

NaCl胁迫对菜用大豆种子膨大初期蛋白质表达的影响

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Effect of NaCl stress on protein expression of vegetable soybean seed at early filling stage

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摘要

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摘要 采用蛭石栽培, 对开花后10 d的菜用大豆 [*Glycine max* (L.) Merr.] 进行100 mmol/L NaCl处理, 利用双向电泳 (Two-dimensional gel electrophoresis, 2-DE) 技术对胁迫5 d时的种子蛋白质进行分离, 并对处理与对照2-DE图谱中蛋白质表达进行比较分析。在对照和处理的2-DE图谱上均检测到327个蛋白点, 有28个差异表达蛋白, 其中16个较对照显著上调, 另外12个显著下调。利用基质辅助激光解吸离子化飞行时间质谱 (Matrix-assisted laser desorption ionization time-of-flight mass spectrometry, MALDI-TOF-MS) 对其中6个丰度差异较大 (丰度变化在2.5倍以上) 的蛋白进行分析, 通过数据库检索, 从中鉴定出5个蛋白质, 分别是大豆球蛋白前体G2、肌动蛋白、大豆球蛋白前体G2相似蛋白、类 α -微管蛋白和Kunitz型胰蛋白酶抑制剂, 并对这些蛋白质在NaCl胁迫下可能的作用进行了讨论。结果表明, NaCl胁迫对菜用大豆种子膨大初期的蛋白质代谢产生了显著影响, 肌动蛋白、类 α -微管蛋白和Kunitz型胰蛋白酶抑制剂可能参与了对NaCl胁迫的应答反应。

关键词: 菜用大豆种子 NaCl胁迫 双向电泳 差异表达蛋白

Abstract: Under vermiculite culture conditions, vegetable soybean [*Glycine max* (L.) Merr.] was treated with 100 mmol/L NaCl at the 10th day after flowering. After the separation of proteins from the seeds at the 5th day of the NaCl stress by two-dimensional gel electrophoresis (2-DE), the differences in protein expression were analyzed between the NaCl treatment and the control. About 327 proteins are detected at each 2-DE map, of which 28 proteins are found to be differentially expressed. Among these NaCl-stress-changed proteins, 16 proteins are up-regulated, while other 12 proteins are down-regulated significantly. Out of the 28 proteins, the abundances of 6 proteins are changed more than 2.5 times. The 6 proteins are analyzed by using the matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF-MS) and searched in the database which allows the identification of 5 spots. These identified proteins are Glycinin G2 precursor, actin, similar to GLYCININ G2 PRECURSOR, alpha-tubulin-like protein and Kunitz trypsin inhibitor. The protein metabolisms at early seed-filling of vegetable soybean of the identified proteins are influenced significantly under the NaCl stress, and actin, alpha-tubulin-like protein and Kunitz trypsin inhibitor might be involved in NaCl stress responses.

Keywords: vegetable soybean seed NaCl stress two-dimensional gel electrophoresis differentially expressed proteins

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