

ENERGY & BIOFUELS/PETROLEOMICS

## **“Bio-oil composition analysis by Direct Infusion Mass Spectrometry”**

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Bio-oils are the condensable fraction of the pyrolysis of biomasses. They are liquids and have much more energy density than gases. A considerable number of work have been done to investigate bio-oils properties and chemical composition to verify their potential to be used as biofuel. The most common technique used to identify bio-oil samples is GC-MS. However, it is limited to identification of small and non-polar compounds. Rosana *et. al* [1] have shown that it's able to analyze bio-oil using ESI-QTOF-MS by Direct Infusion Mass Spectrometry analysis (DIMS). DIMS has been widely used to detect and identify many chemical compounds in different matrixes, like food, biodiesel and petroleum. Some advantages of its use are no need of pre-separation steps, faster analysis and a wide range of compounds detected at the same injection. For the present work, we first analyzed bio-oil sample from pyrolysis of eucalyptus by DIMS using a Q-TOF (Waters Corporation). However, a considerable amount of compounds were detected and the spectrum was quite similar to that generated for petroleum samples (showing a Gaussian shape of  $m/z$  ions), confirming the high complexity of bio-oil samples. Following, we analyzed bio-oil through a High Resolution Mass Spectrometer, using a LTQ ultra FTICR-MS (Thermo Scientific). The bio-oil samples were characterized according to their oxygen and carbon classes. Samples were collected in different steps during the pyrolysis process of eucalyptus and were analyzed by MS. A different spectrum profile was obtained for them, referring their specific chemical composition for each step of the process. This work presents a fast and simple method, not using pre-separation steps, developed to characterize polar compounds in Bio-oil samples by DIMS. A deeply chemical characterization will be done for these samples and other bio-oil samples will be analyzed further.

[1] Pereira, R. C. L.; Abdelnur, P. V.; Teixeira, M. A. G.; Retori, E. S.; Almeida, M. B. B. ESI-MS and ESI-MS/MS as a toll to evaluate upgrading processes of Bio-oils, *Journal of The American Society for Mass Spectrometry*, **2011**, v. 22, S. 1, p. 173.