

生物技术—研究报告

两种制备除草剂2,4-二氯苯氧乙酸分子印迹聚合物方法的比较

李嘉元¹, 顾旭东², 蒋培华³

- 1. 常州大学石油化工学院
- 2. 常州大学
- 3. 江苏省常州大学生命与制药学院

摘要:

制备2,4-二氯苯氧乙酸(2,4-D)分子印迹聚合物,并对两种制备方法进行比较。采用本体聚合法和悬浮聚合法分别制备出2,4-D分子印迹聚合物(2,4-DMIPs)和2,4-D分子印迹聚合物微球(2,4-DMIPMs)。通过正交试验,优化了聚合配方。正交试验结果表明,合成2,4-DMIPs的最优配方为:2,4-D 1.0 mmol、MAA 4.0 mmol、EGDMA 20.0 mmol、氯仿4.0 mL、AIBN 20.0 mmol;合成2,4-DMIPMs的最优配方为:2,4-D 1.0 mmol、MAA 8.0 mmol、EGDMA 20.0 mmol、氯仿8.0 mL、AIBN 10.0 mmol。采用紫外分光光度法(UV)对MIPs和MIPMs的选择吸附性能进行研究,并进行Scatchard分析。Scatchard分析结果表明,在研究浓度范围内,MIPs和MIPMs存在一类等同的结合位点。以2,4-二氯苯酚(2,4-DCP)和2,4-二氯苯甲醛(2,4-DCAD)为竞争底物时,MIPs的分离因子 α 分别为3.27、3.15,MIPMs的分离因子 α 分别为3.78和3.70。对于以2,4-D为模板分子的印迹聚合物,悬浮聚合法制备的微球比本体聚合法制备的颗粒在一定的浓度范围内,有更好的吸附性能和选择性能。该聚合物可用于环境和农作物中2,4-D的富集和检测,具有较好的应用前景。

关键词: 分子印迹

The Comparison of Two Methods about Preparing Molecular Imprinting Polymers of 2,4-Dichlorophenoxyacetic Acid

2, 2

Abstract:

Molecular imprinted polymers of 2,4-dichlorophenoxyacetic acid (2,4-D) were prepared in two methods which were compared in this thesis. 2,4-DMIPs and 2,4-DMIPMs were prepared by noumenon polymeric and suspension polymerization method respectively. The polymerization formula was optimized via orthogonal experiment. The orthogonal experiment results showed that the optimal preparation formula for DMIPs was as follows: 2,4-D 1.0 mmol, MAA 4.0 mmol, chloroform 4.0 mL, AIBN 20.0 mmol, and that for DMIPMs was as following conditions: 2,4-D 1.0 mmol, MAA 8.0 mmol, chloroform 8.0 mL, AIBN 10.0 mmol. The absorption selectivity of the MIPs and MIPMs was studied by UV, and Scatchard analysis was performed. Scatchard analysis showed that the binding sites of equal class were formed in the MIPs and MIPMs under the concentration range studied. When 2,4-Dichlorophenol (2,4-DCP) and 2,4-Dichlorobenzaldehyde (2,4-DCAD) were chosen as the competitive molecules, the separation factors for MIPs and MIPMs were 3.27, 3.15 and 3.78, 3.70 respectively. The results showed that: 2,4-DMIPMs had better adsorption and selective properties than 2,4-DMIPs in certain range. The MIPMs were expected to enrich and test 2,4-D in the environment and crops, and had a good application prospect.

Keywords: molecular imprinting

收稿日期 2011-04-12 修回日期 2011-05-09 网络版发布日期 2011-09-06

DOI:

基金项目:

通讯作者: 李嘉元

作者简介:

作者Email: ljj-1987fighting@163.com

参考文献:

[1] 肖淑娟,李红霞,于守武.分子印迹固相萃取法提取花生壳中木犀草素[J].化工进展,2010,29(2):293-296.

扩展功能

本文信息

- Supporting info
- PDF(854KB)
- [HTML全文]
- 参考文献[PDF]
- 参考文献

服务与反馈

- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- 引用本文
- Email Alert
- 文章反馈
- 浏览反馈信息

本文关键词相关文章

- 分子印迹

本文作者相关文章

- 李嘉元
- 顾旭东
- 蒋培华

PubMed

- Article by Li,J.Y
- Article by Gu,X.D
- Article by Jiang,P.H

- [2] Wang HY, Jiang JG, Ma LY. Synthesis of molecularly imprinted polymers and their molecular recognition study for benzotriazole [J]. *React.Funct.Polym*, 2006, 66(10):1081-1086
- [3] 杨敏莉,李元宗.苯甲酸及其脂类衍生物分子印迹机理的研究[J].*高等学校化学学报*,2004,25(6):1034-1036
- [4] 孟子辉,王进防,刘岚等.球形分子烙印聚合物分离立体异构体[J].*色谱*,1999,17(4):2223-2223
- [5] May AG, Mosbach K. Molecularly imprinted polymers by suspension polymerization in perfluorocarbon liquids, with emphasis on the influence of the porogenic solvent [J]. *J.Chromatography A*, 1994, 673(1):133-141
- [6] Yeon-Hum, Yun?Ho-Kyong Shon, Shon?Soon-Do, et al. Preparation and characterization of molecularly imprinted polymers for the selective separation of 2,4-dichlorophenoxyacetic acid[J].*J Mater Sci*,2009,44:6206-6211.
- [7] 常宇文,吴晓宗,李伟,等.凝胶渗透色谱-气象色谱法测定豆芽中2,4-二氯苯氧乙酸残留量[J].*分析检测*,2007,28(12),203-205.
- [8] Carla Badellino, Christiane Arruda Rodrigues, Rodnei Bertazzoli. Oxidation of herbicides by in situ synthesized hydrogen peroxide and fenton' s reagent in an electrochemical flow reactor: study of the degradation of 2,4-dichlorophenoxyacetic acid[J].*J Appl Electrochem*,2007,37: 451-459.
- [9] 丁怀,蔡文祥,杨晓秋.溶液中的2,4 - 二氯苯氧乙酸[J].*环境污染与防治*,2007,29(12): 934-937.
- [10] J.M. Salman, B.H. Hameed. Adsorption of 2,4-dichlorophenoxyacetic acid and carbofuran pesticides onto granular activated carbon[J].*Desalination*,2010,256: 129-135.
- [11] 高孟姣,应太林,庄云龙,等.2,4-二氯苯氧乙酸分子印迹聚合物研究[J].*分析测试技术与仪器*,2001,7(4): 210-214.
- [12] 郑亚秋,曹湛,郭宏斌,等.替米考星分子印迹聚合物的制备及其固相萃取研究[J].*分析化学*,2010,38(1): 95-99.
- [13] 朱秀芳,汪国松,侯能帮,等.咖啡因分子模板聚合物的合成及性能研究[J].*云南大学学报*,2004,26(6): 528-531.

本刊中的类似文章