UNDERSTANDING CELL WALL STRUCTURE AND HYDROLYSIS OF TWO LEADING C4 BIOENERGY CROPS TO IMPROVE SECOND GENERATION BIOETHANOL PRODUCTION IN BRAZIL

Despite the advances in the production of second-generation bioethanol from sugarcane, the Brazilian system, with its hundreds of mills capable to efficiently produce first generation bioethanol from sucrose, still lack a solution for ethanol production from bagasse and trash by these mills. The main barrier is that of the high cost of the process, which is impared by the lack of knowledge about cell wall hydrolysis and the high cost of enzymes. At the same time, sustainability of sugarcane production could be greatly improved by increasing its productivity in the field, what would impact positively on land use and lower the competition with biodiversity and food production. The primary aim of this partnership is to conduct underpinning research essential for developing sugarcane biomass as a sustainable feedstock for second generation bioethanol production. This will be achieved by addressing three objectives: start developing integrated specific enzyme cocktails tailored to cell wall biomass properties and pretreatment methods. Initiate 'synthetic biology' approaches for the development of; I) in planta cell wall deconstruction strategies and; II) novel enzymes for increased cell wall hydrolysis efficiency. Evaluation of the impact of different environmental and genetic factors on sugarcane biomass yield and quality, with a view of growing sugarcane on marginal land. A key feature of this Research Partnership is to raise the awareness of available resources and capabilities, to generate essential knowledge and technology exchange. This will benefit and unite the sugarcane and miscanthus research communities in Brazil and the UK, and contribute to the realization of the bioeconomy concept.

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