van Holland over 1989, I. Noord Holland*, 324-329.
- Bianchi, G. 1995, 'Plant Waxes', in R.J. Hamilton (ed), *Waxes: Chemistry, Molecular Biology and Functions*, The Oily Press Ltd, Dundee, Scotland, 175-222.
- Binford, L.R. 1985, 'Archaeological systematics and the study of cultural processes', *American Antiquity*, vol. 31, 203-210.
- Boon, J.J. 1987, 'An introduction to pyrolysis mass spectrometry of lignocellulosic material: a case study on barley straw, corn stem and Agropyron', in A. Chesson & E.R. Ørskov (eds), *Physico-chemical characterisation of plant residues for industrial and feed use*, Elsevier Applied Science, Essex, 25-49.
- Boon, J.J. 1992, 'Analytical pyrolysis mass spectrometry: new vistas opened by temperature-resolved in-source PYMS', *International Journal of Mass Spectrometry and Ion Processes*, vol. 118/119, 755-787.
- Boon, J.J. & De Leeuw, J.W. 1987, 'Amino acid sequence information in proteins and complex proteinaceous material revealed by pyrolysis-capillary gas chromatography-low and high resolution mass spectrometry', *Journal of Analytical and Applied Pyrolysis*, vol. 11, 313-327.
- Boon, J.J., Dupont, L. & De Leeuw, J.W. 1986, 'Characterisation of a Peat Bog Profile by Curie Point Pyrolysis-Mass Spectrometry combined with Multivariate Analysis and by Pyrolysis Gas Chromatography-Mass Spectrometry', in C.H. Fuchsmann (ed), *Peat and Water*, Amsterdam, 215-239.
- Boon, J.J., Pastorova, I., Botto, R.E. & Arisz, P.W. 1994, 'Structural studies on cellulose pyrolysis and cellulose chars by PYMS, PYGCMS, NMR and by wet chemical techniques', *Biomass and Bioenergy*, vol. 7, no. 1-6, 25-32.
- Boon, J.J., Tom, A., Brandt, B., Eijkel, G.B., Kistemaker, P.G., Notten, F.J.M. & Mikx, F.H.M. 1984, 'Mass Spectrometric and Factor Discriminant Analysis of Complex Organic matter from the Bacterial Culture environment of *Bacteroides Gingivalis*', *Analytica Chimica Acta*, vol. 163, 193-205.
- Botto, R.E. 1987, 'Solid ¹³C NMR Tracer Studies To Probe Coalification', *Journal of Energy & Fuels*, vol. 1, 228-230.
- Botto, R.E., Wilson, R. & Winans, R.E. 1987, 'Evaluation of the reliability of solid ¹³C NMR spectroscopy for the quantitative analysis of coals: study of whole coals and maceral concentrates', *Energy & Fuels*, vol. 1, 173-181.
- Braadbaart, F. 2004, 'Carbonization of Peas and Wheat - A Window into the Past', Leiden University, Leiden.
- Braadbaart, F. 2005, unpublished results.
- Braadbaart, F., Boon, J.J., van der Horst, J. & van Bergen, P.F. 2004a, 'Laboratory simulations of the transformation of peas as a result of heating: the change of the molecular composition by DTMS', *Journal of Analytical and Applied Pyrolysis*, vol. 71, 997-1026.
- Braadbaart, F., van der Horst, J., Boon, J.J. & van Bergen, P.F. 2004b, 'Laboratory simulations of the transformation of emmer wheat as a result of heating', *Journal of Thermal Analysis and Calorimetry*, vol. 77, 957-973.
- Bracewell, J.M., Robertson, G.W. & Williams, B.L. 1980, 'Pyrolysis-mass spectrometry studies of humification in a peat and a peaty podzol', *Journal of Analytical and Applied Pyrolysis*, vol. 2, 53-62.

- Braun, D.P. 1983, 'Pots as Tools', in A.S. Keene & J. Moore (eds), *Archaeological Hammers and Theories*, New York, 107-134.
- Bray, A. 1982, 'Mimbres Black-on-White, Melamine or Wedgewood? A Ceramic Use-Wear Analysis', *Kiva*, vol. 47, no. 3, 133-149.
- Breckenridge, W.C. & Kuksis, A. 1967, 'Molecular weight distribution of milk fat triglycerides from seven species', *Journal of Lipid Research*, vol. 8, 473-478.
- Breckenridge, W.C. & Kuksis, A. 1968, 'Specific distribution of short-chain fatty acids in molecular distillates of bovine milk fat', *Journal of Lipid Research*, vol. 9, 388-393.
- Bruni, S., Cariati, F., Casadio, F. & Toniolo, L. 1999, 'Spectrochemical characterization of micro-FTIR spectroscopy of blue pigments in different polychrome works of art', *Vibrational Spectroscopy*, vol. 20, 15-25.
- Buckley, S.A., Stott, A.W. & Evershed, R.P. 1999, 'Studies of organic residues from ancient Egyptian mummies using high temperature - gas chromatography - mass spectrometry and pyrolysis - gas chromatography - mass spectrometry', *Analyst*, vol. 124, 443-452.
- Buurman, J. 1988, 'Roman medicine from Uitgeest', *Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg*, vol. 31, 341-351.
- Charters, S., Evershed, R.P., Blinkhorn, P.W. & Denham, V. 1995, 'Evidence for the mixing of fats and waxes in archaeological ceramics', *Archaeometry*, vol. 37, 113-127.
- Charters, S., Evershed, R.P., Goad, L.J., Heron, C. & Blinkhorn, P.W. 1993a, 'Identification of an adhesive used to repair a Roman jar', *Archaeometry*, vol. 35, no. 1, 91-101.
- Charters, S., Evershed, R.P., Goad, L.J., Leyden, Blinkhorn, P.W. & Denham, V. 1993b, 'Quantification and distribution of lipid in archaeological ceramics: implications for sampling potsherds for organic residue analysis and the classification of vessel use', *Archaeometry*, vol. 35, no. 2, 211-223.
- Charters, S., Evershed, R.P., Quye, A., Blinkhorn, P.W. & Reeves, V. 1997, 'Simulation experiments for determining the use of Ancient pottery vessels: the behaviour of epicuticular leaf wax during boiling of a leafy vegetable', *Journal of Archaeological Science*, vol. 24, 1-7.
- Chiavari, G. & Galetti, G.C. 1992, 'Pyrolysis - gas chromatography/mass spectrometry of amino acids', *Journal of Analytical and Applied Pyrolysis*, vol. 24, 123-137.
- Christie, W.W. 1981, *Lipid Metabolism in Ruminant Animals*, Pergamon Press, Oxford.
- Coblentz Society, I. June 2005, 'Evaluated Infrared Reference Spectra', in P.J. Linstrom & W.G. Mallard (eds), *NIST Chemistry WebBook, NIST Standard Reference Database Number 69*, vol. 2005, National Institute of Standards and Technology, Gaithersburg MD, USA, p. (<http://webbook.nist.gov>).
- Colombini, M.P., Giachi, G., Modugno, F., Pallecchi, P. & Ribecchini, E. 2003, 'The characterization of paints and waterproofing materials from the shipwrecks found at the archaeological site of the Etruscan and Roman harbour of Pisa (Italy)', *Archaeometry*, vol. 35, no. 4, 659-674.
- Condamine, J., Formenti, F., Metais, M.O. & Blond, P. 1979, 'The application of gas chromatography to the tracing of oil in ancient amphorae', *Archaeometry*, vol. 18, 195-201.
- Copley, M.S., Rose, P.J., Clapham, A., Edwards, D.N., Horton, M.C. & Evershed, R.P. 2001, 'Detection of palm fruit lipids in archaeological pottery from Quar Ibrim, Egyptian Nubia', *Proceedings of the Royal Society of London, Series B. Biol.*, vol. 268, no. 1467, 593-597.
- Craig, O.E. & Collins, M.J. 2000, 'An improved method for the immunological detection of mineral bound protein using hydrofluoric acid and direct capture', *Journal of Immunological Methods*, vol. 236, 89-97.
- Craig, O.E. & Collins, M.J. 2002, 'The Removal of Protein from Mineral Surfaces: Implications for Residue Analysis of Archaeological Materials', *Journal of Archaeological Science*, vol. 29, no. 10, 1077-1082.
- Craig, O.E., Love, G.D., Isaksson, S., Taylor, G. & Snape, C.E. 2004, 'Stable carbon isotope characterisation of free and bound lipid constituents of archaeological ceramic vessels released by solvent extraction, alkaline hydrolysis and catalytic hydrolysis', *Journal of Analytical and Applied Pyrolysis*, vol. 71, 613-634.
- Craig, O.E., Mulville, J., Parker Pearson, M., Sokol, R., Gelsthorpe, K., Stacey, R. & Collins, M. 2000, 'Detecting milk proteins in ancient pots', *Nature*, vol. 408, p. 312.
- Craig, O.E., Taylor, G., Mulville, J., Collins, M.J. & Parker Pearson, M. 2005, 'The identification of prehistoric dairying activities in the Western Isles of Scotland: an integrated biomolecular approach', *Journal of Archaeological Science*, vol. 32, 91-103.
- Davidek, J., Velíšek, J. & Pokorný, J. 1990, *Chemical Changes during Food Processing*, vol. 21, Elsevier Science Publishers, Amsterdam.
- de Mulder, E.J., Geluk, M.C., Ritsema, I.L., Westerhoff, W.E. & Wong, T.E. 2003, *De ondergrond van Nederland*, Groningen/Houten.

Bibliography

- deMan, J.M. 1999, *Principles of Food Chemistry*, third edn, Kluwer Academic/Plenum Publishers, New York.
- Den Dooren de Jong, L.E. 1961, 'On the formation of adipocere from fats - Contribution to the microbiology of systems containing two liquid phases', *Antonie van Leeuwenhoek Journal of Microbiology and Serology*, vol. 27, 337-361.
- Derrick, M.R., Stulik, D. & Landry, J.M. 1999, *Infrared spectroscopy in conservation science*, The Getty Conservation Institute, Los Angeles, USA.
- Diallo, B., Vanhaelen, M. & Gosselain, O.P. 1995, 'Plant constituents involved in coating practices among traditional African potters', *Experientia - Interdisciplinary Journal for Life Sciences*, vol. 51, no. 1, 95-97.
- Dudd, S.N. & Evershed, R.P. 1998, 'Direct demonstration of milk as element of archaeological economies', *Science*, vol. 282, 1478-1481.
- Dudd, S.N. & Evershed, R.P. 1999, 'Unusual triterpenoid fatty acyl ester compounds of archaeological birch bark tars', *Tetrahedron Letters*, vol. 40, 359-362.
- Dudd, S.N., Regert, M. & Evershed, R.P. 1998, 'Assessing microbial lipid contributions during laboratory degradations of fats and oils and pure triacylglycerols absorbed in ceramic potsherds', *Organic Geochemistry*, vol. 29, no. 5-7, 1345-1354.
- Dybowski, C., Bai, S. & Bramer, S.V. 2000, 'Solid-state nuclear magnetic resonance', *Analytical Chemistry*, vol. 72, no. 12, 2713-2718.
- Dybowski, C., Bai, S. & Bramer, S.V. 2002, 'Solid-state nuclear magnetic resonance', *Analytical Chemistry*, vol. 74, no. 12, 2713-2718.
- Dybowski, C., Bai, S. & Bramer, S.V. 2004, 'Solid-state nuclear magnetic resonance', *Analytical Chemistry*, vol. 76, no. 12, 3263-3268.
- Eerkens, J. 2002, 'The preservation and identification of piñon resins by GC-MS in pottery from the Western Great Basin', *Archaeometry*, vol. 44, no. 1, 95-105.
- Eglinton, G. & Logan, G.A. 1991, 'Molecular preservation', *Philosophical Transactions of the Royal Society of London, B*, vol. 333, 315-328.
- Erdrich, M. 1996, 'Rom und de Barbaren. Das Verhältnis zwischen dem Imperium Romanum und den germanischen Stämmen vor seiner Nordwestgrenze seit der späten römischen Republik bis zum Gallischen Sonderreich', University of Amsterdam, Amsterdam.
- Erhardt, D., Hopwood, W., Baker, M.T. & von Endt, D.W. 1988, 'A systematic approach to the instrumental analysis of natural finishes and binding materials', in *Preprints of the 16th Annual AIC Meeting, New Orleans, Louisiana*, American Institute for Conservation, 67-84.
- Erickson, J.E. & Stickel, E.G. 1973, 'A proposed classification system for ceramics', *World Archaeology*, vol. 4, no. 3, 357-367.
- Evans, J. 1990, 'Come back King Alfred, all is forgiven!' in W.R. Biers & P.E. McGovern (eds), *Organic contents of ancient vessels: materials analysis and archaeological investigation*, vol. 7, The University Museum of Archaeology and Anthropology, University of Pennsylvania, Philadelphia, 7-9.
- Evershed, R.P. 1990, 'Lipids from samples of skin from seven Dutch bog bodies: preliminary report', *Archaeometry*, vol. 32, no. 2, 139-153.
- Evershed, R.P. 1991, 'Bog body lipid taphonomy', in P. Budd, B. Chapman, C. Jackson, R. Janaway & B. Ottaway (eds), *Archaeological Sciences 1989, Proceedings of a conference on the application of scientific techniques to archaeology Bradford, September 1989*, vol. 9, Oxbow Books, Oxford, 352-361.
- Evershed, R.P. 1992, 'Chemical composition of a bog body adipocere', *Archaeometry*, vol. 34, 253-265.
- Evershed, R.P. 1993a, 'Archaeology and Analysis: GC/MS studies of pottery fragments sheds new light on the Past', *Spectroscopy Europe*, vol. 5, no. 4, 21-25.
- Evershed, R.P. 1993b, 'Biomolecular archaeology and lipids', *World Archaeology*, vol. 25, no. 1, 74-93.
- Evershed, R.P. 1996, 'High resolution triacylglycerol mixture analysis using high temperature-gas chromatography/mass spectrometry with polarizable stationary phase, negative ion chemical ionisation and mass resolved chromatography', *Journal of American Society Mass Spectrometry*, no. 7, 350-362.
- Evershed, R.P., Arnot, K.I., Collister, J., Eglinton, G. & Charters, S. 1994, 'Application of isotope ratio monitoring gas chromatography-mass spectrometry to the analysis of organic residues of archaeological origin', *Analyst*, vol. 119, no. 5, 909-914.
- Evershed, R.P., Bethell, P.H., Reynolds, P.J. & Walsh, N.J. 1997a, '5 beta-Stigmastanol and related 5 beta-stanols as biomarkers of manuring: Analysis of modern experimental material and assessment of the archaeological potential', *Journal of Archaeological Science*, vol. 24, no. 6, 485-495.
- Evershed, R.P., Charters, S. & Quye, A. 1995a, 'Interpreting lipid residues in archaeological ceramics: preliminary results

- from laboratory simulations of vessel use and burial', *Materials Research Symposia Proceedings*, vol. 352, 85-95.
- Evershed, R.P., Charters, S. & Quye, A. 1995b, 'New Methods for interpreting lipids preserved in Archaeological pottery', *Abstracts of Papers American Chemical Society*, vol. 209, no. 41.
- Evershed, R.P., Dudd, S.N., Charters, S., Mottram, H., Stott, A.W., Raven, A.M., van Bergen, P.F. & Bland, H. 1999, 'Lipids as carriers of anthropogenic signals from prehistory', *Philosophical Transactions of the Royal Society of London, series B*, vol. 354, 13-31.
- Evershed, R.P., Heron, C., Charters, S. & Goad, L.J. 1992, 'The survival of food residues: new methods of analysis, interpretation and application', *Proceedings of the British Academy*, vol. 77, 187-208.
- Evershed, R.P., Heron, C. & Goad, L.J. 1990, 'Analysis of organic residues of archaeological origin by high-temperature gas chromatography and gas chromatography-mass spectrometry', *Analyst*, vol. 115, 1339-1342.
- Evershed, R.P., Heron, C. & Goad, L.J. 1991, 'Epicuticular wax components preserved in potsherds as chemical indicators of leafy vegetables in ancient diets', *Antiquity*, vol. 65, 540-544.
- Evershed, R.P., Mottram, H.R., Dudd, S.N., Charters, S., Stott, A.W., Lawrence, G.J., Gibson, A.M., Conner, A., Blinkhorn, P.W. & Reeves, V. 1997b, 'New criteria for the identification of animal fats preserved in archaeological pottery', *Naturwissenschaften*, vol. 84, 402-406.
- Evershed, R.P., Stott, A.W., Raven, A.M., Dudd, S.N., Charters, S. & Leyden, A. 1995c, 'Formation of Long-Chain Ketones in Ancient Pottery Vessels By Pyrolysis of Acyl Lipids', *Tetrahedron Letters*, vol. 36, no. 48, 8875-8878.
- Evershed, R.P. & Tuross, N. 1996, 'Proteinaceous material from potsherds and associated soils', *Journal of Archaeological Science*, vol. 23, 429-436.
- Evershed, R.P., van Bergen, P.F., Peakman, T.M., Leigh-Firbank, E.C., Horton, M.C., Edwards, D. & Rowley-Conwy, P.A. 1997c, 'Archaeological frankincense', *Nature*, vol. 390, no. 18/25 december, 667-668.
- Evershed, R.P., Vaughan, S.J., Dudd, S.N. & Soles, J.S. 1997d, 'Fuel for thought? Beeswax in lamps and conical cups from Late Minoan Crete', *Antiquity*, vol. 71, 979-985.
- Ferraro, J.R. & Van Valkenburg, E. 1999, 'Origins of the Diamond Anvil Cell: The Versatile Sampling Accessory Marks Its 40th Year', *Spectroscopy*, vol. 14, no. 11.
- Fogel, M., L. & Tuross, N. 2003, 'Extending the limits of paleodietary studies of humans with compound specific carbon isotope analysis of amino acids', *Journal of Archaeological Science*, vol. 30, 535-545.
- Gerhardt, K.O., Searles, S. & Biers, W.R. 1990, 'Corinthian figurine vases: non-destructive extraction and gas chromatography-mass spectrometry', in W.R. Biers & P.E. McGovern (eds), *Organic contents of ancient vessels: Materials analysis and archaeological investigation*, MASCA, University of Pennsylvania, Philadelphia, 41-50.
- Ghisalberti, E.L. & Godfrey, I.M. 1998, 'Application of nuclear magnetic resonance spectroscopy to the analysis of organic archaeological materials', *Studies in Conservation*, vol. 43, 215-230.
- Gianno, R., Erhardt, D., von Endt, D.W., Hopwood, W. & Baker, M.T. 1990, 'Archaeological resins from shipwrecks off the coasts of Saipan and Thailand', in W.R. Biers & P.E. Mc Govern (eds), *Organic Contents of Ancient Vessels: Materials Analysis and Archaeological Investigation*, vol. 7, University of Pennsylvania, Philadelphia, 59-67.
- Gibson, J. & Evans, J. 1985, 'Some eighteenth-century pharmaceutical vessels from London', *Post-Medieval Archaeology*, vol. 19, 151-157.
- Gijn, A.L.v. & Schallig, M.C. 1997, 'Functional analysis of lithic implements', in J. Boaz (ed), *Steinalderundersokelsene pa Rodsmoen*, vol. Varia, Oslo, 159-163.
- Gilbert, R.I. & Mielke, J.H. 1985, *The Analysis of Prehistoric Diets*, Academic Press, Orlando.
- Hally, D.J. 1983, 'Use alteration of Pottery Vessel Surfaces: An important source of evidence in the identification of Vessel Function', *North American Archaeologist*, vol. 4, no. 1, 3-26.
- Hally, D.J. 1986, 'The identification of vessel function: a case study from Northwest Georgia', *American Antiquity*, vol. 51, no. 2, 267-295.
- Hartgers, W.A., Sinninghe Damsté, J.S. & de Leeuw, J. 1995, 'Curie-point pyrolysis of sodium salts of functionalized fatty acids', *Journal of Analytical and Applied Pyrolysis*, vol. 34, 191-217.
- Hayatsu, R., Botto, R.E., Scott, R.G., McBeth, R.L. & Winans, R.E. 1986, 'Evaluation of lignin and cellulose contributions to low-rank coal formation by alkaline cupric oxide oxidation', *FUEL*, vol. 65, no. June, 821-826.
- Hayatsu, R., McBeth, R.L., Scott, R.G., Botto, R.E. & Winans, R.E. 1984, 'Artificial coalification study: preparation and characterization of synthetic macerals', *Organic Geochemistry*, vol. 6, 463-471.
- Hayek, E.W.H., Krenmayer, P., H., L., Jordis, U., Moche, W. & Sauter, E. 1990, 'Identification of archaeological and recent wood tar pitches using gas chromatography-mass spectrometry and pattern recognition', *Analytical Chemistry*, vol. 62, 2038-2043.

Bibliography

- Heiden, E.v.d., Boon, J.J. & Scheijen, M.A. 1990, 'Pyrolysis mass spectrometry of peat-forming and peatified plant tissues', in D.A.C. Manning (ed), *Organic Geochemistry, Advances and applications in the natural environment*, Manchester, 460-464.
- Henrickson, E.F. 1990, 'Investigating ancient ceramic form and use: progress report and case study', in W.D. Kingery (ed), *The changing roles of ceramics in society: 26,000 B.P. to the present*, vol. 5, American Ceramic Society, Westerville, Ohio, 83-117.
- Henrickson, E.F. & McDonald, M.M.A. 1983, 'Ceramic Form and Function: An ethnographic search and an archaeological application', *American Anthropologist*, vol. 85, no. 3, 630-643.
- Heron, C. & Evershed, R.P. 1993, 'The analysis of organic residues and the study of pottery use', in M. Schiffer (ed), *Archaeological Method and Theory 5*, University of Arizona Press, Tucson, 247-287.
- Heron, C., Evershed, R.P. & Goad, L.J. 1991, 'Effects of migration of soil lipids on organic residues associated with buried potsherds', *Journal of Archaeological Science*, vol. 18, 641-659.
- Heron, C., Nemcek, N., Bonfield, K.M., Dixon, D. & Ottaway, B.S. 1994, 'The chemistry of Neolithic beeswax', *Naturwissenschaften*, vol. 81, no. 6, 266-269.
- Hill, H.E. & Evans, J. 1988, 'Vegetation of Solomon Islands prehistory from pottery residues', in Elizabeth A. Slater & J.O. Tate (eds), *Science and Archaeology, Proceedings of a conference on the application of scientific techniques to archaeology, Glasgow, September 1987*, BAR, Oxford, 449-458.
- Hill, H.E. & Evans, J. 1989, 'Crops of the Pacific, new evidence from organic residues in pottery', in D.R. Harrison & G.C. Hillman (eds), *Foraging and Farming*, Unwin Hyman, London.
- Hillditch, T.P. & Williams, P.N. 1964, *The Chemical Constitution of Natural Fats*, Chapman and Hall, London.
- Hoogerbrugge, R., Willig, S.J. & Kistemaker, P.G. 1983, 'Discriminant analysis by double stage principle component analysis', *Analytical Chemistry*, vol. 55, 1711-1712.
- Howard, H. 1981, 'In the wake of distribution: Towards and integrated approach to ceramic studies in prehistoric Britain.' in H. Howard & E. Morris (eds), *Production and Distribution: A ceramic viewpoint*, vol. International Series 120, British Archaeological Reports, Oxford, 1-30.
- Hurst, W.J., Martin, R.A.J., Tarka, S.M. & Hall, G.D. 1989, 'Authentication of Cocoa in Ancient Mayan Vessels Using HPLC Techniques', *Journal of Chromatography*, vol. 446, 279-289.
- Julien, S., Chornet, E., Tiwari, P.K. & Overend, R.P. 1991, 'Vacuum pyrolysis of cellulose: Fourier transform infrared characterization of solid residues, product distribution and correlations', *Journal of Analytical and Applied Pyrolysis*, vol. 19, 81-104.
- Kaiser, R. 1969, *Gas phase chromatography, Vol III*, vol. 99-103, Butterworths, Washington.
- Kharbade, B.V. & Joshi, G.P. 1995, 'Thin-layer chromatography and hydrolysis method for the identification of plant gums in art objects', *Studies in Conservation*, vol. 40, no. 2, 93-102.
- Kimpe, K., Drybooms, C., Schrevens, E., Jacobs, P.A., Degeest, R. & Waelkens, M. 2004, 'Assessing the relationship between form and use of different kinds of pottery from the archaeological site of Sagalassos (southwest Turkey) with lipid analysis', *Journal of Archaeological Science*, vol. 21, 1503-1510.
- Knights, B.A., Dickson, C.A., Dickson, J.H. & Breeze, D.J. 1983, 'Evidence concerning the Roman military diet at Bearsden Scotland in the 2nd century A.D.' *Journal of Archaeological Science*, vol. 10, 139-152.
- Kobayashi, M. 1994, 'Use-Alteration Analysis of Kalinga Pottery, Interior Carbon Deposits of Cooking Pots', in W.A. Longacre & J.M. Skibo (eds), *Kalinga Ethnoarchaeology, Expanding Archaeological Method and Theory*, Smithsonian Institution Press, Washington, 127-168.
- Kolattukudy, P.E. (ed) 1976, *Chemistry and Biochemistry of Natural Waxes*, Elsevier Science Publishing Company, Amsterdam.
- Koning, J.d. 1998, *Uitgeest: Dorregeest en De Dog in het eerste Millenium*, Amsterdam University, Amsterdam.
- Lambert, J.B., Beck, C.W. & Frye, J.S. 1988, 'Analysis of European amber by carbon-13 nuclear magnetic resonance spectroscopy', *Archaeometry*, vol. 30, no. 2, 248-263.
- Lambert, J.B., Shawl, C.E. & Stearns, J.A. 2000, 'Nuclear magnetic resonance in archaeology', *Chemical Society Reviews*, vol. 29, no. 3, 175-182.
- Lavine, B.K. 2000a, 'Clustering and Classification of Analytical Data', in R.A. Meyers (ed), *Encyclopedia of Analytical Chemistry*, vol. 11, John Wiley & Sons Ltd, Chichester, 9689-9710.
- Learner, T. 1998, 'The Use of a Diamond Cell for the FTIR Characterisation of Paints and Varnishes available to Twentieth-Century Artists', in B. Pretze (ed), *Postprints: Infrared and Raman User's Group Conference, London 1998*, Victoria and Albert Museum, London, 7-20.
- Leninger, A.L. 1977, *Biochemistry*, Worth Publishers, New York.
- Longacre, W.A. & Stark, M.T. 1992, 'Ceramic, kinship and space: A Kalinga example', *Journal of Anthropological*

- Archaeology*, vol. 11, 125-136.
- Louwe Kooijmans, L.P. 1974, 'The Rhine/Meuse delta, four studies on its prehistoric occupation and Holocene geology', *Analecte Praehistorica Leidensia*, vol. 7.
- Louwe Kooijmans, L.P. 1976, 'Hazendonk (gem. Molenaarsgraaf)', *Archeologische Kroniek van Zuid-Holland over 1975, Holland* 8, 263-265.
- Low, M.J.D. & Baer, N.S. 1977, 'Application of infrared Fourier transform spectroscopy to problems in conservation, general principles', *Studies in Conservation*, vol. 22, 116-128.
- Mackenzie, A.S., Brassell, S.C., Eglinton, G. & Maxwell, J.R. 1982, 'Chemical fossils: the geological fate of sterols', *Science*, vol. 217, 491-504.
- Malainey, M.E., Przybylski, P. & B.L., S. 1999a, 'The effects of thermal and oxidative degradation on the fatty acids composition of food plants and animals of Western Canada: Implications for the identification of archaeological vessel residues', *Journal of Archaeological Science*, vol. 26, 95-103.
- Malainey, M.E., Przybylski, P. & B.L., S. 1999b, 'The fatty acid composition of native food plants and animals of Western Canada', *Journal of Archaeological Science*, vol. 26, 83-94.
- Malainey, M.E., Przybylski, R. & Sherriff, B.L. 1999c, 'Identifying the former contents of late precontact period pottery vessels from Western Canada using gas chromatography', *Journal of Archaeological Science*, vol. 26, no. 4, 425-438.
- Maniatis, Y. & Tsirtsoni, Z. 2002, 'Characterization of a black residue in a decorated Neolithic pot from Dikili Tash, Greece: and unexpected result', *Archaeometry*, vol. 44, no. 2, 229-239.
- Matson, F.R. 1965, 'Ceramic ecology: An approach to the study of early cultures in the Near East', in F.R. Matson (ed), *Ceramics and Man*, vol. 41, Aldine Publishing Company, Chicago, 202-217.
- McGovern, P.E., Glusker, D., Exner, L.J. & Voigt, M.M. 1996, 'Neolithic resinated wine', *Nature*, vol. 381, 480-481.
- McGovern, P.E., Zhang, J., Tang, J., Zhang, Z., Hall, G.R., Moreau, R.A., Nunez, A., Butrym, E.D., Richards, M.P., Wang, C.-s., Cheng, G., Zhao, Z. & Wang, C. 2004, 'Fermented beverages of pre-and proto-historic China', *PNAS*, vol. 101, no. 5, 17593-17598.
- Medalia, A.I., Rivin, D. & Sanders, D.S. 1983, 'A comparison of Carbon black with Soot', *The Science of the Total Environment*, vol. 31, 1-22.
- Meuzelaar, H.L.C., Haverkamp, J. & Hileman, F.D. 1982, *Pyrolysis mass spectrometry of recent and fossil biomaterials, compendium and atlas*, vol. 3, Elsevier Scientific Publishing Company, Amsterdam.
- Mills, B.J. 1999, 'Ceramics and social contexts of food consumption in the Northern Southwest', in J.M. Skibo & G.M. Feinman (eds), *Pottery and People - A Dynamic Interaction*, The University of Utah Press, Salt Lake city, 99-114.
- Mills, J.S. & White, R. 1987, *The organic chemistry of museum objects*, Butterworths, London.
- Mills, J.S. & White, R. 1994, *The organic chemistry of museum objects*, Second revised edition edn, Butterworth-Heinemann, Oxford.
- Moers, M.E.C. 1989, 'Occurrence and fate of carbohydrates in recent and ancient sediments from different environments of deposition', Dissertation thesis, TUD, Delft.
- Moldoveanu, S.C. 1998, *Analytical Pyrolysis of Natural Organic Polymers*, vol. 20, Elsevier, Amsterdam.
- Morgan, E.D., Cornford, C., Pollock, D.R.J. & Isaacson, P. 1973, 'The transformation of fatty material buried in soil', *Science and Archaeology*, vol. 10, 9-10.
- Morgan, E.D. & Titus, L. 1985, 'The fate of buried fats and oils and the remains from a 1000-year-old eskimo dwelling', *Analytical Proceedings*, vol. 22, 76-77.
- Morgan, E.D., Titus, L., Small, R.J. & Edwards, C. 1984, 'Gas chromatographic analysis of fatty material from a thule midden', *Archaeometry*, vol. 26, no. 1, 43-48.
- Morton, J.D. & Schwarcz, H.P. 2004, 'Palaeodietary implications from stable isotopic analysis of residues on prehistoric Ontario ceramics', *Journal of Archaeological Science*, vol. 31, 503-517.
- Mottram, H.R. & Evershed, R.P. 2001, 'Elucidation of the composition of bovine milk fat triacylglycerols using HPLC-atmospheric pressure-CIMS', *Journal of Chromatography A*, vol. 926, 239-253.
- Mottram, H.R., Crossman, Z. & Evershed, R.P. 2001, 'Regiospecific characterisation of the triacylglycerols in animal fats using high performance liquid chromatography-atmospheric pressure chemical ionisation mass spectrometry', *Analyst*, vol. 126, 1018-1024.
- Mottram, H.R., Dudd, S.N., Lawrence, G.J., Stott, A.W. & Evershed, R.P. 1999, 'New chromatographic, mass spectrometric and stable isotope approaches to the classification of degraded animal fats preserved in archaeological pottery', *Journal of Chromatography A*, vol. 833, 209-221.
- Mottram, H.R., Woodbury, S.E. & Evershed, R.P. 1997, 'Identification of triacylglycerol positional isomers present in vegetable oils by high performance liquid chromatography/atmospheric pressure chemical ionization mass

Bibliography

- spectrometry', *Rapic Communications in Mass Spectrometry*, vol. 11, 1240-1252.
- Munson, T.O. & Fetterolf, D.D. 1987, 'Evidence for the formation of 2,4-imidazolinediones and pyrrolidino[1,2a]-3,6-piperazinediones in human hair pyrolyzate by pyrolysis-gas chromatography-mass spectrometry', *Journal of Analytical and Applied Pyrolysis*, vol. 11, 15-24.
- Muntean, J.V., Stock, L.M. & Botto, R.E. 1988, *Journal of Magnetic Resonance*, vol. 76, p. 540.
- Murata, T. 1977, 'Analysis of triglycerides by gas chromatography/chemical ionisation mass spectrometry', *Analytical Chemistry*, vol. 49, 2209-2213.
- Needham, S. & Evans, J. 1987, 'Honey and dripping: Neolithic food residues from Runnymede Bridge', *Oxford Journal of Archaeology*, vol. 6, 21-28.
- Nelson, D.R. & Blomquist, G., J. 1995, 'Insect Waxes', in R.J. Hamilton (ed), *Waxes: Chemistry, Molecular Biology and Functions*, The Oily Press Ltd, Dundee, Scotland, 1-90.
- Nes, W.R. & Nes, W.D. 1980, *Lipids in Evolution*, Plenum Press, New York.
- Nip, M., Tegelaar, E.W., Brinkhuis, H., De Leeuw, J.W., Schenck, P.A. & Holloway, P.J. 1986a, 'Analysis of modern and fossil plant cuticles by Curie point Py-GC and Curie point Py-GC-MS: Recognition of a new, highly aliphatic and resistant biopolymer', *Organic Geochemistry*, vol. 10, 769-778.
- Odham, G. & Stenhagen, E. 1972a, 'Chapter 8 - Fatty Acids', in G.R. Waller (ed). *Biochemical Applications of Mass Spectrometry*, Wiley- Interscience, New York, 211-228.
- Odham, G. & Stenhagen, E. 1972b, 'Chapter 9 - Complex Lipids', in G.R. Waller (ed). *Biochemical Applications of Mass Spectrometry*, Wiley- Interscience, New York, 229-249.
- Orton, C., Tyers, P. & Vince, A. 1993, *Pottery in Archaeology*, Cambridge University Press, Cambridge.
- Oudemans, T.F.M. 1991, *Massaspectrometrisch onderzoek van amorfe organische residueen op aardewerk uit pre-en protohistorie*, FOM-Instituut voor Atoom en Molecuul Fysica & Instituut voor Prehistorie, Amsterdam & Leiden.
- Oudemans, T.F.M. unpublished results.
- Oudemans, T.F.M. & Boon, J.J. 1991, 'Molecular archaeology: analysis of charred (food) remains from prehistoric pottery by pyrolysis-gas chromatography/mass spectrometry', *Journal of Analytical and Applied Pyrolysis*, vol. 20, 197-227.
- Oudemans, T.F.M. & Boon, J.J. 1996, 'Traces of ancient vessel use: investigating prehistoric usage of four pot types by organic residue analysis using pyrolysis mass spectrometry', *Analecta Praehistorica Leidensia*, vol. 26, 221-234.
- Oudemans, T.F.M. & Boon, J.J. in press, 'A comparative study of extractable lipids in the shards and surface residual crusts of ceramic vessels from Neolithic and Roman Iron Age settlements in the Netherlands', in H. Barnard & J. Eerkens (eds), *Theory and Practice of Archaeological Residue Analysis*, Archaeopress, Oxford.
- Oudemans, T.F.M., Boon, J.J. & Botto, R.E. 1992, 'Tracing vessel use by combined spectroscopic studies of solid organic residues on prehistoric pottery', *Archaeometry* '92 Conference Abstracts, p. 25.
- Oudemans, T.F.M., Boon, J.J. & Botto, R.E. in press-a, 'FTIR and solid-state ¹³C CP/MAS NMR spectroscopy of charred and non-charred solid organic residues preserved in Roman Iron Age vessels from the Netherlands', *Archaeometry*.
- Oudemans, T.F.M., Boon, J.J. & Eijkel, G.B. in press-b, 'Identifying biomolecular origins of solid organic residues preserved on Iron Age pottery using DTMS and MVA', *Journal of Archaeological Science*.
- Oudemans, T.F.M., Eijkel, G.B. & Boon, J.J. 2005, 'DTMS and DTMS/MS study of solid organic residues preserved on ancient vessels', *the 33rd International Symposium on Archaeometry, 22-26 April 2002*, eds H. Kars & E. Burke, Vrije Universiteit, Amsterdam, 501-505.
- Oudemans, T.F.M. & Erhardt, D. 1996, 'Organic residue analysis in ceramic studies: implications for conservation treatment and collections management', *Archaeological conservation and its consequences*, eds A. Roy & P. Smith, The International Institute for Conservation of Historic and Artistic Works, London, Copenhagen, 137-142.
- Oudemans, T.F.M., Erhardt, D.W. & von Endt, D.W. 1996, 'Organic Residues as Use Indicators: Comparative Spectroscopic Studies of Contemporary and Archaeological Kalinga Ceramics', *International Symposium on Archaeometry*, p. 80.
- Oudemans, T.F.M. & Hopwood, W. unpublished results.
- Passi, S., Rothshild-Boros, M.C., Fasella, P., Nazzaro-Parro, M. & Whitehouse, D. 1981, 'An application of high performance liquid chromatography to the analysis of lipids in archaeological samples', *Journal of Lipid Research*, vol. 22, 778-784.
- Pastorova, I., Arisz, P.W. & Boon, J.J. 1993a, 'Preservation of D-glucose-oligosaccharides in cellulose chars', *Carbohydrate Research*, vol. 248, 151-165.
- Pastorova, I., Botto, R.E., Arisz, P.W. & Boon, J.J. 1994, 'Cellulose char structure: a combined analytical Py-GC-MS, FTIR and NMR study', *Carbohydrate Research*, vol. 262, 27-47.

- Pastorova, I., Oudemans, T.F.M. & Boon, J.J. 1993b, 'Experimental polysaccharide chars and their "fingerprints" in archaeological food residues', *Journal of Analytical and Applied Pyrolysis*, vol. 25, 63-75.
- Patrick, M., de Koning, A.J. & Smith, A.B. 1985, 'Gas liquid chromatographic analysis of fatty acids in food residues from ceramics found in the Southwestern Cape, South Africa', *Archaeometry*, vol. 27, 231-236.
- Plog, S. 1980, *Stylistic variation in prehistoric ceramics: Design analysis in the American Southwest*, Cambridge University Press, New York.
- Pouwels, A.D., Eijkel, G.B. & Boon, J.J. 1989, 'Curie-point pyrolysis-capillary gas chromatography-high resolution mass spectrometry of microcrystalline cellulose', *Journal of Analytical and Applied Pyrolysis*, vol. 14, 237-280.
- Raven, A.M., van Bergen, P.F., Stott, A.W., Dudd, S.N. & Evershed, R.P. 1997, 'Formation of long-chain ketones in archaeological pottery vessel by pyrolysis of acyl lipids', *Journal of Analytical and Applied Pyrolysis*, vol. 40-41, 267-285.
- Reber, E.A. & Evershed, R.P. 2004a, 'How Did Mississippians Prepare Maize? The Application of Compound-Specific Carbon Isotope Analysis to Absorbed Pottery Residues From Several Mississippi Valley Sites.' *Archaeometry*, vol. 46, no. 1, 19-33.
- Reber, E.A. & Evershed, R.P. 2004b, 'Identification of maize in absorbed organic residues: a cautionary tale', *Journal of Archaeological Science*, vol. 31, 399-410.
- Regert, M., Bland, H.A., Dudd, S.N., van Bergen, P.F. & Evershed, R., P 1998, 'Free and bound fatty acid oxidation products in archeological ceramic vessels', *Philosophical Transactions of the Royal Society of London, series B*, vol. 265, no. 1409, 2027-2032.
- Regert, M., Colinart, S., Degrand, L. & Decavallas, O. 2001, 'Chemical alteration and use of beeswax through time: Accelerated aging tests and analysis of archaeological samples from various environmental contexts', *Archaeometry*, vol. 43, no. 4, 549-569.
- Regert, M. & Rolando, C. 2002, 'Identification of Archaeological Adhesives Using Direct Inlet Electron ionization Mass Spectrometry', *Analytical Chemistry*, vol. 74, no. 5, 965-975.
- Regert, M., Vacher, S., Moulherat, C. & Decavallas, O. 2003, 'Adhesive production and pottery function during the Iron Age at the site of Grand Aunay (Sarthe, France)', *Archaeometry*, vol. 45, no. 1, 101-120.
- Reyers, O. 1985, *Eindrapport Uitgeest 54, Project Oer-IJ Estuarium*, IPP, Universiteit van Amsterdam, Amsterdam.
- Rice, P.M. 1987, *Pottery analysis: a sourcebook*, Chicago.
- Rice, P.M. 1990, 'Functions and Uses of Archaeological Ceramics', in W.D. Kingery (ed), *The Changing Roles of Ceramics in Society: 26,000 B.P. to the Present*, The American Ceramic Society, Westville, 1-10.
- Rice, P.M. 1996a, 'Recent ceramic analysis: 1. Function, style and origins', *Journal of Archaeological Research*, vol. 4, 133-163.
- Rice, P.M. 1996b, 'Recent ceramic analysis: 2. Composition, production and theory', *Journal of Archaeological Research*, vol. 4, no. 165-202.
- Rottländer, R.C.A. 1990, 'Lipid analysis in the identification of vessel contents', in W.R. Biers & P.E. McGovern (eds), *Organic contents of ancient vessels: Materials analysis and archaeological investigation*, MASCA, University of Pennsylvania, Philadelphia, 37-40.
- Rottländer, R.C.A. 1991, 'Die Resultate der modernen Fettanalytik und ihre Anwendung auf prähistorische Forschung', *Archaeo-Physika*, vol. 12.
- Rottländer, R.C.A. & Blume, M. 1980, 'Chemische Untersuchungen an Michelsberger Scherben', *Archaeo-Physika*, vol. 7, 71-86.
- Rottländer, R.C.A. & Schlichtherle, H. 1979, 'Food identification of samples from archaeological sites', *Archaeo-Physika*, vol. 10, 260-267.
- Rottländer, R.C.A. & Schlichtherle, H. 1980, 'Gefäßinhalte - Eine kurz kommentierte Bibliographie', *Archaeo-Physika*, vol. 7, 61-70.
- Rottländer, R.C.A. & Schlichtherle, H. 1983, 'Analyse frühgeschichtlicher Gefäßinhalte', *Die Naturwissenschaften*, vol. 70, 33-38.
- Rye, O.S. 1976, 'Keeping your temper under control', *Archaeology and Physical Anthropology in Oceania*, vol. 11, no. 2, 106-137.
- Scanlon, J.T. & Willis, D.E. 1985, 'Calculation of flame ionisation detector relative response factors using the effective carbon number concept', *Journal of Chromatographic Science*, vol. 23, 333-340.
- Schiffer, M.B. 1972, 'Archaeological context and systemic context', *American Antiquity*, vol. 37, no. 2, 156-165.
- Schiffer, M.B. 1983, 'Toward the identification of formation processes', *American Antiquity*, vol. 48, no. 4, 675-706.
- Schmid, E.M., Knicker, H., Bäumer, R. & Kögel-Knaber, I. 2001a, 'Chemical composition of organic matter in Neolithic soil materia as revealed by CPMAS ¹³C NMR spectroscopy, polysaccharide analysis, and CuO

Bibliography

- oxidation', *Soil Science*, vol. 166, no. 9, 569-584.
- Semenov, S.A. 1964, *Prehistoric technology*, Barnes and Noble, London.
- Shaw, N. 1974, 'Lipid composition as a guide to classification of Bacteria', in D. Perlman (ed), *Advances in Applied Microbiology 17*, Academic Press, New York, 63-109.
- Shedrinski, A.M., Stone, R.E. & Baer, N.S. 1991, 'Pyrolysis gas chromatographic studies on Egyptian archaeological specimens: organic patinas on the "Three Princesses" gold vessels', *Journal of Analytical and Applied Pyrolysis*, vol. 20, 229-238.
- Shepard, A.O. 1976, *Ceramics for the Archaeologist*, vol. 609, Carnegie Institute of Washington, Washington, DC.
- Sherriff, B.L., Tisdale, M.A., Sayer, B.G., Schwartz, H.P. & Knyf, M. 1995, 'Nuclear magnetic resonance spectroscopic and isotopic analysis of carbonized residues from subarctic Canadian prehistoric pottery', *Archaeometry*, vol. 37, 95-111.
- Sinopoli, C., M. 1999, 'Levels of complexity: Ceramic variability at Vijayanagara', in J.M. Skibo & G.M. Feinman (eds), *Pottery and People - A Dynamic Interaction*, The University of Utah Press, Salt Lake City, 115-136.
- Skibo, J.M. 1992, *Pottery function: a use-alteration perspective*, Plenum Press, New York.
- Skibo, J.M. & Blinman, E. 1999, 'Exploring the Origins of Pottery on the Colorado Plateau', in J.M. Skibo & G.M. Feinman (eds), *Pottery and People, A Dynamic Interaction*, University of Utah Press, Salt Lake City, 171-183.
- Smith, G.G., Reddy, G.S. & Boon, J.J. 1988, 'Gas chromatographic-mass spectrometric analysis of the Curie-point pyrolysis products of some dipeptides and their diketopiperazines', *Journal of the Chemical Society Perkin Trans. II*, 203-211.
- Spangenberg, J.E., Jacomet, S. & Schibler, J. 2006, 'Chemical analyses of organic residues in archaeological pottery from Arbon Bleiche 3, Switzerland - evidence for dairying in the late Neolithic', *Journal of Archaeological Science*, vol. 33, no. 1, 1-13.
- Stankiewicz, B.A., van Bergen, P.F., Duncan, I.J., Carter, J.F., Briggs, D.E.G. & Evershed, R.P. 1996, 'Recognition of chitin and proteins in invertebrate cuticles using analytical pyrolysis/gas chromatography and pyrolysis/mass spectrometry', *Rapid Communications in Mass Spectrometry*, vol. 10, 1747-1757.
- Stern, B., Heron, C., Corr, L., Serpico, M. & Bourriau, J. 2003, 'Compositional variations in aged and heated Pistacia resin found in Late Bronze Age Canaanite amphorae and bowls from Amarna, Egypt', *Archaeometry*, vol. 45, no. 3, 457-469.
- Stern, B., Heron, C., Serpico, M. & Bourriau, J. 2000, 'A comparison of methods for establishing fatty acid concentration gradients across potsherds: a case study using Late Bronze Age Canaanite amphorae', *Archaeometry*, vol. 42, no. 2, 399-414.
- Taylor, R.E. 2004, 'Setting up C-13 CP/MAS experiments', *Concepts in Magnetic Resonance Part A*, vol. 22, 37-49 <Posted at the eScholarship Repository <http://repositories.cdlib.org/postprints/278>>.
- ten Anscher, T.J. 2000/2001, 'Huisplattegronden uit de late Swifterbantcultuur op P14 gem. Noordoostpolder', *Archeologie*, vol. 10, 80-85.
- Therkorn, L.L. 2004, 'Landscaping the powers of darkness and light: 600 BC - 350 AD settlement concerns of Noord-Holland in wider perspective.' Universiteit van Amsterdam, Amsterdam.
- Therkorn, L.L. & Abbink, A.A. 1987, 'Seven levee sites: B. C. D. G. H. F and P' in R.W. Brandt, G.-v. Waateringe & S.E. Van der Leeuw (eds), *Asendelver Polder Papers 1*, Amsterdam, 177-224.
- Thornton, N.D., Morgan, E.D. & Celoria, F.S.C. 1970, 'The composition of bog butter', *Science and Archaeology*, vol. 2/3, 20-25.
- Tromp, P.J.J., Moulijn, J.A. & Boon, J.J. 1988, 'Coal characterization by means of Curie-point pyrolysis techniques', in Y. Yürü (ed), *New Trends in Coal Science*, Kluwer Academic Publishers, Dordrecht, 241-269.
- Tsuge, S. & Matsubara, H. 1985, 'High-resolution pyrolysis-gas chromatograph of proteins and related materials', *Journal of Analytical and Applied Pyrolysis*, vol. 8, 49-64.
- Van der Leeuw, S.E. & Pritchard, A.C. (eds) 1984, *The Many Dimensions of Pottery: Ceramics in Archaeology and Anthropology*, University of Amsterdam, Amsterdam.
- Van der Weerd, J. 2002, 'Microscopic analysis of Traditional Oil Paint', University of Amsterdam, Amsterdam.
- Van der Weerd, J., Brammer, H., Boon, J.J. & Heeren, R.M.A. 2002, 'Fourier transform infrared microscopic imaging of an embedded paint cross-section', *Applied Spectroscopy*, vol. 56, no. 3, 275-283.
- Van der Weerd, J., Heeren, R.M.A. & Boon, J.J. 2004a, 'Preparation methods and accessories for the infrared spectroscopic analysis of multi-layer paint films', *Studies in Conservation*, vol. 49, 193-210.
- Van der Weerd, J., Smith, G.D., Firth, S. & Clark, R.J.H. 2004b, 'Identification of black pigments on prehistoric Southwest American potsherds by infrared and Raman Microscopy', *Journal of Archaeological Science*, vol. 31, 1429-1437.

- van Geel, B., Buurman, J., Brinkkemper, O., Schelvis, J., Aptroot, A., Reenen, G.v. & Hakbijl, T. 2003, 'Environmental reconstruction of a Roman period settlement site in Uitgeest (The Netherlands), with special reference to coprophilous fungi', *Journal of Archaeological Science*, vol. 30, no. 7, 873-883.
- van Heeringen, R.M. 1992, 'The Iron Age in the Western Netherlands', Dissertation thesis, University of Amsterdam, Amsterdam.
- van Heeringen, R.M. & Koot, C.W. 2005, *De Late Prehistorie in West-Nederland, De Nationale Onderzoeksagenda Archeologie, Hoofdstuk 14*, <http://www.archis.nl/noaa/>, NOaA groep, viewed 3 July 2006.
- van Heeringen, R.M., Smit, A. & Theunissen, E.M. 2004, 'Archaeology in the future - baseline measurement of the physical quality of the archaeological monument at Broekpolder', *Nederlands Archeologische Rapporten*, vol. 27.
- van Smeerdijk, D.G. & Boon, J.J. 1987, 'Characterisation of subfossil Sphagnum leaves, rootlets of Ericaceae and their peat by pyrolysis-high-resolution gas chromatography-mass spectrometry', *Journal of Analytical and Applied Pyrolysis*, vol. 11, 377-402.
- Varién, M.D. & Mills, B.J. 1997, 'Accumulations Research: Problems and Prospects for estimating Site Occupation Span', *Journal of Archaeological Method & Theory*, vol. 4, no. 2, 141-191.
- Vos, P.C. 1983, 'De relatie tussen geologische ontwikkeling en de bewoningsgeschiedenis in de Assendelver Polders vanaf 1000 voor Chr', *Westerheem*, vol. 32, 6-32.
- Waller, G.R. 1972, *Biochemical Applications of Mass Spectrometry*, New York.
- Waller, G.R. & Dermer, O.C. 1980, *Biochemical applications of mass spectrometry: first supplementary volume*, John Wiley and Sons, New York.
- Wang, Q. & Andrews, K.C. 2002, 'Technological investigation of the decorative coatings on Yangshao pottery from Henan, China', *Archaeometry*, vol. 2002, no. 2, 241-250.
- Weerts, H.T.J., Cleveringa, P., Ebbing, J.J.J., de Lang, F.D. & Westerhoff, W.E. 2000, *De Lithostratigrafische indeling van Nederland - Formaties uit het Tertiair en Quartair, Versie 2000, Rapport NITG 00-95-A*, Nederlandse Organisatie voor toegepaste natuurwetenschappelijk onderzoek TNO, Utrecht.
- Williams, D.H. & Fleming, I. 1966, *Spectroscopic Methods in Organic Chemistry*, McGraw-Hill Publishing Company limited, London.
- Windig, W., Haverkamp, J. & Kistemaker, P.G. 1982, 'Interpretation of sets of pyrolysis mass spectra by discriminant analysis and graphical rotation', *Analytical Chemistry*, vol. 55, no. 1, 81-87.
- Woltering, P.J. 1982, 'Uitgeest-Groot Dorregeest', *Archeologische Kroniek van Holland over 1981, I. Noord-Holland*, 204-208.
- Woltering, P.J. 1983, 'Uitgeest-Groot Dorregeest', *Archeologische Kroniek van Holland over 1982, I. Noord-Holland*, 214-220.
- Wong, D.W.S. 1989, *Mechanism and Theory in Food Chemistry*, Van Nostrand Reinhold, New York.
- Woodbury, S.E., Evershed, R.P. & Rossell, J.B. 1998, 'Purity assessments of major vegetable oil based on $\delta^{13}\text{C}$ values of individual fatty acids', *Journal of the American Oil Chemistry's Society*, vol. 75, no. 3, 371-379.
- Woods, A.J. 1986, 'Form, Fabric, and Function: Some Observations on the Cooking Pot in Antiquity', in W.D. Kingery (ed), *Technology and Style*, The American Ceramic Society, Columbus, Ohio, 157-172.
- Zagwijn, W.H. 1986, *Nederland in het Holoceen. Geologie van Nederland 1*, Haarlem.
- Zoetbrood, P.A.M. 1985, *Romeinse Importen in Noord-Nederland*, Amsterdam University, Amsterdam.

