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Fatty acid methyl esters (FAMEs) obtained from rare seeds of Tunisia: *Ibicella lutea, Peganum harmala, Smyrnium olusatrum, Onopordum nervosum and Solanum elaeagnifolium*

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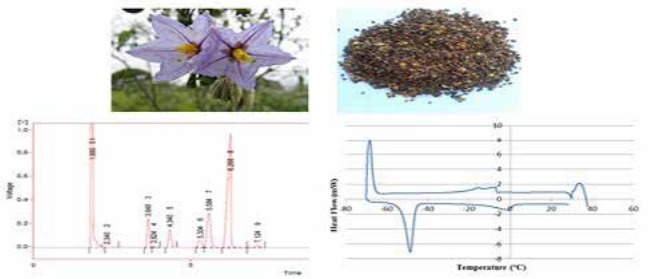
The transport sector is a major energy consumer with the 27% of the total energy used worldwide. This energy is almost completely provided by petroleum, a non-renewable resource that is concentrated in politically unstable countries and that causes global warming due to the greenhouse gas effect. Due to this situation, and the increase in the demand and the oil price, it is necessary to search for alternatives which may be used as transport fuels. One of the most viable alternatives are fatty esters, as they have similar properties to fossil fuels and they can be used as substitutes of conventional fuels without making big modifications to engines. This work aims to study the properties of fatty acid methyl esters (FAMEs) from Tunisian oils in order to assess their potential use as biofuel sources. The oils chosen for this study have been scarcely researched by other authors and are very interesting for a possible exploitation as fuels. Some of them are non-edible sources and all of them can be grown in arid places with no need of supplementary water and those include: *Ibicella lutea, Peganum harmala, Smyrnium olusatrum, Onopordum nervosum* and *Solanum elaeagnifolium*. Their properties (cloud point, pour point, cold filter plugging point, oxidation stability, cetane number, density, kinematic viscosity and heating value) have been predicted using equations that correlate the above properties with their ester profiles, measured with gas chromatography (GC-FID) and gas chromatography coupled with mass spectrometry (GC-MS), and crystallization onset temperature (COT), measured by differential scanning calorimetry (DSC). The work concludes with the comparison of the properties of the biodiesel obtained from these oils and the analysis of their possible use as biofuel sources.



Solanum elaeagnifolium: Chromatogram (GC-FID) and differential scanning calorimetry (DSC)

Biography

David Bolonio is pursuing his 3rd year PhD. He studied Mining Engineering and completed Master's in Environmental Research, Modeling and Risk Assessment at the Universidad Politécnica de Madrid. He has done his research at the Faculty of Chemistry of the University of Graz and at the Joint Bioenergy Institute (Lawrence Berkeley National Laboratory). He has attended seven conferences presenting his research works and has published four papers in high impact journals.

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