

INTISARI

Sistem Deteksi Kelayakpakaian Minyak Goreng Sawit Menggunakan Metode Cepat Rambat Gelombang Ultrasonik

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Minyak goreng merupakan salah satu bahan makanan yang digunakan saat proses menggoreng makanan. Minyak goreng sawit merupakan jenis yang paling sering digunakan dan memiliki standar mutu SNI 7709:2012 yaitu Standar Nasional Indonesia tentang minyak goreng sawit yang menjadi acuan dalam produksi dan pemasarannya di Indonesia. Kebiasaan menggunakan kembali minyak goreng yang sudah dipakai menjadi penting dibahas karena hubungannya dengan kesehatan. Salah satu parameter yang mengalami perubahan ketika minyak goreng sering dipanaskan adalah bilangan peroksida. Pengukuran dan pengujian bilangan peroksida dapat dilakukan menggunakan gelombang ultrasonik sehingga dapat dilihat tingkat kelayakan konsumsi minyak goreng tersebut.

Sistem yang diciptakan menghasilkan gelombang ultrasonik dari osilator gelombang yang diteruskan menuju transistor sebagai media *switching* sebelum akhirnya gelombang dipancarkan ke minyak goreng sawit melalui transduser. Nilai tegangan yang diterima oleh *receiver* yang mengalami pelemahan tegangan dikuatkan menggunakan rangkaian penguat dan deteksi oleh komparator yang selanjutnya data diolah oleh mikrokontroler.

Dari penelitian yang dilakukan dapat diambil kesimpulan bahwa semakin sering minyak goreng sawit dipanaskan berbanding lurus dengan kenaikan bilangan peroksida. Pengukuran kecepatan rambat gelombang diperoleh pada minyak goreng yang belum dipanaskan 1340,90 m/s, satu kali pemanasan 1335,43 m/s, dua kali pemanasan 1325,83 m/s, lebih tiga kali pemanasan 1322,62 m/s. Rata-rata akurasi pengukuran bilangan peroksida berdasarkan nilai kecepatan gelombang adalah 92,44 %. Batas kelayakan konsumsi minyak goreng sawit dilihat dari bilangan peroksida adalah 10 mekO²/kg. Analisis cepat rambat dan bilangan peroksida disimpulkan minyak goreng tidak lagi layak dikonsumsi setelah satu kali pemanasan.

Kata kunci : Minyak goreng sawit, gelombang ultrasonik, cepat rambat, pengulangan pemanasan, bilangan peroksida, tingkat kelayakan.

ABSTRACT

Determination of Feasibility Determination System Using Palm Cooking Oil Using Ultrasonic Wave Fast Rapid Method

Cooking oil is widely known as a liquid to fry food. Palm cooking oil is the most frequent type used and has a quality standard of SNI 7709:2012, namely the Standar Nasional Indonesia on palm cooking oil. The standard is used to be a reference for producing and marketing palm cooking oil in Indonesia. The habit of reusing palm cooking oil for frying food is important to discuss because of its relationship with health. One parameter that changes when palm cooking oil is often heated is the number of peroxide. The measurement and testing of peroxide numbers can be done by using ultrasonic waves which later can be used as the parameters to see the feasibility level of the palm cooking oil consumption.

The system created generates ultrasonic waves from the wave oscillator which is transmitted to transistor as a switching medium before the waves are transmitted to palm cooking oil through the transducer. The voltage value received by the receiver that experiences a voltage attenuation is amplified using the amplifier circuit and detected by the comparator which is then processed by the microcontroller.

From the result, it could be inferred that the more often the palm cooking oil is heated, the more the number of peroxide increases. In the measurement of unheated cooking oil, the wave velocity was 1340,90 m/s. Afterward, in the first heating, it was obtained 1335,43 m/s, the second heating was obtained 1325,83 m/s, and more than third heating was obtained 1322,62 m/s. The average accuracy of the measurement of peroxide numbers based on the value of the wave velocity was 92,44%. The feasibility limit for consumption of palm cooking oil seen from the number of peroxide was 10 mekO²/kg. Therefore, from the analysis between heating repetitions on propagation velocity and the number of peroxide, it could be concluded that palm cooking oil was no longer suitable for consumption after one time heating.

Keywords: *Palm cooking oil, ultrasonic waves, propagation, heating repetition, peroxide number, feasibility level.*