

研究论文

SO₂水合物诱发蚕豆 (*Vicia faba*) 根尖细胞染色体畸变效应

仪慧兰, 姜林

山西大学生命科学与技术学院, 太原030006

收稿日期 2006-5-8 修回日期 2007-2-1 网络版发布日期: 2007-6-25

摘要 以蚕豆为材料, 研究SO₂水合物-亚硫酸钠与亚硫酸氢钠混合液 (3: 1, mmol·L⁻¹/mmol·L⁻¹) 对根尖细胞的遗传毒效应。结果表明: SO₂水合物处理可诱发蚕豆根尖细胞遗传不稳定, 出现染色体数目和结构变异, 使非整倍体和染色体结构异常明显增加。中期染色体出现了缺失、断片、环 (染色体和染色单体环)、易位、双着丝粒等异常; 在细胞分裂后期出现了滞后染色体、桥和断片等异常。研究结果表明, SO₂是DNA分子断裂剂、非整倍体诱变剂, 能够破坏生物细胞的基因组稳定性, 是一种具有遗传毒性的环境诱变剂。

关键词 [SO₂水合物](#) [蚕豆](#) [染色体畸变](#)

分类号 [Q142](#), [Q945](#), [Q948](#)

Chromosomal aberrations induced by sulfur dioxide hydrates in *Vicia faba* root tips

YI Hui -Lan, JIANG Li n

College of Life Science and Technology, Shanxi University, Taiyuan 030006, China

Abstract College of Life Science and Technology, Shanxi University, Taiyuan 030006, China Acta Ecologica Sinica,2007,27(6):2318~2324.Abstract: Sulfur dioxide (SO₂) is a common air pollutant, which could inhibit plant growth, influence photosynthesis, and injure micro molecular in plant cells. For this reason, the chromosomal aberrations induced by hydrates of SO₂— sodium bisulfite and sodium sulfite mixture (3: 1, mmol·L⁻¹/mmol·L⁻¹) were investigated in *Vicia faba* (broad bean) root tips.

Dry broad bean seeds were soaked for 24 h in distilled water at 23°C and allowed to germinate between two layers of moist cotton. When the newly emerged roots were of 1.00-2.00 cm in length, they were used in the test. The negative control was incubated in distilled water. Bisulfite groups were exposed to bisulfite-sulfite solutions for 12 and 24 h respectively, in the range of 0.20-5.00 mmol/l. For chromosomal aberration assay, the roots were incubated in 0.05% colchicine for 5 h, then fixed in 1: 3 (V/V) aceto-ethanol solutions. They were digested in the solution of 2.5% cellulase and pectinase, and harvested as cell suspensions. The cell suspensions were dropped on slides to make chromosomal samples. After staining with Giemsa solution, aberrations of chromosomal structure and number were examined through microscopy. For anaphase aberration assay, *Vicia* roots were soaked in the fixative directly after treatment. When slides prepared for microscopic examination, the roots were hydrolyzed in 1 mmol/l HCl and stained with Schiff reagent, and then mitotic zone from well-stained root tip were immersed on a clean slide and squashed under a cover glass.

Present results showed that sulfur dioxide hydrates caused aberrations of chromosomal structure and number. Frequencies of chromosomal structure aberrations, both chromatid-type aberrations and chromosome-type aberrations, increased significantly as well as aneuploid after seedlings exposed to sulfur hydrates over a range of 0.20 to 15.0 mmol/L. Deletions, fragments and other complex aberrations, such as rings (chromatid and chromosome), dicentrics and translocation, were f

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [\[PDF全文\]\(1625KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ 本刊中 包含“[SO₂水合物](#)”的 [相关文章](#)
- ▶ 本文作者相关文章
 - [仪慧兰](#)
 - [姜林](#)

ound on metaphase slides after Vicia roots exposed to the hydrates, while abnormal chromosome behavior including lagging, bridge and fragment appeared during division. These results indicated that SO₂ hydrates induced chromosomal breakage and inappropriate chromosome fuse in V. faba root tip cells, which destabilize the orderly transmission of genetic information to the next generation of cells, and lead to the destroy of genetic stability and genome instability. Results of the present study suggest that SO₂ is one of the mutagenic and clastogenic agents in the environments.

Key words SO₂ hydrate _ Vicia faba _ chromosomal aberration

DOI

通讯作者 仪慧兰 yihuilan@yahoo.com.cn