

螺蛳壳和鱼骨混合物对水中磷酸盐的去除作用

杨孟娟, 林建伟, 詹艳慧, 方巧, 郑雯婧

上海海洋大学海洋科学学院

Effect of *Bellamya-quadrata*-Shells-and-Fish-Bones Mixture Removing Phosphate in Water

YANG Meng-Juan, LIN Jian-Wei, ZHAN Yan-Hui, FANG Qiao, ZHENG Wen-Jing

College of Marine Science, Shanghai Ocean University

摘要

参考文献

相关文章

Download: [PDF \(1139KB\)](#) [HTML 1KB](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

摘要 通过试验研究了螺蛳壳、鱼骨以及螺蛳壳和鱼骨混合物对水中磷酸盐的去除作用。结果表明,当磷酸盐初始质量浓度 C_0 为 $20\text{ mg}\cdot\text{L}^{-1}$ 、pH值为7、 T 为303 K时,螺蛳壳投加量为 $4\text{ g}\cdot\text{L}^{-1}$ 时对水中磷酸盐的去除率在36 h时达到最大值86%;鱼骨投加量为 $2\text{ g}\cdot\text{L}^{-1}$ 时,在不存在钙离子的情况下鱼骨对磷酸盐的去除率较低,当反应时间为5 h时仅为36%左右。螺蛳壳和鱼骨混合物可以有效去除水中的磷酸盐,特别是较短时间内(12 h以内)其去除能力明显优于单独利用螺蛳壳或鱼骨,投加量为 $6\text{ g}\cdot\text{L}^{-1}$ 时其对水中磷酸盐的去除率在12 h时达最大值96%。pH值,水中共存的 Cl^- 、 SO_4^{2-} 、 Na^+ 、 K^+ 和 Mg^{2+} 对螺蛳壳和鱼骨混合物去除水中磷酸盐的影响较小, HCO_3^- 会抑制螺蛳壳和鱼骨混合物对水中磷酸盐的去除,而 Ca^{2+} 则会促进螺蛳壳和鱼骨混合物对水中磷酸盐的去除。螺蛳壳和鱼骨混合物对水中磷酸盐的主要去除机制包括螺蛳壳和鱼骨对磷酸盐的表面吸附作用以及钙磷化合物沉淀作用。鱼骨可以为钙磷化合物沉淀的异质成核提供核心,促进钙磷化合物沉淀的生成;螺蛳壳和鱼骨所释放出来的钙离子可以为钙磷化合物沉淀的形成提供钙源。

关键词: 螺蛳壳 鱼骨 混合物 磷酸盐 去除 沉淀 动力学

Abstract: An experiment was conducted to study effects of *Bellamya quadrata* shells, fish bones and mixture of *Bellamya quadrata* shells and fish bones removing phosphate in water. Results show that in water, $20\text{ mg}\cdot\text{L}^{-1}$ in initial phosphate concentration, 7 in pH and 303K in T , and the phosphate removal rate by *Bellamya quadrata* shells ($4\text{ g}\cdot\text{L}^{-1}$) reached as high as 86% after 36 hours of exposure; the phosphate removal rate by fish bones ($2\text{ g}\cdot\text{L}^{-1}$) was comparatively low in the absence of Ca^{2+} , reaching 36% or so after 5 hours of exposure; and the phosphate removal rate of by the mixture of *Bellamya quadrata* shells and fish bones ($6\text{ g}\cdot\text{L}^{-1}$) was significantly higher than *Bellamya quadrata* shells or fish bones, reaching as high as 96% after 12 hours of exposure. Besides, pH and the existence of Cl^- , SO_4^{2-} , Na^+ , K^+ , or Mg^{2+} in the water did not show much effect on phosphate removal rate of the mixture, while the existence of HCO_3^- inhibited the removal, and the existence of Ca^{2+} promoted the removal. The chief mechanisms of the mixture removing phosphate include surface adsorption of phosphate on *Bellamya quadrata* shells and fish bones, and precipitation of calcium phosphate. Fish bones act as cores for heterogeneous nucleation, promoting calcium phosphate precipitation, while *Bellamya quadrata* shells and fish bones do as Ca source, releasing Ca^{2+} to form calcium phosphate that precipitates.

Keywords: *Bellamya quadrata* shell fish bone mixture phosphate removal precipitation kinetics

Received 2013-03-27; published 2014-01-25

Fund:

国家自然科学基金(50908142);上海市科学技术委员会科研项目(10230502900);上海高校青年教师培养资助计划(ZZhy12012);上海市教委重点学科建设项目(J50702);长江水环境教育部重点实验室开放基金(YRWEF201107)

Corresponding Authors: 林建伟 上海海洋大学海洋科学学院 Email: jwlin@shou.edu.cn

About author: 杨孟娟 (1990-), 女, 河南三门峡人, 硕士生, 主要研究方向为水污染控制原理与技术。E-mail: 505873449@qq.com

引用本文:

杨孟娟, 林建伟, 詹艳慧, 方巧, 郑雯婧. 螺蛳壳和鱼骨混合物对水中磷酸盐的去除作用[J] 生态与农村环境学报, 2014, V30(1): 63-70

YANG Meng-Juan, LIN Jian-Wei, ZHAN Yan-Hui, FANG Qiao, ZHENG Wen-Jing. Effect of *Bellamya-quadrata*-Shells-and-Fish-Bones Mixture Removing Phosphate in Water[J] Journal of Ecology and Rural Environment, 2014, V30(1): 63-70

Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

作者相关文章

- ▶ 杨孟娟
- ▶ 林建伟
- ▶ 詹艳慧
- ▶ 方巧
- ▶ 郑雯婧