

会议专栏

## 咖啡酸代谢物的抗肾炎活性分析

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**摘要:** 在研究治疗肾功能紊乱植物的细胞培养时, 建立了一个 *Eritrichium sericeum* 的 E-4 愈伤组织株系, 发现此株系可产生大量的咖啡酸代谢物、(-)-rabdosiin (1.8%干重)和迷迭香酸(4.6%干重), 通过诱导(-)-rabdosiin 的含量提高至 4.1% (干重)。将 E-4 愈伤组织喂服 Masugi 肾炎大鼠, 结果发现, 与对照组(未喂服 E-4 愈伤组织的 Masugi 肾炎大鼠)相比, 处理组(喂服 E-4 愈伤组织)中的大鼠出现如下症状: 尿多、排泄物中肌氨酸酐降低、尿蛋白水平降低; 当对照组中所有大鼠都出现疼痛症状时, 处理组中仍有约 1/4 的大鼠表现出健康状况良好。以上结果表明, E-4 株系具有缓解肾炎症状的潜在功能。此外, 利用富含多酚的 *rolC* 转基因的细胞株系, 研究了愈伤组织中咖啡酸代谢物的诱导合成机制。结果发现, 在 *rolC* 转基因的 *E. sericeum* 愈伤组织中, 咖啡酸代谢物的高产与迷迭香酸生物合成中的关键基因 *CYP98A3* 的高表达有关。

**关键词:** 咖啡酸代谢物, 细胞培养, 血管球性肾炎, *CYP98*

## Biotechnological Analysis of Caffeic Acid Metabolites Possessing Potent Anti-nephritic Activity

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**Abstract:** During an investigation of plant cell cultures which may be useful for the treatment of renal disorders, we established a well-growing E-4 callus culture of *Eritrichium sericeum* that produced high amounts of caffeic acid metabolites, (-)-rabdosiin (1.8% dry wt) and rosmarinic acid (4.6% dry wt). Elicitation of the calli induced an increase in (-)-rabdosiin production by as much as 4.1% dry wt. Oral administration of E-4 callus biomass to rats with induced Masugi-nephritis caused an increase of diuresis, lowered creatinine excretion and proteinuria levels, compared with Masugi-nephritis untreated rats. While all of the Masugi-nephritis untreated rats began to ache, near a quarter of the E-4 treated rats remained in good health. This result indicates that the E-4 culture has a potential to alleviate symptoms associated with nephritis. A mechanism by which production of caffeic acid metabolites could be activated in the calli was studied using a high polyphenol-producing cell cultures transformed with the *rolC* gene. We established that the increase of caffeic acid metabolites production in *rolC*-transgenic *E. sericeum* calli positively correlated with high expression of the *CYP98A3* gene, a key gene for rosmarinic acid biosynthesis.

**Keywords:** caffeic acid metabolites, cell culture, experimental glomerulonephritis, *CYP98*

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