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Advanced Extraction Methods for the Recovery of Organic Chemicals from Aqueous Phase Derived Through Hydrothermal Liquefaction

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ABSTRACT

Hydrothermal Liquefaction (HTL) provides an efficient way to produce biofuel and valuable chemicals. In addition to the generation of bio-oil, a significant volume of aqueous phase is also produced during HTL process. The aqueous phase is rich in organic compounds, majorly phenols, organic acids, saccharides, ketones, aldehydes, amides etc. The complex composition of aqueous phase and low concentration of some organics chemicals make the extraction process challenging. The purpose of this study is to improve the sustainability and commercial feasibility of the HTL process by concentrating on the extraction of organic compounds from the HTL aqueous phase. The review involved a comprehensive investigation of various extraction methods. Various traditional methods such as solvent extraction, molecular distillation, liquid-liquid separation have been employed extensively to recover organic compounds. Although some issues associated with traditional methods such as solvent toxicity, lower selectivity and low reproducibility encourage the development of novel extraction techniques. Recent studies have concentrated on novel extraction strategies that overcome the drawbacks of traditional extraction methods. The advantages of using ionic liquids and supercritical liquids in solvent extraction methods have been discussed in this review. Moreover, other new emerging technologies such as solid adsorption, membrane-based separation and hybrid extraction system have also been analyzed for their potential to extract organic chemicals from HTL aqueous phase. This review article can provide insightful knowledge about several methods of organic chemical extraction. This might help in selecting effective methods for the extraction of targeted compound present in aqueous phase to enhance the feasibility of HTL process.

Keywords: HTL, Aqueous phase, Organic Chemicals, Extraction techniques

