# Characterization of Natural Resin Shellac by Reactive Py-GC in the Presence of Organic Alkali

**[Background]** Shellac is a thermosetting resin of animal origin found in south-east Asia and is used in a wide variety of applications such as adhesives, sealants, insulating materials, coatings, etc. It features thermoplasticity, oil resistibility, cohesiveness, insulating ability, and nonpoisonous property. The chemical composition varies depending on growing areas, species of insects, environmental conditions, etc. Various analytical techniques have been used to analyze shellac resins, however all with difficulties. The reactive Py-GC in the presence of tetramethylammonium hydroxide (TMAH) was applied to the compositional analysis of shellac without any tedious pretreatments of the samples.
**[Experimental]** Eight shellac samples from India and Thailand were used. All the shellac samples were cryo-milled into a fine powder (<60 mesh) prior to Py-GC analysis. About 90µg of shellac sample and 2µL of TMAH solution were introduced into the pyrolyzer. Pyrolysis was done at relatively low temperature of 400˚C.
**[Results]**. Figure 1 shows typical pyrograms of Indian shellac at 400˚C with and without addition of TMAH. In Figure 1a, only weak and broad peaks of terpenic acids and wax components were observed, while in Fig 1b, a series of sharp peaks due to the methyl derivatives of shellac constituents were observed with better resolution and higher sensitivity. With these results shown, this technique was found to provide simple and quick compositional analysis of shellac.

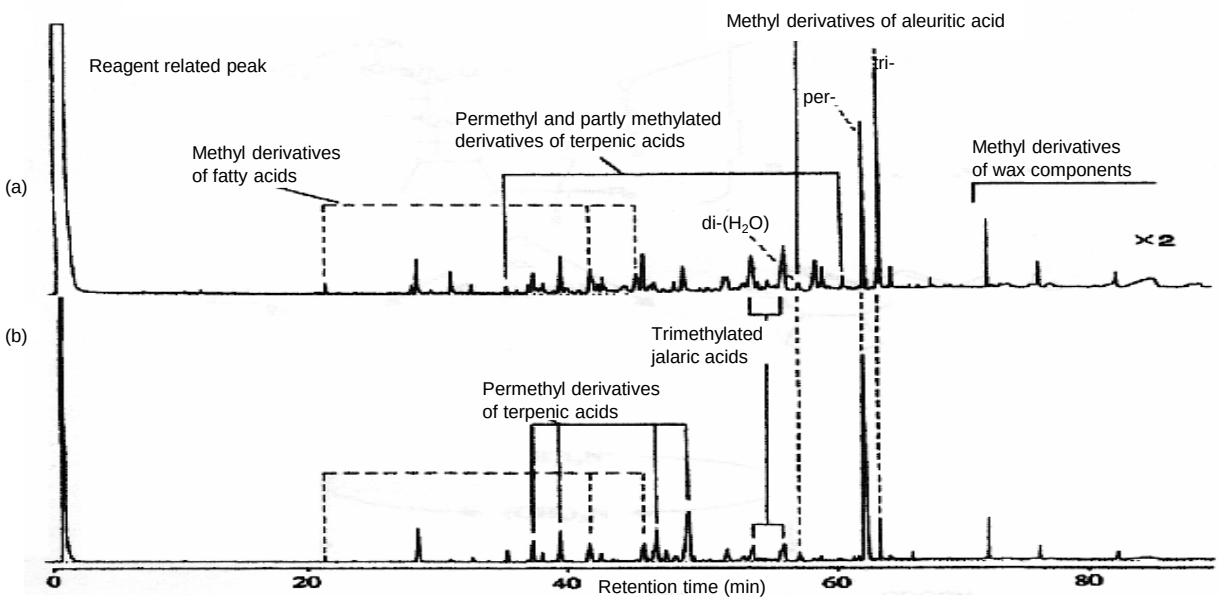


**Figure 1.** Typical pyrograms of Indian Shellac generated at 400˚C, (a) in the absence of TMAH and (b) in the presence of TMAH aqueous solution

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**Keywords :** Shellac, Reactive Pyrolysis, Py-GC, TMAH

**Products used :** Multi-functional pyrolyzer

**Applications :** General polymer analysis

**Related technical notes :**

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