Purification of antileukemic drugs through silica-based supported ionic liquids

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L-asparaginase (LA) is an enzyme used as a biopharmaceutical for the treatment of acute lymphoblastic leukemia. LA can be produced via fermentation and its purification usually comprises several steps including precipitation, liquid-liquid extraction and chromatography techniques. Among these, ion exchange chromatography, which is often preceded by precipitation with salts as a first pre-chromatographic step, is the most used. However, theses common strategies for protein purification result in low yields and purity, requiring long processing times, while leading to a consequent increase of the process costs. Therefore, the demand for new cost-effective production/purification processes play now a priority role.

This work aims the development of cost-effective technologies to purify LA from the complex fermentation medium from *Bacillus Subtillis*. Silica-based supported ionic liquids (SILs) are investigated as cost-effective purification materials for the target enzyme. The concentration of the extract from the fermentation, material/ extract from fermentation ratio and contact time effects in the purity and yield of LA were optimized. With this strategy, process costs, energy consumed, and waste generated, may be significantly decreased, which may lead to this biopharmaceutical price decrease and wider application.

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