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ANALYTICAL STUDIES FOR SULPHUR AND ITS
STATUS IN COCONUT SOILS AND PLANTS

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ABSTRACT

The first part of the thesis deals with aspect of digestion, extraction and techniques for the estimation to sulphur in water, soil and plant tissues.

Initially estimation of sulphur was done on pure chemicals using various conventional methods. This resulted in the choice of turbidimetry as the most convenient. It was then compared with the more modern technique - High Performance Liquid Chromatography. This was found to be more sensitive, selective and also rapid. Having established these two methods it was then tested on water (rain), coconut plant tissues (leaf, nut water and kernel) and soils. These studies revealed that HPLC was superior to turbidimetry with rainwater, nut water and soils but not with leaf tissue and kernel. The digestion procedure adopted for leaf and kernel caused difficulties in the estimation of sulphur. Turbidimetry however has to remain for leaf tissue. The nature of extractants also conditioned the use of HPLC for estimation of soil sulphur. The appropriate extractants were hot water and 100 ppm P' solution. Therefore HPLC and turbidimetry are both necessary for application to nutritional studies in coconut.

The second part of the thesis deals with the application of these findings to the accurate evaluation of the nutritional status in plant tissues and soils.

A greenhouse pot experiment was conducted on a coconut soil from a field experiment to evaluate an appropriate extracting solution for the estimation of sulphur in soils, using the indicator plant, soya. Correlation studies of soil available sulphur, using a 100 ppm P' solution, gave the best correlation with leaf sulphur.

Two long term field experiments where different sources of nitrogen were applied resulting in treatments, with and without sulphur were utilized to study its effect on yield. Studies on leaf tissue, nut

components (nut water and kernel) and soil both in S treated and control (No sulphur) showed that sulphur was not a limiting factor in production. However, rainwater analysis showed that adequate quantities of sulphur were deposited from the atmosphere which could probably meet the requirements of coconut.