POSTER 179

Identification and quantification of adipocere from human grave soils and its forensic application

Sara Sousa Queirós[1*], Barbara von der Lühe[2], Inês Morais Caldas[1,3,4], Lorna Dawson[5], Áurea Madureira-Carvalho[1,6]

[1]*TOXRUN – Toxicology Research Unit, University Institute of Health Sciences, CESPU, CRL, 4585-116 Gandra, Portugal.*

[2]*Faculty of Geosciences, University of Münster, Germany.*

[3]*Faculdade de Medicina Dentária, Universidade do Porto, Rua Dr. Manuel Pereira da Silva, s/n, 4200-393 Porto, Portugal.*

[4]*CFE - Centro de Ecologia Funcional, Departamento de Ciências da vida, Universidade de Coimbra, Calçada Martim de Freitas, 3000-456 Coimbra, Portugal.*

[5]*Centre for Forensic Soil Science, Environmental and Biochemical Sciences Group, James Hutton Institute, Aberdeen, Scotland, UK.*

[6]*LAQV/REQUIMTE, Laboratório de Farmacognosia, Departamento de Química, Faculdade de Farmácia, Universidade do Porto, Rua de Jorge Viterbo Ferreira, 228, 4050-313 Porto, Portugal.*

*✉ *sarasousaqueiros@gmail.com*

Doi: https://doi.org/10.51126/revsalus.v4iSup.446

Resumo

Introduction: Human body degradation on soil leads to the release and accumulation of a wide series of decomposition products. Their analysis allows to establish a temporal relationship between compounds found in soil and different stages of decomposition, helping determine the post-mortem interval [1]. In addition, the identification of these components in soil may be a strong indicator that a human body had been buried in a particular location [1, 2]. **Objectives:** As such, we herein aimed to review the main organic compounds deriving from human decomposition, already identified in soils. **Methods:** The terms "soil chemistry", "human decomposition" and "adipocere" were searched in PubMed (US National Library of Medicine), without time limitation. **Results:** The autolysis processes occurring during cadaveric decomposition hydrolyse adipose tissue; if the environment is humid and hot, adipocere, a mixture of saturated (myristic, palmitic and stearic) and unsaturated fatty acids (oleic and palmitoleic) and triglycerides, can be formed [3]. Identifying and quantifying these lipidic compounds, enables an association with the different decomposition stages. The most frequently used identification and quantification technique of adipocere is Gas Chromatography coupled with Mass Spectrometry [3]. Normally, in advanced human decomposition stages, adipocere is present in greater abundances. Different body parts have different predominance of adipocere, with the abdominal area showing a higher lipid concentration, justified by the greater volume of adipocytes in this region [4]. The knowledge of adipocere compounds present in soil can also make possible to test the possible movement of a body, since the state of decomposition must agree with the existing compounds in the place where it is found. Additionally, adipocere may also contribute to the preservation of evidence, possibly helping ascertain the cause of death [4]. Other compounds such as steroids can also be identified and quantified in soils, aiding forensic investigations [1]. Moreover, intrinsic and extrinsic factors affecting decomposition should be considered [5]. **Conclusion:** The existence of adipocere in soil may contribute to establish the post-mortem interval, simultaneously indicating that a certain soil was possibly in contact with a decomposing body. However, the exact composition of adipocere remains to be studied.

References:

[1] Von der Lühe B, Birk, JJ, Dawson L, Mayes RW, Fiedler S. Steroid fingerprints: Efficient biomarkers of human decomposition fluids in soil, Organic Geochemistry, vol 124, p. 228-237, 2018.

[2] Forbes SL, Stuart BH, Dent BB. The identification of adipocere in grave soils, Forensic Science International, vol 127, p. 225-230, 2002.

[3] Forbes SL, Keegan J, Stuart BH, Dent BB. A gas chromatography-mass spectrometry method for the detection of adipocere in grave soils, European Journal Lipid Science and Technology, vol 105, p. 761-768, 2003.

[4] Magni PA, Lawn J, Guareschi EE. A practical review of adipocere: Key findings, case studies and operational considerations from crime scene to autopsy, Journal of Forensic and Legal Medicine, vol. 78, p. 102-109, 2021.

5. Dent BB, Forbes SL, Stuart BH. Review of human decomposition processes in soil, Environmental Geology, vol. 45, p. 576–585, 2004.