A Comprehensive Review on l-Asparaginase and Its Applications

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ABSTRACT
l-asparaginase (LA) catalyzes the degradation of asparagine, an essential amino acid for leukemic cells, into ammonia and aspartate. Owing to its ability to inhibit protein biosynthesis in lymphoblasts, LA is used to treat acute lymphoblastic leukemia (ALL). Different isozymes of this enzyme have been isolated from a wide range of organisms, including plants and terrestrial and marine microorganisms. Pieces of information about the three-dimensional structure of l-asparaginase from *Escherichia coli* and *Erwinia* sp. have identified residues that are essential for catalytic activity. This review catalogues the major sources of l-asparaginase, the methods of its production through the solid state (SSF) and submerged (SmF) fermentation, purification, and characterization as well as its biological roles. In the same breath, this article explores both the past and present applications of this important enzyme and discusses its future prospects.

KEYWORDS: l-asparaginase Lymphoblasts Acute lymphoblastic leukemia Solid state fermentation Submerged fermentation

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