

Hydrogeochemistry of areas with Chronic Kidney Disease of uncertain etiology (CKDu) in Sri Lanka

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Chronic kidney disease with unknown etiology (CKDu) is being conservational health problem that is widespread in the tropical dry regions of Sri Lanka. Early studies on the problem indicated that the occurrence of CKDu could be induced by geo-environmental factors. From which hydrogeochemistry of groundwater of effected areas received much attention. Since the drinking water requirement of CKDu regions are primarily fulfilled by groundwater, it is very important to investigate the geochemical properties of groundwater in such regions. Therefore a detailed hydrogeochemical surveys was carried out in three different CKDu effected regions, namely Giradurukotte, Wilgamuwa and Nikawewa. Eighty (80) groundwater samples were collected from these regions and major and trace element contents were investigated.

Results of this study showed that alkalinity, hardness, Ca, and Mg relatively higher in Nikawewa with the mean values of 375, 397, 71, 35.1 mg/L respectively. The order of the major cations were ranged as $Ca > Na > Mg > K > Fe$ while anions were vary in the order of $Cl > SO_4^{2-} > F^- > NO_3^- > PO_4^{3-}$. The highest fluoride concentration was observed in Wilgamuwa area (5.47 mg/L) compared to other studied regions.

Statistical data interpretations showed that rock weathering is the dominant geochemical process that controls the quality of the groundwater while the majority of samples were belong to the Ca-Mg-HCO₃ chemical facies in all three regions. Hardness is one of the important parameter, which varied from moderately to very hard in affected areas. Weathering of silicates are very important factor in these areas where most of groundwater samples were showed $Na/Cl > 1$. Among trace elements, Mg, Fe, Zn, Sr and Ba are relatively high in groundwater while Cd, Cu, Pb and Al are mostly below 0.01 µg/L. The study reveals that the measured geochemical parameters were comparatively high in the Nikaweawa with respect to Wilgamuwa and Giradurkotte regions.

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