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Bioprospecting for microalgae strains with commercial applications

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The National Research Council (NRC) of Canada is currently conducting applied R&D in the microalgae biotechnology with the longer-term goal of working with industry to develop new and sustainable bioproducts from algal biomass for commercial applications. A library comprised of nearly 430 strains of microalgae, currently held at the NRC's Algal Biorefinery R&D facility in Ketch Harbour, Nova Scotia has been collected and screened for growth rate and biomass production over the past several years. The strain library is a living resource of material with potential applications in many industrial sectors including nutraceuticals/pharmaceuticals, functional foods, agriculture/aquaculture feeds, platform chemicals, soil products/fertilizers among others. With the aim of supporting commercialization of value-added products of microalgal origin, we have undertaken a strain-by-strain biochemical characterization of the library using custom solvent extraction and fractionation methods followed by separation and metabolite analysis by HPLC linked to high-resolution mass spectrometry. These data are processed and compiled into 'factsheets', each one of which provides a high-level overview of the general macromolecular composition of that particular strain and includes amino acid and triacylglyceride profiles, intact lipid class analysis and pigment composition in addition to other primary data. This approach will be discussed within a bioprospecting context in the search for the best 'fit-for-purpose' strains for targeted industrial applications.

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