

The Tunisian Jurassic Organic Facies: Petrographic Characterization

BEKIR-INOUBLI, Halima

Entreprise Tunisienne d'activités Pétrolières,
27 bis Avenue Khéreddine Pacha, Tunis, Tunisia

Organic petrographic analyses using transmitted and reflected lights have been applied on concentrated organic matter of Jurassic outcrops and wells selected from six tunisian onshore and offshore areas: the North, the Central Atlas, the Chotts area, the Tataouine region, the Southern part of the Gulf of Gabes and the Saharian platform.

These analyses revealed that Tunisian jurassic sediments are characterised by a big variability on the richness, the quality and the maturity of their organic contents.

These parameters are specially controlled by the depositional setting and the preservational conditions.

The more rich layers are Toarcian-Bajocian in age; the Callovian-Oxfordian layers are less rich; the Kimmeridgian ones are relatively poor in organic matter. Laterally, Jurassic shale facies of the central part of Tunisia is relatively richer than its equivalent where Jurassic facies becomes detritic and evaporitic southwards.

In order to define the quality of the Toarcian to Callovian-Oxfordian organic matter, a relative proportion, of different organic compounds, was evaluated visually. Organic constituents have been grouped into three categories:

-a hydrogen-poor inertinite-vitrinite group or woody debris, particularly abundant in the North (Jebel Boukornine) at DJM-1 well and in Tataouine area;

-a pollen and spore group containing also cutinite, found in the Central Atlas, the Chotts area, at El Biban field and in the Saharian platform;

-an amorphous organic matter group (sapropelic), which is known only at Echo-1 well.

Maturity assessment is based both on the vitrinite reflectance (R°) and the thermal alteration index (TAI) of palynomorphes; analyses, using only the reflected light, were hampered by the poor quality of the vitrinite particles (variability of populations reworked and altered vitrinite).

With the exception of the Chaabat Laataris locality, where the Toarcian deposits belong to the immature zone, the Toarcian to Callovian-Oxfordian series are, in general, at an advanced maturity stage (oil window); locally, they can reach the gas zone.

The Jurassic sequence, studied trough out Tunisia, is, in general, a local moderate potential source-rock. It's a good source rock only at Echo-1 well and a poor source rock at the Jurassic outcropping deposits and at DJM-1 well.

In addition, more attention must be taken to the Upper Jurassic (Kimmeridgian and Tithonian) and to the Lower Jurassic which have good opportunities as reservoirs for oil and/or gas (offshore, in the Southern part of Gulf of Gabes, and onshore, in the Central part of Tunisia).

Key words: organic matter, vitrinite, inertinite, Jurassic, Toarcian, Callovian-Oxfordian, richness, quality, maturity, vitrinite reflectance, thermal alteration index, source rock, oil window