



### 转 $phyA$ 基因棉花纯合株系筛选及其对土壤有机磷的利用能力

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### Identification of Homogeneous Transgenic Lines with $phyA$ Gene in Cotton and Its Utilization for Organic Phosphate in Soil

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摘要

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**摘要** 为了获得转植酸酶基因 ( $phyA$ ) 棉花高代纯合株系并验证其利用土壤中有机关磷的能力, 对实验室获得的转 $phyA$ 基因 $T_4$ 代材料进行了PCR筛选, 在水培条件下研究了纯合株系植株根际分泌的植酸酶活性, 并在田间进行了植株磷含量和棉花产量性状分析。结果表明, 在PCR筛选的4个株系中, 有2个株系为纯合株系, 其后代均为PCR阳性植株。在以植酸盐为唯一磷源条件下, 高表达 $phyA$ 的转基因株系的植酸酶活性较野生型增加了1.5倍, 不同生育时期转基因株系植株叶片磷含量中L6株系增加最多, 苗期、现蕾期、花铃期和吐絮期分别增加了4.5%, 5.95%, 5.45%和8.73%。

**关键词:** 棉花 (*Gossypium hirsutum* L.) 植酸酶基因 ( $phyA$ ) 转基因植株 有机关磷

**Abstract:** To obtain homogeneous transgenic lines with expression of  $phyA$  and to identify the organic phosphate utilization ability of the transgenic cotton plants, PCR amplification, secreted phytase activity, the available phosphorus content and the yield characters of transgenic cotton plants were analyzed. The results showed that two(L6 and L9) out of the four lines were homogeneous lines by PCR amplification. Under the phytate condition, the phytase activity of transgenic lines was higher than all of the wide types, and L6 increased by 1.5-fold. Also, L6 kept best performance in phosphorus content with an increase of 4.5%, 5.95%, 5.45%, and 8.73% at seedling, budding, blooming and boll-opening stage, respectively. Moreover, the number of bolls per plant, lint index and lint percentage increased in the transgenic plants. Therefore, it is clearly shown that  $phyA$  gene with high expression can significantly increase the ability of cotton to utilize organic phosphate.

**Keywords:** cotton (*Gossypium hirsutum* L.) phytase gene ( $phyA$ ) transgenic plants organic phosphate

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