

论文

褶合光谱法考察亚硝酸钠致DNA突变的初步研究

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摘要:

目的采用褶合光谱法考察亚硝酸钠致DNA突变。方法选择检测波长在200~340 nm,以同一浓度的DNA多次扫描组成自身标准,并考察了此浓度的DNA溶液在亚硝酸钠作用下的光谱变化。结果小牛胸腺DNA与亚硝酸钠作用后,其差谱值在200~340 nm随着时间的延长不断增大,且与亚硝酸钠浓度呈正相关,与近红外光谱的检测结果一致。结论褶合光谱法检测DNA突变过程简便快捷、成本低廉、灵敏度高,有望用于新药致突性的高通量检测。

关键词: DNA突变 亚硝酸钠 褶合光谱法

STUDIES ON NaNO₂-INDUCED DNA MUTATION BY CONVOLUTION SPECTROMETRY

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Abstract:

AIMTo study the sodium nitrite induced DNA mutation by convolution spectrometry (CS). METHODSThe spectra of sodium nitrite-induced mutative calf thymus DNA was compared with ego criteria based on Spectra of the primary DNA within the wavelength range from 200 to 340 nm. Distilled water served as blank and normal saline served as negative control. Any difference was quantitatively expressed by differential value (δ) of convolution spectra. Near-infrared spectroscopy was employed as the reference method. RESULTSThe differential value was positively correlated with the increasing time and concentration of sodium nitrite. δ values increased to 1.37%, 2.41% and 5.44% respectively within 2-hour's reaction between calf thymus DNA and 0.5, 0.05 and 0.005 $\mu\text{g}\cdot\text{mL}^{-1}$ sodium nitrite, while on the contrary, changes could be hardly observed on the corresponding UV absorption spectra. The results were also confirmed by their corresponding near-infrared spectra. CONCLUSIONThe δ values can be used to represent the compound's strength of mutagenesis. Every convolution procedure takes less than one minute, so CS provides a fast, simple and inexpensive alternative method to determine chemical or medicinal DNA mutation.

Keywords: sodium nitrite convolution spectrometry DNA mutation

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