

资源环境 生物药物 生物质转化

巢湖流域地下水硝态氮的分布及其影响因素研究

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摘要:

为了探讨巢湖流域地下水硝态氮的空间分布规律, 2009年11月至12月在巢湖流域采集了253个地下水样品, 分析了其硝态氮含量。结果表明, 巢湖流域地下水硝态氮含量平均值为7.13 mg/L, 超标率($10 \text{ mg/L} \leq \text{NO}_3^- \text{ N} < 20 \text{ mg/L}$)和严重超标率($\text{NO}_3^- \text{ N} \geq 20 \text{ mg/L}$)分别为15.81%和7.11%。不同土地类型的地下水硝态氮含量存在一定差异, 其中村庄>菜地>果园>旱地>城镇>水稻-油菜(或小麦)轮作田>单季水稻田>养殖场。巢湖流域绿色水稻产区地下水硝态氮含量比非绿色水稻产区低。农田地下水硝态氮含量与化肥氮施用量、人口密度和耕地面积比例呈正相关。农田地下水硝态氮含量具有随地下水位的下降而降低的趋势, 但两者之间没有显著相关性。当化肥氮的年施用量超过 100 kg/hm^2 或地下水位低于9 m时, 地下水硝态氮含量存在超标的潜在危险。

关键词: 巢湖流域; 地下水; 硝态氮

Studies on Groundwater Nitrate Nitrogen Distribution and its Affecting Factors in Chao Lake Watershed

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Abstract:

To investigate the spatial distribution of groundwater nitrate nitrogen ($\text{NO}_3\text{-N}$) in the Chao Lake watershed, 253 water samples were collected from wells in the watershed from November to December, 2009 and their $\text{NO}_3\text{-N}$ concentrations were analyzed. The results showed that the samples $\text{NO}_3\text{-N}$ concentrations were averaged 7.13 mg/L, and 15.81% of them exceeded 10 mg/L, the WHO limit for $\text{NO}_3\text{-N}$ of drinking water, and 7.11% of them exceeded 20 mg/L, the criterion for serious $\text{NO}_3\text{-N}$ pollution. The $\text{NO}_3\text{-N}$ concentrations were different in different land types, with the pattern of villages>vegetable fields>fruit gardens>dry lands>towns>ricerape (or wheat) fields>singleseason rice fields>livestock farms. The $\text{NO}_3\text{-N}$ concentration of groundwater in Green RiceProducing Area was lower than that in NonGreen RiceProducing Area in Chao Lake watershed. The $\text{NO}_3\text{-N}$ concentration of groundwater in farmlands was positively related to the application rate of nitrogen chemical fertilizer, the population density and the proportion of cultivated area. The $\text{NO}_3\text{-N}$ concentrations were declined with the lowering of the groundwater table, but there was no significant correlation between them. When the application of chemical fertilizer nitrogen exceeds 100 kg/hm^2 , or the groundwater table is less than 9 m, the $\text{NO}_3\text{-N}$ concentration of groundwater has the potential risk of exceeding the WHO limit.

Keywords: the Chao Lake watershed groundwater nitrate nitrogen

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