

Presence of Lipid Compounds in Soil of Amazon Archaeological Sites

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Introduction

Amazon archaeological soils have been largely studied in many chemical parameters, but lipid analysis have not been explored in their whole potential in these soils.¹

Lipids, as biomarkers, provide a diagnostic mean for answering specific questions related to soil organic matter engendered by various overlying vegetation changes or anthropogenic activity.²

The aim of present study was to evaluate the presence of lipid biomarker in two Amazon archaeological soils: Terra Preta do Índio (TPI) and Terra Mulata (TM).

Top soils (5g) were extracted and sonicated with a solvent mixture and then fractionated by four separated solvent systems using a silica gel:alumina column (F1 – hexane, F2 – dichloromethane, F3 ethyl acetate:methanol, 3:1; F4 ethyl acetate:acetic acid 3:1). Lipids were analysed using GC-MS system.

Results and Discussions

Four classes of lipid components were detected, n-alkanes, n-alcohols, steroids, and n-alkanoic acids in both soils. n- Alkane typified by a monomodal distribution maximized at C₂₉ in TPI soil and C₃₁ in TM soils. The range of n-alkanes were different with a higher range in the TPI soil (Fig. 1).

Distribution of alcohols compounds, n-alcohols ranging from C₁₄ – C₃₄ with a maximum at C₂₈ and steroids, were similar in both soil, but steroids were the major compounds in TPI and n-alcohols in case of TM (Fig. 1).

n-Alkanoic acid distributions obtained for most of soil samples exhibit a bimodal distribution of components with distinct relative abundance. TPI shows a range of C₁₆ to C₃₄ carbon atoms with a higher maximum at C₁₆ and a lower maximum at C₃₀. In contrast, TM depicted a range of C₁₆ to C₃₂ carbon atom with a higher maximum at C₁₆ and a lower maximum at C₂₄ (Fig. 1).

An extra class of compounds were detected in the TM soil, the ω-hydroxyalkanoic acids.

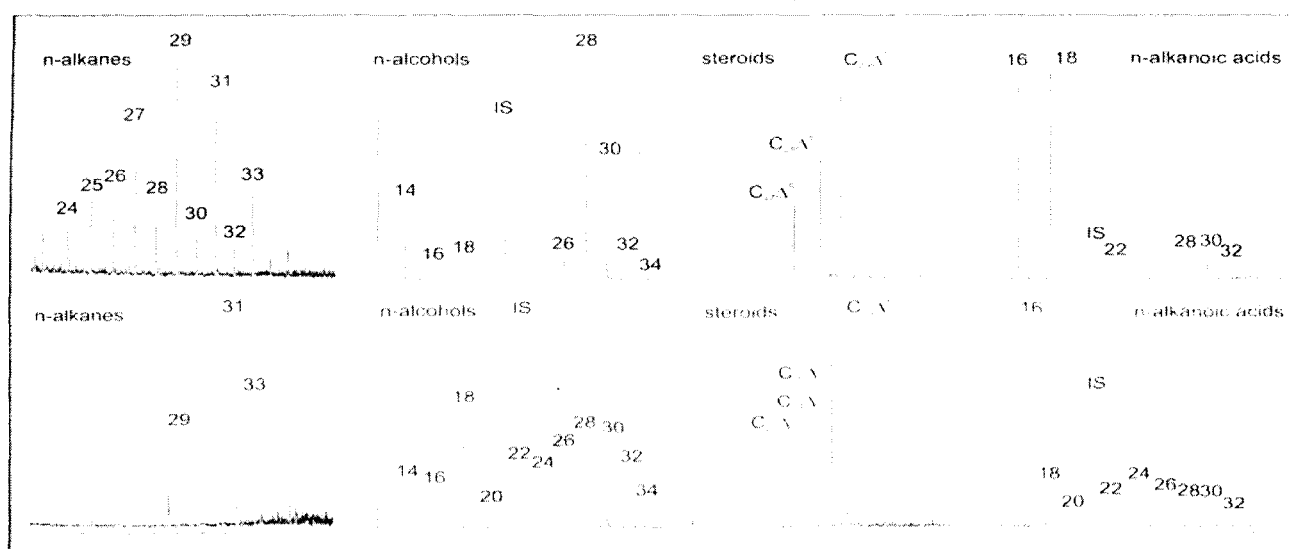


Figure 1. Partial total ion current (TIC) showing the major classes of lipid compounds identified in the soils of Amazon Archaeological Sites. "Upper" Terra Preta do Índio (TPI) and "below" Terra Mulata (TM). Numbers refer to the number of carbon atoms in the lipids compounds.

Conclusions

Both archaeological soils showed a good preservation of at least four different classes of organic compounds. Therefore others studies identifying the source of this compounds will be carry on in theses soils samples in the future.

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