

**COMPLETE AND BALANCED FERTILIZER RECOMMENDATION FOR
BITTER GOURD (*Momordica charantia* L.)**

By

MALAVI GAMARALLAGE THUSITHA SHYAMAKUMARA AMARASEKARA

Thesis

Submitted in partial fulfillment of the requirements

for the degree of

MASTER OF PHILOSOPHY

in the

POSTGRADUATE INSTITUTE OF AGRICULTURE

of the

UNIVERSITY OF PERADENIYA

PERADENIYA

March 2006

C 631.8
A51



557600

AGRICULTURE LIBRARY
UNIVERSITY OF PERADENIYA

557600 ✓



ABSTRACT

Bitter gourd (*Momordica charantia* L.) is a nutritious vegetable cultivated in the low country in Sri Lanka. Field surveys have shown that the average production of bitter gourd remained stagnant during the past ten years despite introduction of high yielding varieties. Many research studies revealed that yield stagnation of vegetable crops in Sri Lanka is mainly due to imbalanced fertilization. Present fertilizer recommendations for vegetable crops are too generalized and insufficiently related to the site specific yield potentials and local fertility status. Therefore, the main objectives of this study were to investigate the limiting nutrients in Alfisols at CIC farm Pelvehera and to test the fertilizer recommendation made for bitter gourd based on nutrient requirement in Alfisols at Pelvehera.

The systematic approach tested in this study involved steps of soil sampling, chemical analysis, nutrient sorption study, greenhouse experiment and field experiment. Available P, K, Cu, Fe, Mn, and Zn were extracted by 0.25 M NaHCO₃, 0.01M EDTA and 0.01M NH₄F solution. 1N KCl was used to extract NH₄ - N, Ca and Mg while SO₄ - S and B were extracted using 0.08 M CaH₄(PO₄)₂ solution. A sorption study was conducted to determine fixation capacity of P, K and Cu in the soil. A greenhouse experiment was carried out to quantify the performance of individual nutrients against optimum treatment based on modified missing element technique.

Routine analysis of soil samples showed that N, P, and Cu were deficient in the soil. The results of the greenhouse experiment clearly indicated that optimum treatment was the superior out of 13 other treatments. The relative dry matter yield of all other treatments remained lower than that of the optimum. Treatments having deficient level of nutrients (ie, N, P and K) showed significant reduction ($P > 0.05$) of dry matter yield compared to the optimum. In the field experiment optimum treatment showed significantly higher yield in three seasons out of four cultivated seasons and Rs. 56875.00 of gross return above fertilizer cost compare to DOA recommendation. Therefore, site-specific fertilizer recommendation based on systematic approach can be considered as most efficient and reliable way to refine traditional fertilizer recommendations in Sri Lanka.