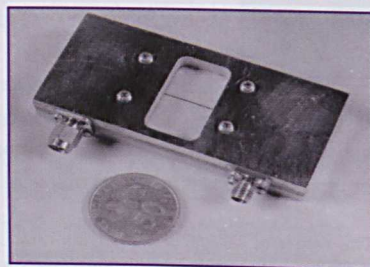


## Microstrip and Coplanar—Moisture Sensors for Oil Palm Fruit

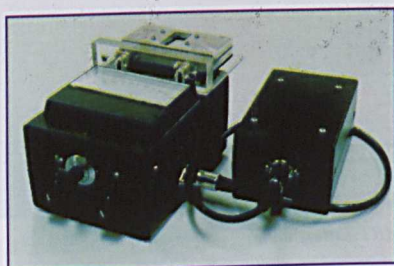


Microwave aquametry or measurement of moisture content in liquid or solid by microwave technique is known to be accurate and rapid. For a small sample size, it is conveniently measured by using a microstrip sensor or conductor-backed coplanar waveguide (CBCPW) sensor since only a small part of the sample interacts with the sensing line. These sensors consist of three parts i.e. the coupling system, the 50 $\Omega$  stripline section and sensing area. The substrate material is RT-Duriod and sensing area is protected by a thick layer of polymeric material. It is a broad band sensor which gives good sensitivity in the region of 5GHz.

One of the main application of this sensor is to determine the moisture content in oil palm fruit. The close relationship between moisture content and oil content in mesocarp gives a possibility of using % m.c./fresh mesocarp as a parameter to gauge fruit ripeness.



*Microstrip moisture sensor*



*A prototype of ripeness meter for oil palm fruit*

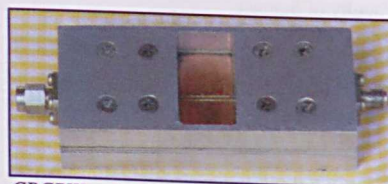
A profile of ripeness can be developed by monitoring the % m.c./fresh mesocarp of the outer fruit of the bunch and corresponding magnitude of insertion loss,  $S_{21}$  of the sensor. The technique, which is directly related to oil quantity, is able to determine the actual stages of the developing fruit such as under ripe, ripe and fully ripe. A single test of the sample is adequate for predicting the optimum time of harvesting by applying the profile of ripeness.

This method is also suitable for assessing the quality of the fruits that reach the factory. For this purpose a compact and portable microwave instrument can be developed from this sensor to give an accurate and quick measurement.

### **For further information, kindly contact:**

Professor Dr. Kaida Khalid  
Department of Physics  
Faculty of Science  
Universiti Putra Malaysia  
43400 UPM, Serdang, Selangor  
Malaysia

Tel: +603-8946 6606, Fax: +603-8943 2508  
E-mail: [kaida@fsas.upm.edu.my](mailto:kaida@fsas.upm.edu.my)



*CBCPW moisture sensor*