MUTHURAJAWELA PEAT - ITS GEOCHEMICAL ATTRIBUTES AND THE POTENTIAL TO ACIDULATE EPPAWALA APATITE

A THESIS PRESENTED BY
HERATH MUDIYANSELAGE THALAPITIYE GEDERA
AMARASOORIYA PITAWALA

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Institute of Fundamental Studies
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Kandy
Sri Lanka

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Abstract

Previous studies have revealed that Muthurajawela peatland is at points characterised by high acidic conditions. It is known that there is a massive phosphate deposit at Eppawala. Due to its poor solubility this phosphate cannot be used as fertilizer for short term crops. This material has to be acidulated to be used as a soluble P-fertilizer. An effort was made to use the naturally occurring acidic water to enhance the solubility of Eppawala phosphate.

Different Muthurajawela waters such as surface water, pool water and interstitial water were collected during the dry season. Peat samples were collected and some field observations were also carried out during water sampling. Some sulphur species such as sulphate sulphur and hydrogen sulphide and halide content in different waters were measured.The distribution pattern of Total sulphur, sulphate sulphur of the peatland was observed. Some major elements such as K, Na, Mg, Ca, total Fe and organic carbon of surface peat in Muthurajawela were measured and the distribution pattern of their elements was investigated.

pH of Muthurajawela water ranged from 2.35 to 7.5 and an inverse relationship between sulphate content and pH of water was noted. The acidity of the peatland is attributed to high sulphate contents of its water. Organic acids also contribute towards the acidity of peatland. The acidity of the peatland is controlled by iron content, environmental conditions, carbonate rich marine shells and organic carbon content.

The distribution of major elements such as S, Mg, Ca and Na in peat and halide in water reveals that the chemistry of peat in Muthurajawela is related to influx of seawater. Not only seawater but also biological and ecological factors control the chemistry of the Muthurajawela peatland. The Ca content depends on marine shells and K is controlled by plants of the peatland. In addition, lateritic soil of underlying granitic rocks of the hinterland contributes to the Fe and K content of the landward side of the peatland. Ca and Mg distribution of the peatland reveals the marine influences on the peatland.

To increase the solubility of Eppawala phosphate the following treatments were carried out using materials from Muthurajawela: (i) Powdered primary apatite was buried in selected locations of the Muthurajawela peatland. (ii) Laboratory incubation experiments were carried out. (iii) Acidulation with peat extracted water and other acids were investigated.

The solubility of buried primary apatite showed an increasing trend with time. But the acid content of water was not enough to solubilize the apatite within a short period. The apatite incubated with peat in the laboratory showed significant solubility increases when compared to apatite buried in the peatland. If apatite were buried for a long period (more than one year), the solubility of it may be increased. The acidulation of primary apatite with peat extracted water give positive results when heated to $65^{0}C$ with HNO_3 acid. Even the adding of minute amounts of HNO_3 acid (0.1 ml of HNO_3) to peat extracted water helped to improve the solubility of apatite. The results of the study suggest that both organic compounds and inorganic acids of peat contribute to enhance the solubility of Eppawala apatite.