CHANGE IN CARBON BALANCE IN GRASSES IN ORDER TO INCREASE SUGAR PRODUCTION

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In recent years, the substitution of fossil fuels by alternative sources of energy has been intensely discussed. Great efforts have been focused on research of renewable fuels and ethanol emerges as a promissory solution for this subject. Together with the idea of substitution of fossil fuels comes in focus the environmental issues and sustainability in our way of living. The increase in areas cultivated with sugarcane could, therefore, results in great environmental impacts, leading us to search alternatives to increase ethanol production. Thus, genetic engineering might contribute significantly to improve productivity, increasing ethanol production without expanding cultivated areas. This project propose the increase in sugar levels in sugarcane and in the model plant *Setaria italica* through transgenic technologies, focusing as strategies changes in redox status of the mitochondrial and changes in the synthesis of other fermentable sugars, as a way to improve ethanol production by area. These strategies can result not only in transgenic events with agronomic potential, but would bring also important information about the relationship of cellular respiration and the use of carbon in sugarcane, bringing new insights of research in this area. Moreover, the characterization of carbon use (such as conversion in fermentable sugars) is still neglected and might contribute to breeding programs. Preliminary results show that varieties, with different harvesting time, present different metabolic profiling in mature and immature internodes, indicating that the carbon dynamics and sugar accumulation differ among genotypes.

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