

## 大豆丙二烯氧化物合酶基因(*GmAOS*)及其启动子的克隆与分析

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## Cloning and Characterization of *GmAOS* Gene and Its Promoter in Soybean (*Glycine max*)

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摘要

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**摘要** 利用RT-PCR、RACE和LA PCR相结合的方法, 从大豆中克隆了*GmAOS*基因及其启动子序列(登录号: EU366252), *GmAOS*基因共1 789 bp碱基, 等电点8.97, 分子量58.3 kD, 在3种不同抗性大豆材料中均有2个拷贝。生物信息学分析表明, *GmAOS*酶的N末端有典型叶绿体定位信号肽, 基因序列上有多个丝氨酸、苏氨酸、酪氨酸的磷酸化位点。该研究克隆到ATG上游472个碱基的*GmAOS*基因启动子部分序列, 其含有赤霉素的响应元件(TAACAA), 可诱导抗性基因响应元件(W box), 细菌和盐诱导的响应元件(GAAAAA), 茉莉酸诱导的响应元件(G box)。 *GmAOS*能强烈响应茉莉酸的诱导, 且在黄皮小青豆(高抗斜纹夜蛾)中表达量高于徐瞳大豆, 两种材料抗虫性的差异可能是由*GmAOS*基因受诱导后的表达量差异引起的, 即*GmAOS*基因与作物抗虫性相关, 可做为培育高诱导抗性材料的候选基因。

**关键词:** 大豆 丙二烯氧化物合酶 启动子 克隆 生物信息学分析

**Abstract:** Allene oxide synthase (AOS) is a major intermediate enzyme in octadecanoid pathway to JA biosynthesis affecting the synthesis and levels of all JA-related compounds in plants, and therefore plays a significant role in plant defense. In this study, a full length cDNA of *GmAOS* and its promoter were cloned from the soybean (*Glycine max*) by RT-PCR, RACE, and LA PCR methods. *GmAOS* cDNA coding 519 amino acids (58.3 kD) with an isoelectric point of 8.97 and two genes copies in the soybean genome coding for *GmAOS*. Bioinformatics analysis indicated that the N-terminal region of *GmAOS* displayed features of a typical chloroplast targeting peptide including an enrichment of serine, threonine and tyrosine phosphorylation sites. The length of the promoter was 472 bp, containing several stress-induced elements: GA inducing elements (TAACAA), W-box element which was in response to elicitor-responsive transcription of defense genes, element responsive to salt and pathogen (GAAAAA) and G-box (CACGTG) induced by JA. Jasmonic acid showed a strong inducement of the *GmAOS* transcript level, expression patterns of *GmAOS* were explored in two soybean accessions with distinct resistance to cotton worm: XTDD was highly susceptible and HPXQD highly resistant, showing that *GmAOS* had higher transcript level in HPXQD(HR) than in XTDD(HS). *GmAOS* transcript level were correlated with soybean material resistance grades. These results suggest *GmAOS* is likely to be a useful tool for improving self-resistance ability of high plants.

**Keywords:** Soybean A11ene oxide synthase Promoter Clone Bioinformatics analysis

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