

TITLE: Astrobiology

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In the new and emerging field of astrobiology many different techniques and methods are being used to answer the fundamental questions that govern the laws of nature and the very existence of life as a whole . The questions of the origin and the evolution of life are far from answered and much studies are being done to address them.

One such approach to the study of the conditions that support extreme forms of life in hostile environments is that of the survival of microorganisms in the Trinidad and Tobago Pitch Lake. The pitch Lake consisting mainly of hydrocarbons contains an atmosphere that can prove hostile to the development of life of organisms as we know it. An organism living in Pitch or asphalt would have no access to oxygen (anaerobic) and have no access to light.

To find out the chemical basis for the biological phenomena of the existence of the organism or microorganism an entire chemical investigation of the asphalt contained in the pitch lake would have to be undertaken. This project examines the chemical composition of the pitch lake from the astrobiology aspect. As asphalts and their chief component, asphaltene is a very complex and elusive compound a variety of techniques would have to be used to form a composite sketch of the chemical composition of the asphalt and its constituent compounds and how it relates to the metabolic compatibility of the microorganisms that reside in the asphalt.

The techniques that are used in the structural elucidation of asphalt will be presented. Detailed understandings of these techniques are necessary in order to navigate through the complexity of the compounds contained in the matrix of the Trinidad Lake Asphalt.