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PhD project title: Use of NADES and NAIL for the enhancement of plant biomass

Research summary: My research project consists of the green valorization of waste biomass to obtain different classes of compounds (e.g., the oil fraction or high-value bioactive compounds such as polyphenols) that could have a new application in industry. To develop an all-green process, different classes of alternative solvents, such as deep eutectic solvents (DES) and ionic liquids (ILs) (with a focus on combinations obtained from molecules abundantly present in nature, defined as NADES and NAIL), and naturally-derived terpenes, are exploited for biomass valorization. In particular, *p*-cymene is used to extract the oil fraction and DES to extract polyphenolic compounds from biomass. ILs are used to process lignocellulosic residues. For the biomass study, a systematic approach was performed to evaluate the influence of temperature, time, solid/liquid ratio, and method of extracts obtained were also characterized by testing the viability of cells treated with DES containing the extracted polyphenols. The final year of my PhD will be in collaboration with Kode Chemoinformatics, during which computational models of toxicity (QSAR) will be studied to develop, through machine learning technique, new models capable of predicting human and environmental toxicity.