

Macromolecular Composition of Tertiary and Cretaceous Resins from India: It's Application in Hydrocarbon Exploration

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Resins are plant exudates which harden on atmospheric contact. They can occur as lumps in sediments or coal, or at a microscopic scale as the maceral resinite within coal and due to their non-degraded nature can be well-preserved for hundreds of millions of years. However, during late stage diagenesis or early stage catagenesis, resins also yield many saturated and aromatic products which can contribute to crude oils. Fossil resins are ubiquitous in Indian coals and sediments. The Tertiary resins have been collected from Cambay, Kutch, Kerala-Konkan, and Cauvery Basins, whereas the Cretaceous resin sample has been collected from Meghalaya. The pyrolysis products of Tertiary resins are characterized by cadalene based C_{15} sesquiterpenoids and their dimers (bicadinane) (Figure 1). These resins are derived from angiosperm family Dipterocarpaceae known to produce dammar resin (Dutta et al., 2009; Mallick et al., 2009).

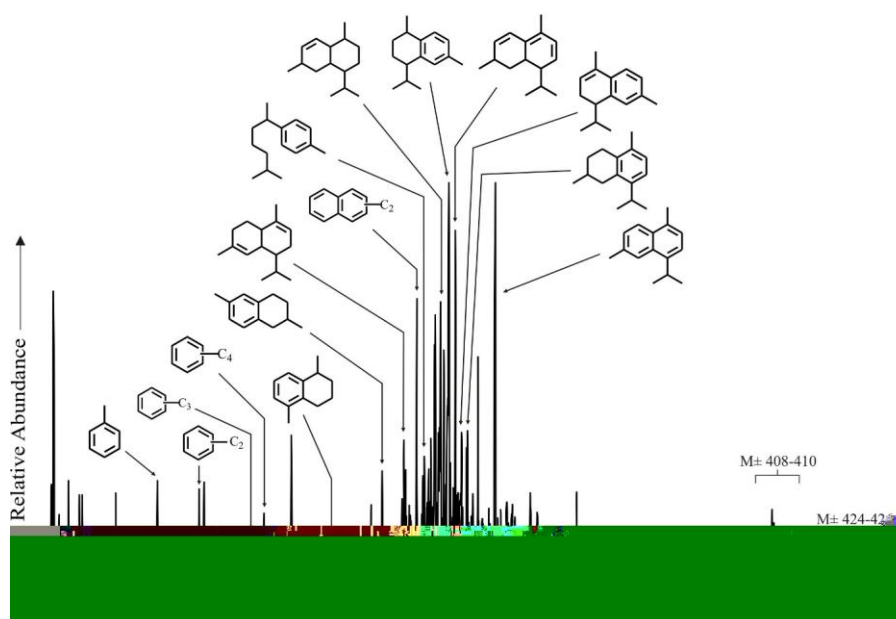


Figure 1. Total Ion Chromatograms of Tertiary resin sample from Vastan lignite mine, Cambay Basin resulting from Pyrolysis-Gas Chromatography-Mass Spectrometry.

The Cretaceous resin from Meghalaya mostly comprised of abietane type diterpenoids with labdane derivatives originated from coniferales, probably from family Pinaceae. The wide occurrence of these cadalene-type terpenoids in SE Asian oils suggests dammar resins may be a significant regional precursor of petroleum hydrocarbons, and these may be important biomarkers for exploration purposes (i.e., source rock–oil and oil–oil correlations) in Indian sedimentary basins.

Reference

- Dutta, S., Mallick, M., Bertram, N., Greenwood, P.F., Mathews, R.P., 2009. Terpenoid composition and class of Tertiary resins from India. *International Journal of Coal Geology* 80, 44-50.
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