Influences of laterite soil towards physico-chemical properties and heavy metals concentration in urban lake quality index

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Abstract
The soil is a transmitted agent of water run-off to the water body. Variety of soil type in Malaysia has contributed to the difference of soil properties dissolved in the water and the concern of soil problem in Malaysia involving from laterite, sandy, acid sulfate and organic soil type. Soil properties are one of the subjects of impacting the hydrological composition through transportation of physico-chemical properties that bring all compound result on water quality. Thus, this research aimed to identify the influences of laterite soil towards physico-chemical properties and heavy metals concentration in an urban lake. The study was conducted at 10 site studies located at the laterite soil area by evaluating physico-chemical properties and heavy metals concentrations by using inductively coupled plasma mass spectrometry. The results established the significant physico-chemical and heavy metal variables that strongly associated with laterite soil urban lake are high value in biological oxygen demand (62.4 mg/L), chemicals oxygen demand (15.87 mg/L), NH3-N (0.58 mg/L), total suspended solids (59.27 mg/L), slightly acidic of pH (6.62) and for heavy metals three elements found dominants in water samples such as Fe (0.49 mg/L), Al (0.24 mg/L) and Mn (0.05 mg/L). The laterite soil samples were dominated by clay (36.1%) whereas the composition of heavy metals concentration was found high in Fe (676.25 mg/L), Al (563.13 mg/L), and Mn (1.82 mg/L). The significant outcome of this study can be used as key tools indicator for monitoring urban lakes status and indices.

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<td>Showing 18 of 18 View All in Cited References page</td>
</tr>
</tbody>
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1. **Study of water quality and heavy metals in soil & water of ex-mining area Bestari Jaya, Peninsular Malaysia**  
   By: Ashraf, M. A.; Maah, M. J.; Yusoff, I. B.  
   Times Cited: 1

2. **Title: [not available]**  
   By: Boyd, C. E.  
   Water Quality an Introduction Published: 2000  
   Publisher: Kluwer Academic  
   Times Cited: 90

3. **Solid-phase extraction and separation procedure for trace aluminum in water samples and its determination by high-resolution continuum source flame atomic absorption spectrometry (HR-CS FAAS)**  
   By: Cilli, Harun; Es, Cigdem  
   ENVIRONMENTAL MONITORING AND ASSESSMENT Volume: 185 Issue: 3 Pages: 2745-2753 Published: MAR 2013  
   Times Cited: 16

4. **Title: [not available]**  
   By: Dent, D.  
   Acid Sulphate Soil: A Baseline for Research and Development Published: 1986  
   Publisher: International Institute for Land Reclamation and Improvement, The Netherlands  
   Times Cited: 1

5. **Alleviating aluminum toxicity in an acid sulfate soil from Peninsular Malaysia by calcium silicate application**  
   By: Elisa, A. A.; Ninomiya, S.; Shamshuddin, J.; et al.  
   SOLID EARTH Volume: 7 Issue: 2 Pages: 367-374 Published: 2016  
   Times Cited: 7

6. **Research Advances in Bioremediation of Soils and Groundwater Using Plant-Based Systems: A Case for Enlarging and Updating Information and Knowledge in Environmental Pollution Management in Developing Countries**  
   By: Erakhrumen, A. A.  
   Biomanagement of Metal-Contaminated Soils Pages: 143-166 Published: 2011  
   Publisher: Springer, Netherlands  
   Times Cited: 2

7. **Physiographic Implications of Laterite in West Malaysia**  
   By: Eyles, R. J.  
   BULLETIN Volume: 3 Pages: 1-7 Published: 1970  
   Publisher: Geological Society of Malaysia  
   Times Cited: 1

8. **Title: [not available]**  
   By: Hooda, P. S.  
   Trace Elements in Soil Published: 2010  
   Publisher: John Wiley and Sons Ltd., Publications, UK  
   Times Cited: 9

9. **Water quality index: an indicator of surface water pollution in eastern part of Peninsular Malaysia**  
   By: Hossain, M.A.; Sujaul, I.M.; Nasly, M.A.  
   Res J Recent Sci Volume: 2 Pages: 10-17 Published: 2013  
   Times Cited: 9

10. **SUSTAINABLE RIVER WATER QUALITY MANAGEMENT IN MALAYSIA**  
    Times Cited: 16