

## **APPLICATION OF GAS-CHROMATOGRAPHY USING THE CARBURANE SOFTWARE IN THE OIL CHARACTERIZATION FROM DIFFERENT RESERVOIRS**

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Geochemical petroleum characterization allows the recognition of depositional paleoenvironment of source rocks, the level of maturation of the oil and possible secondary processes that can change the oil composition after the reservoir is filled.

The geochemical characteristics of reservoired fluids in a Brazilian oil field were studied by gas chromatography analysis (GC) with the CARBURANE software combined with statistical data analysis. CARBURANE is a chromatography data processing software that provides detailed characterization and quantification of hydrocarbons in petroleum (Ferreira *et al*, 2006). Originally developed for refining purposes, it allows the identification of the whole set of isomers of organic compounds with 5 to 15 carbon atoms. Currently, this software is being used in Petrobras for reservoir geochemistry and characterization studies, even for biodegraded oils with low API gravities.

The aim of this study was to apply this new analytical methodology (GC-CARBURANE) to characterize oils produced from an oil field located in the central part of Campos Basin, Brazil. There are two producing intervals that involve Oligocene (the shallowest ones) and Paleocene-Eocene reservoirs (the deepest ones). The produced oils have the same origin and maturation according to biomarker results, and migrated from the same source kitchen. Pressure and seismic reservoir data suggested the possible communication between the reservoirs through normal faults. Thus, this new quantitative methodology was used to identify compositional differences associated with variations in the biodegradation intensity.

The analytical results were applied to calculate ratios between linear paraffins and adjacent saturated compounds using their concentrations in mass percentage and these ratios bring out the small differences in biodegradation among the crude oils. The linear paraffins are more susceptible to the biodegradation process when compared to the adjacent compounds and are more appropriate for the evaluation of the early stages of biodegradation. The statistical analysis shows two different oil groupings and the resulting dendogram is shown in

Figure 1. The first group comprises the produced oils from the shallowest reservoirs and the second group involved those from the deepest reservoirs, suggesting that the two production zones are not in communication anywhere in the oil field.

In conclusion, this approach allowed us to discriminate produced oils from adjacent reservoirs containing oils with similar molecular composition, besides can suggesting no oil zone communication among these reservoirs.

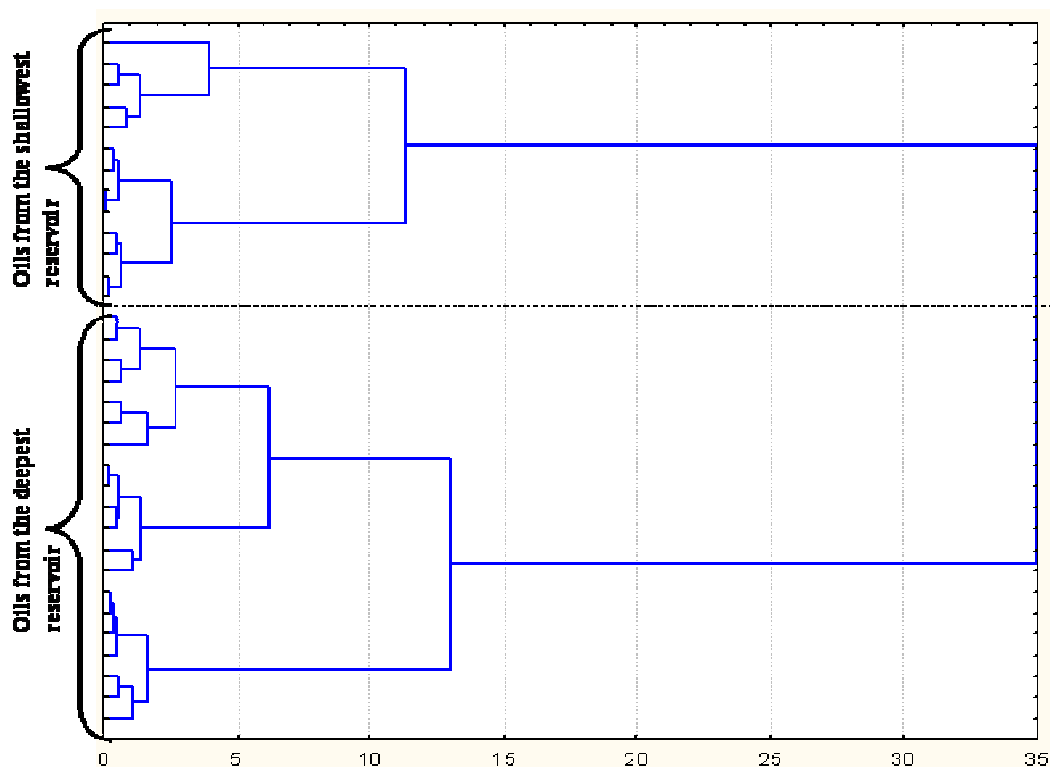


Figure 1. Dendrogram obtained from the cluster analysis of GC data processed with the CARBURANE software from a set of crude oils from a field in central part of Campos Basin, Brazil.

## REFERENCES

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