

研究论文

东湖沉积物中微生物磷脂的垂向分布

冯峰^{1,2}, 方涛¹, 刘剑彤^{1,*}

1.中国科学院水生生物研究所, 武汉 430072

2.中国科学院研究生院, 北京 100039

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摘要 以武汉东湖柱状沉积物为研究对象, 利用磷脂法测定了3个采样点各层的微生物量, 同时测定了沉积物中各层的pH, 简要分析了沉积物中磷脂含量的垂向分布与pH垂向分布的相关性。结果表明: 各样点沉积物中磷脂平均含量分别为: 1号点59.40nmol/g·dw, 2号点为20.56nmol/g·dw, 3号点为31.57nmol/g·dw。在沉积物的垂向分布上, 微生物量与pH均随着沉积物深度的增加而降低, 并且存在很高的相关系数。

关键词 东湖; 沉积物; 微生物量; 磷脂

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The vertical distribution of sedimentary microbial biomass in Lake Donghu by phospholipid methods

FENG Feng^{1,2}, FANG Tao¹, LIU Ji an- Tong^{1,*}

1. Institute of Hydrobiology, Chinese Academy of Sciences, Wuhan 430072, China;

2. Graduate School of Chinese Academy of Sciences, Beijing 100039, China

Abstract Sediment samples for phospholipid and pH analysis were collected from three sites in Lake Donghu. Lipids were recovered from all samples by chloroform-methanol extraction. Briefly, the sediment samples were mixed with chloroform, methanol, and phosphate buffer (pH 7.4) at a ratio of 1: 2: 0.8 in colorimetric tube, incubated for 2h, then subjected to centrifugation. The lipid-containing solvent (chloroform) was transferred into separatory funnels. Then partitioned by adding chloroform and buffer till the final ratio of chloroform -methanol-buffer was 1: 1: 0.9. The mixture was allowed to separate for 24h. The lower organic phase was decanted into a test tube and then dried under a gentle steam of nitrogen. Phosphate was liberated from lipids by perchloric acid digestion and heated to 200°C for 2h. Finally, inorganic phosphate released by digestion was determined by the method of Van Veldhoven and Mannaerts. Meanwhile, the pH value of sediments was measured in situ and the relativity between pH value and concentration of phospholipids was analyzed. The results showed that the highest concentration of microbial phospholipids occurred in Station 1, which suffered from heavy domestic sewerage and the average concentration is 59.40nmol/g·dw. The lowest concentration of microbial phospholipids presented in Station 2, which is located at the centre of Lake Donghu and its concentration is 20.56nmol/g·dw. Station 3 was in the middle with its concentration at 31.57nmol/g·dw. Vertical distribution of three sample sites indicated that microbial phospholipids decreased along with sediment depth. At the top 10cm layer of the sediments, all of the sampling sites in Lake Donghu were very high. However, along with the increasing of the depth of sediment, the concentrations of microbial phospholipids of the three sampling sites showed great changes, because of the long time precipitation of nutritious matters, the concentrations of microbial phospholipids in station 1 were still high, but it decreased obviously in Station 2 and Station 3, because they are far from heavy domestic sewerage. The pH value of sediments also decreased along with depth and the correlation coefficient between them was high, which were $r^1=0.9492$, $r^2=0.7376$ and $r^3=0.9050$ respectively. Considering the important effect of the concentration of nutritious matters for microbial growth, s

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systematic analyzing the relativities between the concentration of microbial phospholipids and biogenic matters, such as total nitrogen, total phosphorus etc, as well as environmental factor should be done in further study.

Key words Lake Donghu _ sediments _ microbial biomass _ phospholipid

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通讯作者 刘剑彤 jlou@ihb.ac.cn