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番茄 P56 和部分来源多糖裂解酶家族 I 的其它蛋白的系统演化分析

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摘 要: 果胶裂解酶包含果胶酸裂解酶(pectate lyase)和果胶酸酯裂解酶(pectin lyase)二种形式,是一类多糖裂解酶,由细菌、真菌、植物和线虫等生物产生,分布在5个多糖裂解酶家族,果胶酶在食品与饮料、纺织与洗涤、制药等工业中有广泛的应用。利用 NCBI BLASTX 服务器,搜索与番茄 P56 蛋白氨基酸序列相似且都属于多糖裂解酶家族 I 的果胶裂解酶蛋白序列共 28 条,用 DNAMAN 软件分析其保守区,用 CLUSTALX8.0 软件进行序列比对和 BioEdit 软件进行文件转换,进一步用 PUAP4.0 软件构建系统进化树。构建的 MP 树(phylogenetic trees)和 NJ 树(neighbor-joining)显示:来自植物的果胶酸裂解酶、真菌的果胶酸酯裂解酶、细菌的果胶酸裂解酶分别可聚为一个独立的类群;相对于细菌果胶酸裂解酶和真菌果胶酸酯裂解酶而言,构巢曲霉(*Aspergillus nidulans*)的果胶酸裂解酶 A 和植物的果胶酸裂解酶之间有较近的亲缘关系;细菌 *Pseudomonas syringae* 的果胶酸酯裂解酶和真菌的果胶酸酯裂解酶之间的亲缘关系较近。

关键词: 果胶酸裂解酶; 果胶酸酯裂解酶; 多糖裂解酶家族 I; 系统演化树
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Phylogenetic Analysis of Tomato P56 and Some Other Proteins from Polysaccharide Lyase Famliy I

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Abstract: Pectate and pectin lyases are a class of polysaccharide lyases produced by a diverse group of organisms including bacteria, fungi, plant and nematodes. Various pectate lyases and pectin lyases are divided into five families. By NCBI BLASTX server, tomato P56 amino-acid sequence was compared with other pectate and pectin lyases belonging to polysaccharide lyase family I 28 proteins, with higher identity of amino acid sequence compared to P56 amino-acid sequence, were obtained. On the base of the constructing phylogenetic tree using PAUP 4.0, MP (phylogenetic trees) and NJ (neighbor-joining) trees of diverse pectate and pectin lyases showed that pectate lyases from plant, pectin lyases from fungi and pectate lyases from bateria belong to different groups, respectively. The pectate lyase A of *Aspergillus nidulans* is more closely related to plant pectate lyases than to pectin lyase from fungi and pectate lyases from bacteria. The pectin lyase from *Pseudomonas syringae* is more closely related to fungi pectin lyases than other lyases.

Key words: Pectate lyase; Pectin lyase; Polysaccharide lyase family I; Phylogenetic tree

果胶酸裂解酶(pectate lyase, EC 4.2.2.2)和果胶酸酯裂解酶(pectin lyase, EC 4.2.2.10)是一类多糖裂解酶,由细菌[1-6]、真菌[7-15]、植物[16-23]和线虫[24,25]等生物产生。真菌来源的果胶裂解酶以果胶酸酯裂解酶为主,果胶酸裂解酶极少[7-15];细菌来源的果胶裂解酶以果胶酸裂解酶为主,果胶酸酯裂解酶极少[1-6];植物来源的果胶裂解酶为果胶酸裂解酶[16-23]。

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