

UNIVERSITI TEKNOLOGI MARA

SABBATICAL PROJECT REPORT
March - September 2011

**FEATURES EMPIRICAL ANALYSIS OF DISEASE
INFECTED RUBBER TREE LEAVES BASED ON
VISIBLE LIGHTING PROPERTIES**

by

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ABSTRACT

This work describes an empirical analysis of an infected rubber tree by a selected known disease where its symptom could be detected visually from leaves gradual discoloration. It is known in this industry that diseases of rubber are divided into four categories; root, panel, stem and branch and leaf diseases. The most serious disease is the root disease because not only it can kill the tree slowly but it could spread from tree to tree by root contact. Among the major root diseases, white root is the most destructive agent of trees and agricultural crops especially *Hevea brasiliensis*. Since, it is too difficult and expensive to treating root disease infected trees; prevention is important whereby one must rely on symptoms appearing on the roots themselves in order to recognize the disease. Other symptom on the tree is when the leaves produce discoloration and go yellow and die. Conventionally, early detection of diseases is through assessing via visual inspection by an expert person regularly. However, this evaluation process however, are time consuming, low percentage in accuracy and as well as costly.

The main objective of this work is to investigate further optical properties on four different regions of interest (ROI) locations of the top side leaf sample features such as petiolule, midrib/main vein, vein and leaf cell of rubber trees that are infected by white root disease. Visible spectrum of optical measurements is taken and then analyzed using statistical techniques for conclusive scientific findings of which ROIs above show clear discrimination between the healthy, medium and worst condition. Healthy tree is the one not being infected by white root disease while medium case is where the tree is being infected but categorized as early stage and the worst case belongs to badly infected trees which need to be treated urgently. The scope of the work involves raw data inclusion of leaf samples belong only to 2025 rubber tree clone. This clone is recommended by Rubber Research Institute of Malaysia (RRIM) management due to its popularity and commercially used by small scale planters. Outcome of this work will suggest that it is a novel idea to develop on the shelf technology engineering sensor instrument using non-invasive advanced signal processing techniques and intelligent system for early detection of white root disease.

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