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Efficacy of *Phyllanthus emblica* bark powder in reducing total hardness of domestic well water in Jaffna peninsula, Sri Lanka

M. Shanthamareen and W. M. D. N. Wijeyaratne*

Department of Zoology and Environmental Management, Faculty of Science,
University of Kelaniya, Sri Lanka.

*dimuthu.wijeyaratne@kln.ac.lk

Jaffna peninsula is underlain by thick Miocene limestone deposits and these geological formations result in increased hardness of ground water. Increased hardness of drinking water can result in severe health effects including higher risk for urinary and salivary stone formation, urolithiasis and chronic kidney disease. The present study was conducted to evaluate the potential of the *Phyllanthus emblica* bark powder to be used as a home remedial method to reduce total hardness of drinking water. Water samples with three replicates were collected from 15 domestic wells from Kondavil area, Jaffna peninsula. The total hardness (TH), pH, temperature, Dissolved Oxygen (DO), Electrical Conductivity (EC), salinity, nitrate-N and Total Phosphorous (TP) concentration of these water samples were measured using standard methods (APHA). The water quality parameters were compared with the Sri Lanka Standards Institution (SLSI) drinking water standards. The pH and TP concentration of wells were within the SLSI drinking water standards. However, all the tested wells exceeded the total hardness concentration (250 mg/L) and 60% of the wells exceeded total nitrate (11.3 mg/L) concentrations established by SLSI for safe drinking water. The mean TH of the wells ranged from 454.8 to 784.4 mg/L CaCO₃ and the mean nitrate-N ranged from 0.82 - 20.99 mg/L respectively. Well water samples were then filtered in a column filter using *Phyllanthus emblica* bark powder and the total hardness and total nitrate of the filtered water samples were measured. The variation of these parameters before and after filtration were compared by paired t-test using MINITAB 14 software. After filtration through the *Phyllanthus emblica* bark powder, a significant reduction (paired t-test, p<0.05) of TH was observed with a 9.50% reduction. However, filtration through *Phyllanthus emblica* bark powder increased the nitrate concentration (4.89%). Therefore, it was concluded that *Phyllanthus emblica* bark powder could be used as a remedial method to reduce hardness in drinking water.

Keywords: Drinking water, home remedial techniques, Kondavil, plant based water purification