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นางสาวพัชรี วิรัชพันธ์

ศูนย์วิทยทรัพยากร

จุฬาลงกรณ์มหาวิทยาลัย

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COMPARISON OF PHOSPHORUS PARTITIONING RESULTS IN SEDIMENTS
BY VARIOUS EXTRACTION METHODS



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วิธีสกัดรูปแบบฟอสฟอรัสในตะกอน 3 วิธี ได้แก่ SEDEX scheme (Ruttenberg, 1992), Modified SEDEX scheme (Vink et al., 1997) และ Agemian scheme (Agemian, 1997) ถูกนำมาใช้ในการศึกษารูปแบบฟอสฟอรัสในตะกอน 3 ตัวอย่างที่มีขนาด $<125 \mu\text{m}$ จากปากแม่น้ำเจ้าพระยา แมกลอน และบางปะกง เพื่อเปรียบเทียบผลการศึกษารูปแบบฟอสฟอรัสที่ได้มาจากต่างวิธีสกัดในตะกอนเดียวกัน นอกจากนี้ยังวิเคราะห์ปริมาณฟอสฟอรัสรวมในตะกอนโดยใช้เทคนิคทาง X-ray fluorescence spectroscopy (XRF), ignition methods (Aspila et al., 1976; Vink et al., 1997; Agemian, 1997) และ total digestion method ($\text{HF-HClO}_4\text{-HNO}_3$) เพื่อนำมาใช้ในการเปรียบเทียบความถูกต้องของวิธีสกัดรูปแบบฟอสฟอรัส โดยการนำผลรวมของรูปแบบฟอสฟอรัสมาเปรียบเทียบกับผลการวิเคราะห์ฟอสฟอรัสรวมในตะกอน

ผลการศึกษาพบว่าผลการสกัดรูปแบบฟอสฟอรัสในตะกอนจากต่างวิธีไม่สามารถนำมาเปรียบเทียบกันได้ และวิธีสกัดรูปแบบฟอสฟอรัสของ Agemian (1997) เป็นวิธีสกัดที่ดีที่สุด เนื่องจากผลการวิเคราะห์มีความถูกต้องและแม่นยำสูงกว่าวิธีสกัดของ Ruttenberg (1992) และ Vink et al. (1997) ถึงแม้ว่าทั้ง 3 วิธีให้ผลในเชิงปริมาณที่เปรียบเทียบกันไม่ได้ แต่ทั้ง 3 วิธีก็ให้ผลในเชิงคุณภาพที่เหมือนกันอย่างหนึ่ง คือ รูปแบบ Fe-P เป็นรูปแบบที่มีพบมากที่สุด ในตะกอนทั้ง 3 ตัวอย่าง ส่วนรูปแบบอื่นพบในปริมาณสัมพัทธ์ที่แตกต่างกันไป ซึ่งน่าจะเกิดเนื่องมาจากอิทธิพลของสภาพทางธรณีวิทยาและกระบวนการผุพังของหินในลุ่มน้ำและกิจกรรมมนุษย์

จุฬาลงกรณ์มหาวิทยาลัย

หลักสูตร สาขาวิชา ปีการศึกษา

ลายมือชื่อนิสิต
ลายมือชื่ออาจารย์ที่ปรึกษา
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PATCHAREE WIRATCHAPUN : COMPARISON OF PHOSPHORUS PARTIONING RESULTS IN SEDIMENTS BY VARIOUS EXTRACTION METHODS. THESIS ADVISOR : ASSIST. PROF. SIRICHAH DHARMVANIJ, Ph.D., THESIS CO ADVISOR : ASSIST. PROF. PUNYA CHARUSIRI, Ph.D., 119pp. ISBN 974-03-0512-1.

Three sequential extraction schemes in sediments, namely SEDEX scheme (Ruttenberg, 1992), Modified SEDEX scheme (Vink et al., 1997) and Agemian scheme (Agemian, 1997) were employed in the study of three, less than 125 μm fraction of the sediment samples. These samples were collected from the Chao Phraya, Mae Klong and Bang Pakong Estuaries. The objective of this study is to compare phosphorus partitioning results in sediment by the three extraction schemes. In addition, the samples were analyzed for total phosphorus contents by X-ray fluorescence spectroscopy (XRF), ignition methods (Aspila et al., 1976; Vink et al., 1997; Agemian, 1997) and total digestion method ($\text{HF-HClO}_4\text{-HNO}_3$). The total phosphorus contents were used in evaluating the accuracy of the extraction schemes by comparing these values with the sum of all phosphorus fractions.

All schemes show different and incomparable results. However, in terms of accuracy, the Agemian scheme shows the most promising results with higher accuracy and precision than those by Ruttenberg (1992)'s and Vink et al. (1997)'s. Eventhough three schemes are incomparable quantitatively but qualitatively all three show the same trend of having Fe-P as the most dominant fraction in all samples. Other fractions show different relative dominant in different samples, which may be caused by the geological conditions and weathering processes in the watersheds and human activities.

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