

**POSSIBILITY OF CADMIUM AND FLUORIDE
ACCUMULATION IN TEA PLANTS AND SOILS FERTILIZED
WITH EPPAWALA PHOSPHATE ROCK**

**THE PROJECT REPORT PRESENTED BY
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to the Board of Study in Environmental Science of the
POSTGRADUATE INSTITUTE OF SCIENCE

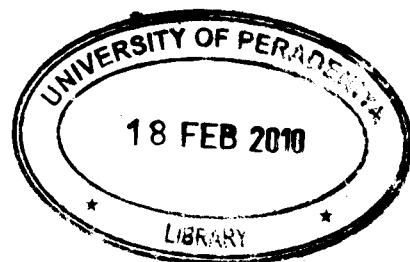
in partial fulfillment of the requirement
for the award of the degree of

MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE

of the

**UNIVERSITY OF PERADENIYA
SRI LANKA
2008**

625829



ABSTRACT

Contamination of the environment by heavy metals and fluoride is a major concern because of their toxic effects. The presence of these elements in Eppawala Phosphate Rock (EPR) is a major concern because most tea plantations use this as a source of P fertilizer. Cadmium and fluoride are not required by plants. Though fluoride is an essential element to animals, excessive amounts may induce harmful effects. Research studies conducted in tea plants on cadmium and fluoride accumulation due to EPR application in Sri Lankan is scanty. Since Sri Lankan tea is the most popular beverage among Sri Lankans, most Asians and Westerners, this study was carried out to determine the possibility of cadmium and fluoride accumulation due to EPR (apatite) application in tea soils, considering the high acidity in tea soils. The effect on tea plants was also investigated as those plants are fertilized with EPR. Retention of high concentrations of P in tea soils was also investigated.

Cadmium and fluoride concentration in tea soils were determined by analyzing the soil samples collected from tea soils that were not treated with EPR, tea soils that were continuously applied with EPR and adjacent jungle soils. Consequently, relevant samples of tea leaves were also analyzed for cadmium and fluoride.

Atomic absorption spectroscopy was used for cadmium determination, while fluoride was analyzed by the fluoride ion selective electrode. Soil phosphorus was determined by using Bray and Kertiz - 1 (vanadomolybdate blue method) and plant phosphorus was determined by the vanadomolybdate yellow method.

Cadmium accumulation in tea soils fertilized with EPR was very low ($0.04 - 0.48 \text{ mg kg}^{-1}$) because its concentration in normal soil was $0.1 - 1.0 \text{ mg kg}^{-1}$. But it was found that cadmium concentration in tea plants was significantly higher than that of the soils and it is in the range of $0.15 - 0.55 \text{ mg kg}^{-1}$. Tea plants are known to accumulate fluoride in their leaves. The fluoride concentration in tea soils was between $10.1 - 14.5 \text{ mg kg}^{-1}$ and in the tea leaves where tea was grown in EPR fertilized soils was $114.7 - 169.0 \text{ mg kg}^{-1}$.

With aid of the results in this study, it can be concluded that there is a possibility to accumulate as considerable amounts of fluoride in tea soils and tea plants owing to continuous application of EPR to tea soils.