

## **PRELIMINARY STUDY IN THE BACKSCATTERING MEASUREMENTS AND THEORETICAL MODELING OF OIL PALM CANOPIES.**

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### **ABSTRACT :**

With the increasing prices and slow depletion of fossil fuels, research into bio-fuel technologies are picking up all across the world in an effort to develop cheaper and cleaner sources of energy. Malaysia, being one of the world's largest producers of palm oil, is directing much of its resources into the development of palm oil based fuels. In the near future, microwave remote sensing may play an important role in the monitoring of the large expanse of oil palm plantations in the country. Before such applications can be developed however, detailed studies into the backscattering behaviour of oil palm canopies need to be carried out to enable a better understanding of microwave interactions within the canopy. Such a study is being carried out by both Multimedia University (MMU) and the Malaysian Centre for Remote Sensing (MACRES). In this study, an attempt is made to measure the backscattering coefficients of oil palm canopies using a ground-based, mobile C-Band scatterometer. Measurements are conducted over various angles of incidence for oil palm trees of about 4 to 5 years of age in Bangi, Selangor, Malaysia. A simple theoretical model based on the radiative transfer theory is developed, in which the leaves, fronds and tree trunks are modeled as discrete scatterers (elliptic disks and cylinders) in a background host medium. The preliminary results of the scatterometer measurements and model calculations are presented and analyzed. A detailed investigation into the difficulties and challenges faced in the backscattering measurement and theoretical modeling of oil palm canopies are also presented, together with suggestions for future work in this area of research.