

## Investigations On A Novel Inductive Concept Frequency Technique For The Grading Of Oil Palm Fresh Fruit Bunches.

### ABSTRACT

From the Malaysian harvester's perspective, the determination of the ripeness of the oil palm (FFB) is a critical factor to maximize palm oil production. A preliminary study of a novel oil palm fruit sensor to detect the maturity of oil palm fruit bunches is presented. To optimize the functionality of the sensor, the frequency characteristics of air coils of various diameters are investigated to determine their inductance and resonant characteristics. Sixteen samples from two categories, namely ripe oil palm fruitlets and unripe oil palm fruitlets, are tested from 100 Hz up to 100 MHz frequency. The results showed the inductance and resonant characteristics of the air coil sensors display significant changes among the samples of each category. The investigations on the frequency characteristics of the sensor air coils are studied to observe the effect of variations in the coil diameter. The effect of coil diameter yields a significant 0.02643 MHz difference between unripe samples to air and 0.01084 MHz for ripe samples to air. The designed sensor exhibits significant potential in determining the maturity of oil palm fruits.

**Keyword:** Inductive; Resonant Frequency; Air Coil; Oil Palm; Frequency Characteristics; Maturity Classification; Inductive Concepts