Pengukuran koefisien transmisi dan refleksi pada bahan dielektrik dengan frekuensi 2,4 ghz = Transmission and reflection coefficients measurement on the dielektric material at frequency 2,4 ghz

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Abstrak

[ABSTRAK
Antena mikrostrip saat ini banyak diaplikasikan dalam dunia telekomunikasi. Antena mikrostrip sendiri memiliki beberapa kelebihan jika dibandingkan dengan antena jenis lain, yaitu bentuknya yang tipis dan kecil, memiliki bobot yang ringan, mudah untuk difabrikasi, serta harga yang relatif murah. Berangkat dari keperluan untuk melakukan penelitian dengan tujuan mengetahui tingkat kematangan buah-buahan dengan menggunakan antena, maka dilakukan uji coba menggunakan antena mikrostrip serta melakukan pengujian terhadap nilai koefisien transmisi dan refleksi untuk memperoleh data yang nantinya dapat digunakan untuk pengembangan alat serta teknologi lebih lanjut.

Koefisien transmisi dan refleksi ini bisa terjadi ketika propagasi gelombang elektromagnetik mengenai yang sebuah benda. Data hasil pengukuran nilai koefisien transmisi dan refleksi akan diperoleh dengan menggunakan antena mikrostrip serta Network Analyzer (NA) di dalam alat berwujud waveguide. Dengan parameter pengukuran meliputi jarak, posisi, nilai parameter S11, S21 permitivitas dan jenis bahan.

Pada skripsi ini telah dilakukan pengukuran data dengan membandingkan parameter S21 pada antena mikrostrip dengan beberapa variasi jenis benda yaitu, buah labu, buah semangka, balon garam dan balon gula. Dari hasil pengukuran diketahui bahwa nilai S21 yang paling tinggi dimiliki oleh buah labu matang nilai S21 sebesar -32,9 dB, pada buah semangka matang nilai S21 sebesar -39,7 dB, balon air garam S21 sebesar -43,52 dB, balon gula S21 sebesar -48,56 dB, labu mentah -50.09 dB dan semangka mentah -52.22 dB. Dari beberapa data pengukuran diatas, dapat diambil kesimpulan bahwa semakin rendah nilai kepadatan dan kerapatan benda uji, semakin kecil nilai koefisien transmisi dan refleksi. Dari hasil penelitian berikut ini diharapkan dapat digunakan untuk pengembangan alat pada masa yang akan datang, serta metode alternatif untuk mendeteksi tingkat kematangan buah dengan memanfaatkan antena mikrostrip serta nilai koefisien transmisi dan refleksi.
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ABSTRACT Microstrip antenna is now widely applied in telecommunications. Microstrip antenna has several advantages when compared with other types of antennas, which is its thin and small, has a light weight, easy to be fabricated, and the price is relatively cheap. The aim of this research is to figuring out the level of fruit?s maturity using the antenna. Data can be obtained by using a microstrip antenna as well as some test of the Coefficient Transmission and Reflection factor. Afterward the data can be used in developing advanced technologies in the next future.

Coefficient Transmission and Reflection can occur when electromagnetic wave get on to the object, Transmission loss measurement data will be obtained by using a microstip antenna array and Network Analyzer (NA) in the Waveguide Chamber. This measurenment using some parameter such as distance,

position, value?s parameter S11, S21, permitivity and type of materials.

The research has been done by comparing the data in the parameter S21 in a microstrip antenna using some materials which are a pumpkin, watermelon, balloon filled with saline and ballon containing sugar. The study shows that the highest value of S21 from a ripe pumpkin is -32,9 dB, followed by a ripe watermelon -39,7 dB, balloon filled with saline -43,52 dB, ballon containing sugar -48,56 dB, raw pumpkin -50.09 dB and a raw watermelon -52,22 dB. Furthermore, it can be concluded that the density of an object affects the value of the Coefficient Transmission and Reflection. Afterward, the data can be used in developing tools and alternative methods for detecting the level of fruit?s maturity by using a microstrip antenna and Coefficient Transmission and Reflection value.
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