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Towards a grass biorefinery

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Abstract

There is a continual need to identify new biomass feedstocks for producing products to mitigate climate change and help drive the 'green economy'. High sugar perennial ryegrasses offer a potential alternative biorefining feedstock which can be considered as both 1st and 2nd generation. This high yielding abundant crop can grow on low grade soils and contains high levels of fermentable water-soluble sugars. As a lignocellulosic feedstock it benefits from a low lignin content and high digestibility. In assessing this crop as a biorefining feedstock we have developed optimised processes and carried out an economic assessment including valorisation of co-products. Research will be presented on: characterisation of the high sugar grass phenotype; determination of the genetic components underlying this trait; agronomy, harvesting regimes and storage methods within the context of farming practice and down-stream processing. Data will also be presented on the conversion of the polymeric soluble sugars in the juice fraction to free fermentable sugars by a recombinant fructan exohydrolase enzyme and on the optimisation of sugar release and fermentation of the fibre component. A method for monitoring real time biomass saccharification developed in this project will be discussed along with co-products and competing uses for this multiple purpose feedstocks

Biography

I graduated from the National University of Ireland, Maynooth (BSc. in Biology and Chemistry, Ph.D., in antimicrobial compounds, fungal fermentation and yeast biochemistry. I have since worked in the areas of microbial and plant molecular biology, enzymology and biochemistry. Initially on the characterisation, cloning and expression of recombinant cellulases and chitinases from both fungi and bacteria, and later on the genes and enzymes involved in carbohydrate metabolism in grasses and clovers