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WORKING GROUP ON BIOCHEMICAL AND MOLECULAR TECHNIQUES, AND DNA-PROFILING IN PARTICULAR

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USE OF MOLECULAR MARKER TO IDENTIFY SUGARCANE VARIETIES

Document prepared by experts from Brazil

1. Modern sugarcane varieties have one of the most complex genomes among important crops. They are largely the result of intercrossing from the first interspecific crosses carried out in the early twentieth century, involving essentially two highly polyploid species *Saccharum officinarum* and *Saccharum spontaneum*. As few parental varieties were used in those initial crossings, concerns about the limited genetic base of modern sugarcane varieties have increased.

2. Due to this genetic background and to the fact that vegetative traits are influenced by environmental factors, presenting continuous variation and a high degree of plasticity, it is becoming difficult to distinguish varieties based only on morphological descriptors.

3. Molecular markers have a great potential to help breeders to depict a sugarcane variety through genetic fingerprinting analysis. Genetic fingerprinting or DNA fingerprinting is a technique employed to assist in the identification of individuals by their respective DNA profile and is increasingly being used to assist variety protection of different crops. It would be a rich tool for solving sugarcane issue of restricted genetic base and overlapped morphological descriptors.

4. CTC (Centro de Tecnologia Canavieira) has been working with SNP markers (*Single Nucleotide Polymorphisms*) by MALDI-TOF MS (*Matrix Assisted Laser*

Desorption/Ionization Time of Flight Mass Spectometry) from Sequenom Inc. This system, based on mass spectrometry, allows analysis on a large scale and high fidelity on variations in the sequence of nucleic acids. Unlike other types of molecular markers commonly used in sugarcane (AFLP and SSR), which generate information on the presence or absence of each allele, the data generated by this technology give the frequency of alleles present in a given region of the genome. This type of data yields higher specific genetic information.

5. In an effort of protecting its varieties, CTC is working on the development of the genetic fingerprinting of all the varieties launched in the last years.

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