

Geochemical characterization of oils discovered from Offshore Benin Basin (Benin, West Africa)

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In order to establish the origin of the discovered oils in relation to their potential source rocks, 4 oil samples and 2 rock extracts samples from wells R16, R17, R24, R24, G20 and G21 in the offshore of the Benin coastal sedimentary basin constituted the main part of the study material. This is based on the chromatographic study of saturated and aromatic hydrocarbons in the samples. Chromatograms of the saturated fraction and geochemical ratios (CPI, Pr/Ph, Pr/nC17 and Ph/nC18) of the corresponding aliphatic hydrocarbons revealed that: (1) the oils from the Turonian and Albian reservoirs in the Sèmè oil field (shallow offshore) are virtually identical and would come from a common source rock. However, the oil in the H6 horizon is heavier (API = 22°C) than in the H6.5 horizon (API = 36°C). These oils are relatively mature and thick, but appear to have been washed into the reservoir. Carbon isotope data suggest that these oils are derived from algal organic matter; (2) the oils from the G20 and G21 wells (API = 42.47°C and 34.24°C) in the deep offshore are about the same (but the G21 well is less mature) and come from the same source that can be the source of the rock extract from the G20 well (Albian). The dominance of the Pr/Ph ratio suggests that the organic matter from which these oils originate is mixed: marine and terrestrial. These oils are apparently different from those of the R16 and R17 wells in the Sèmè field, which are much richer in light aromatics. GC-MS analyses will make it possible to specify this origin by studying biomarkers because several factors can affect sampling conditions before laboratory analyses by GC. Without further precision analysis, these changes can make the interpretations resulting from the chromatograms obtained speculative.

Keywords: Gas chromatography, oils, source rock, origin, coastal sedimentary basin of Benin