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Extended Abstract

Extraction of Fungal Chitin Using Natural Deep Eutectic Solvents †

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Chitin is considered the second most plentiful biopolymer in nature after cellulose, its main sources being crustaceous shells and cell walls of fungi [1]. Chitin has great economic value due to its various characteristics, such as biodegradability, biocompatibility, non-toxicity, and thermal stability, which offer many potential applications in different fields [2]. The extraction of chitin involves two preliminary steps including demineralization and deproteinization. They can be conducted by two methods, chemical or biological. The chemical method requires the use of acids and bases, while the biological method involves microorganisms. The conventional chemical extraction of chitin requires strong acids and alkali to eliminate minerals and proteins, but using these hazardous chemicals can deteriorate the physicochemical properties of this biopolymer, and consequently, its biological properties [3]. Natural deep eutectic solvents (NaDESs) have emerged as a promising alternative to classical methods for extraction of biopolymers and other biomolecules and offer the opportunity to preserve the exceptional qualities of chitin. The aim of this study was to investigate chitin extraction from *Agaricus bisporus* in several NaDESs. *Agaricus biosporus* was commercially purchased from a local supermarket, washed, cut, frozen the same day, and lyophilized before further treatments. Before chitin extraction, the mushrooms were depigmented with hydrogen peroxide, followed by demineralization and deproteinization with biocompatible acids such as citric acid, tartric acid, or ascorbic acid. A series of NaDESs were synthesized based on combinations between choline chloride, betaine chloride, guanidine, urea, and sorbitol, which were mixed at optimal molar ratio and heated at 50–80 °C until a homogeneous liquid was formed. The pretreated samples were dispersed in NaDESs with different mushroom/NaDESs ratios (1:5, 1:10, 1:20) and then the mixtures were heated at various times (2–12 h). After reaction, chitin and NaDESs were separated by centrifugation and the chitin was rinsed with distilled water and was lyophilized. The extracted chitin was analysed by a plethora of techniques such as FTIR and XRD spectroscopy, SEM, and TGA analysis which revealed a good quality chitin. This study could be a starting point for chitin extraction with NaDESs using Design of Experiments (DOE).

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