

ABSTRAK

PEMBUATAN ALAT UKUR TINGKAT MANIS BUAH MANGGA MENGUNAKAN SENSOR KAPASITOR SEMI SILINDER

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Telah dilakukan penelitian tentang pembuatan alat ukur tingkat manis buah mangga menggunakan sensor kapasitor berbentuk semi silinder yang akan melingkari bagian buah dan mampu melakukan pengukuran agar memperoleh hasil yang optimal. Tujuan dari penelitian ini adalah membuat alat ukur tingkat manis buah menggunakan sensor kapasitor semi silinder sebagai sensor tingkat manis buah mangga. Penelitian ini dilakukan dengan memberikan masukan frekuensi pada sensor kapasitor menggunakan modul osilator IC XR-2206 dengan variasi frekuensi 10 kHz, 50 kHz, 100 kHz dan 500 kHz. Tingkat manis buah mangga diukur menggunakan *Pocket refractometer Otago PAL-a*. Karakterisasi sensor kapasitor semi silinder dilakukan pada 10 buah mangga. Hasil pengukuran pada frekuensi 100 kHz memiliki *range* tegangan yang paling luas dibandingkan frekuensi lainnya. *Range* tegangan pada frekuensi 100 kHz sebesar 653,4 mV, pada rentang kadar gula 15,3 – 17,7%. Tegangan keluaran sensor kapasitor semi silinder dari rangkaian pengkondisi sinyal memiliki hubungan linier dengan tingkat manis buah mangga. Semakin naik kadar gula buah mangga maka semakin tinggi tegangan keluaran yang dihasilkan sesuai dengan persamaan $y = 266,89x - 3771,1$ dan koefisien korelasi sebesar 0,9841% pada frekuensi 100 kHz. Diperoleh kesimpulan pada pengujian alat tingkat manis buah mangga pada nilai brix 14,0 – 15,1% dinyatakan asam, sedangkan pada nilai brix 17,5 – 18,4% dinyatakan manis. Hasil pengujian alat memperoleh nilai akurasi rata-rata sebesar 98,41%, nilai presisi sebesar 98,86%, dan nilai *error* rata-rata sebesar 1,59%.

Kata kunci: Tingkat manis, mangga, sensor, kapasitor, semi silinder.

ABSTRAC

DEVELOPMENT OF A MEASUREMENT TOOL FOR SWEETNESS LEVELL OF MANGO FRUIT USING SEMI-CYLINDRICAL CAPACITIVE SENSOR

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Research has been conducted on the development of a measuring device for the sweetness level of mango fruit using a semi-cylindrical capacitor sensor that will encircle the fruit and capable for performing measurements to obtain optimal results. The objective of this research is to create a measuring device for fruit sweetness using a semi-cylindrical capacitor sensor as a sensor for measuring the sweetness level of mango fruit. This research was conducted by inputting frequencies to the capacitor sensor using the Xr-2206 IC module, with variations in frequency at 10 kHz, 50 kHz, 100 kHz, and 500 kHz. The sweetness level of mango fruit was measured using the Pocket refractometer Otago PAL- α . The characterization of semi-cylindrical capacitive sensor was conducted on 10 mangoes. The measurement results at a frequency of 100 kHz have the widest voltage range compared to other frequencies. The voltage range at a frequency of 100 kHz is 653.4 mV, within the sugar content range of 15.3 – 17.7%. The output voltage of the semi-cylindrical capacitive sensor from the signal conditioning circuit has a linear relationship with the sweetness level of the mango fruit. As the sugar content of the mango fruit increases, the output voltage generated by the sensor increases accordingly, following the equation $y = 266.89x - 3771.1$, with a correlation coefficient of 0.9841% at a frequency of 100 kHz. The conclusion obtained from testing the device for measuring the sweetness level of mango fruit is that at a Brix value of 14.0 – 15.1% it is classified as acidic, while at a Brix value of 17.5 – 18.4%, it is classified as sweet. The tool testing resulted in an average accuracy value of 98.41%, a precision value of 98.86%, and an average error value of 1.59%.

Keyword: *Sweetness level, mango, sensor, capacitor, semi-cylindrical.*