Contribution ID: **228** Type: **Invited Lecture**

INVITED LECTURE - Neutron activation analysis: a consolidated analytical tool in the sugarcane agroindustry

Thursday 20 September 2012 08:20 (20 minutes)

Currently, Brazil has become a leader in development of science and technology for the agribusiness sector of sugarcane. The country has maintained a tradition of decades as the world's largest producer of sugarcane preferentially oriented to the production of sugar and ethanol. In addition, bioelectricity generated by the burning of bagasse is employed to power mills with electric power remaining being sold to make a clean process, which avoids the use of fossil fuels. More recently, innovative products derived from sugarcane as biodegradable plastics and essential amino acids have emerged and gained competitiveness in the market for economic and environmental reasons. Ethanol from sugar cane has been the most successful biofuel in the world, evidencing the enormous contribution of sugarcane to sustainability in the production of clean fuels and reduction of greenhouse gas emissions. Nevertheless, there is potential to further increase the competitiveness of products derived from sugarcane, with more sophisticated management of the production process, including quality control, optimization of partnerships between growers and industry, increased efficiency in the fermentation process, among others. To comply with the demand for one billion tons of sugarcane in 2020, new varieties with higher productivity have been developed, including genetic modified ones. For evaluating the genetic improvement, specific certified reference materials are being developed at CENA/USP. Neutron activation analysis has been successfully applied since 1986 to the various segments of the sugarcane productive chain, thereby contributing to the efficacy of the system. By assessing the amount of soil adhered to sugarcane stalks transported to the industry, tracking those mineral impurities in the entire production process, comprising washing efficiency, bagasse, juice, sugar and yeasts, it was possible to accurately measure the influence of soil type, moisture content, soil preparation techniques and the overall impact on the sugarcane payment system.

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Session Classification: Session 10 - Radioanalytical Chemistry and Nuclear Analytical Techniques

Track Classification: Radioanalytical Chemistry and Nuclear Analytical Techniques