

研究论文

羟自由基对支撑磷脂双层膜的破坏及水溶性抗氧化剂保护作用的电化学研究

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摘要 以支撑磷脂双层膜(supported bilayer lipid membrane, s-BLM)作为生物膜模型, 利用Fenton体系产生羟自由基(hydroxyl free radical, •OH), 采用循环伏安法研究了s-BLM与•OH之间的相互作用.

结果表明: •OH通过与磷脂发生化学反应, 诱发s-BLM上形成孔洞或缺陷, 这种作用对时间、FeSO<sub>4</sub>和H<sub>2</sub>O<sub>2</sub>

的浓度具有依赖性, 且不可恢复. 具有还原性基团的抗氧化剂维生素C, 还原型谷胱甘肽和L-半胱氨酸,

通过与•OH发生氧化还原反应, 可抑制•OH与s-BLM的相互作用, 降低•OH对s-BLM结构的破坏程度.

关键词 [支撑磷脂双层膜](#) [循环伏安](#) [羟自由基](#) [抗氧化剂](#)

分类号

### Electrochemical Study on the Destructive Effect of Hydroxyl Free Radical on Supported Bilayer Lipid Membrane and Protective Effect of Water-Soluble Antioxidant

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**Abstract** Supported bilayer lipid membrane (s-BLM) was served as a biomembrane model. The interaction between s-BLM and hydroxyl free radical (•OH) produced by Fenton system was investigated by means of cyclic voltammetry. The results show that •OH can induce pore or defect on s-BLM through chemical interaction with lecithin. The interaction between them depends on time, concentration of FeSO<sub>4</sub> and H<sub>2</sub>O<sub>2</sub>, moreover, it is not reversible. Through redox reaction with •OH, the antioxidants including vitamin C, glutathione and L-cysteine which contain redutive radicals, can suppress the interaction between •OH and BLM. Therefore, they can decrease the destructive degree of the structrue of s-BLM.

**Key words** [supported bilayer lipid membrane](#) [cyclic voltammetry](#) [hydroxyl free radical](#) [antioxidant](#)

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