

TUTORIALS

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Worldwide, Brazil has one of the cleanest energy matrix, with almost 50% of its primary energy supply derived from renewable sources. Biofuels, among them ethanol produced from sugarcane, represent today the largest part of the renewable energy of the country. It is important that this reality, without similarity in the world scenario of fossil fuels substitution, be analyzed and better understood in all its potentials. These include the spectrum from production and transformation of plant material to engine technology, adapted for ethanol use. Sugar cane, a high yield crop, is the most important raw material for ethanol production in Brazil. Even recognizing the almost unique situation of the country, there are lessons here to be learned by other countries seeking ways to reduce fossil fuels consumption. Of utmost importance are the related basic science and technology activities and the efforts towards sustainable practices throughout the production chain that explain the important learning curve constructed by Brazil in the ethanol field in the last 35 years. At the same time, Brazil is eager to learn from other countries how to improve efficiencies and sustainability of the bioenergy supply chain.

BBEST organizers identified the importance of offering a set of tutorials covering the technological, social, economic, and environmental aspects related to the production and use of biofuels, with emphasis on sugarcane ethanol.

The tutorials are aimed at professionals involved in the production and use of biofuels, as well as researchers and students.

The technical review of biofuels production is organized in eight tutorials, covering the principles and the basis of science and technology related to biofuels. Tutorials are intended to present the essential elements from introductory material up to the frontier problems. As such, they are not intended to be technical specialized seminars that assume an extensive prior knowledge of the audience, but rather,

extended colloquia giving the audience a broader view of each topic.

The tutorials are going to be held on October 23rd, 2014, from 9:30 to 12:30 a.m. and from 2:00 to 5:00 p.m.

T1 and T2; T3 and T4; T5 and T6; T7 and T8;

Where T1, T3, T5 and T7 will be held in the morning and T2, T4, T6 and T8 in the afternoon.

Investment: Please check [here](#)

The tutorials are summarized below:

Tutorial 1 – Sugarcane Breeding

This tutorial will address the basic concepts of how sugarcane is bred to produce new varieties and how modern molecular biology tools can be applied to improve the plant in the fastest possible way.

Tutorial 2 – Sugarcane Agricultural Practices

This tutorial will review sugarcane agricultural practices. This will include field planning approaches, scheduling of field operations, cultivation and fertilization of plant and ratoon cane, application of industrial residues, harvesting and transportation planning, trends of manual and mechanized operations, controlled and reduced traffic patterns, among other aspects.

Tutorial 3 – Advanced Biofuels – Ethanol Production in Brazil

This tutorial will cover the current Brazilian experience in bioethanol production, focusing on sugarcane. Although cellulosic ethanol offers many promises, ethanol obtained from sugarcane juice fermentation still sets the relevant cost and efficiency benchmark to be achieved and, hopefully, surpassed. Productivity, energy conversion efficiencies and carbon emissions will be discussed. The Brazilian strategy of integrating bioethanol production, sugar production and electricity co-generation, to increase conversion efficiencies and to optimize the industrial plants for market demands, as well as the required innovations will be presented.

Tutorial 4 –Thermochemical Routes for Biofuels

This tutorial will present the thermal decomposition of carbonaceous materials, such as the gasification and pyrolysis, including Fischer-Tropsch conversion into synthetic fuels (BTL technology). The possibility of integrating gasification and thermal conversion in the present first generation ethanol production, increasing the efficiency of cogeneration operations, will also be covered.

Tutorial 5 – Biochemical Routes for Cellulosic Ethanol

This tutorial will discuss in detail liquid biofuel production from lignocellulosic materials, with emphasis on bioethanol. The biochemical (hydrolysis) route will be explored, detailing the present technological status and the future forecast. The alternative of integrating current technology and cellulosic bioethanol production will be presented and discussed.

Tutorial 6 – Biorefineries beyond ethanol

This tutorial will describe the biorefinery concepts, raw materials used and products potentially obtained, in order to increase the sustainability of biofuels and green chemicals production. Biorefinery technologies will be discussed with emphasis on the green chemistry (alcoholchemistry and sugarchemistry) routes as well as the optimization strategies to be used.

Tutorial 7 – Biofuel Sustainability

This tutorial will focus on the bioenergy sustainability agenda. Aspects such as energy ratio, greenhouse gases (GHG) avoided emissions, land use changes (direct and indirect), water resources requirement and quality will be discussed. Socio-economic aspects of sugarcane ethanol production will be presented, as well as a broad overview of the present and future characteristics of the global ethanol market, such as the food vs. fuel debate.

Tutorial 8 – Biofuel Engines

This tutorial will present the experience in the use of ethanol as a fuel in light vehicles, mixed with gasoline or in flex fuel motors. It will also detail the possibilities for using ethanol in diesel engines.

Particularities of ethanol ignition/engine will also be introduced, looking for new technological developments such as hybrid flex-fuel engines. Emission reductions observed with ethanol use will be discussed.