Danzi D, Marino I et al., J Fundam Renewable Energy Appl 2020, Volume 10

Assessment of durum wheat straw genotypes with improved saccharification efficiency

Danzi D, Marino I, De Bari I, Mastrolitti S, Petretto G.L, Pignone D, Janni M, Cellini F, and Venditti T

Institute of Biosciences and Bioresources - National Research Council (IBBR-CNR) Bari, Italy

The increasing worldwide demand for energy combined with the depletion of fossil fuel reserves and concerns about climate change, have increased the interest in the production of fuels from renewable energy sources. Lignocellulosic biomass has considerable potential as feedstock for the production of biofuels and biochemicals, contributing to decreasing carbon dioxide emissions, one of the drivers of climate change. The global production of cereals straw, a by-product left after grain harvest, represents an abundant source of biomass for lignocellulosic-based biorefineries. The conversion of the lignocellulosic biomass to final biobased products such as alcohols mainly requires a three-steps process: 1) pretreatment; 2) acid or enzymatic hydrolysis; 3) fermentation. An efficient digestibility of the lignocellulosic materials is fundamental for the overall feasibility of any final bioproduct. In the present work a set of durum wheat genotypes, selected from a germplasm collection, was used to analyze some phenotypic traits and biochemical aspects of the cell wall. These characteristics were correlated with the their enzymatic digestability. The main objective was to identify the most profitable genotype(s) to be used as feedstock for bioethanol production. A significant variability was observed within genotypes in the release of sugars after enzymatic hydrolysis. The results evidenced that the lignin content was the major component of the cell wall determining recalcitrance to the enzymatic process. As for association to phenotypic traits, positive correlations were found with plant height and uronic acids content. The possible role of other cell wall components is also discussed.

Biography

Donatella Danzi has obtained PhD in Plant Genetics and Biotechnology, University of Bari (Italy). During the PhD course she worked on identification and characterization of plant genes involved in the production of fuctional molecules. After that period, she continued her activity with post-doc within the frame of a project on plant phenotyping using high throughput phenotyping platform to evaluate the response to water and nutrient stress in plants. She is involved in a research regarding the assessment of digestible fibers and sugars in wheat straw, comparing different wheat genotypes in order to identify the most profitable genotype as feedstock for biofuel production.