

ABSTRACT

PURITY OF MILK DETECTION SYSTEM USING ULTRASONIC WAVE METHOD

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Currently, the test of pure milk adulteration can only be done by conducting laboratory test, by adding milk with some chemicals so it takes time to see the reaction with the mixing ingredients and also it can damage the content of milk so it can't be consumed again. In this study, a system that can detect a pure cow's milk adulteration is made by utilizing wave velocity measurement and wave attenuation methods without damaging the shape and nature of the milk (Non-Destructive Test / NDT).

Wave velocity measurement is done by propagating ultrasonic wave with a frequency of 40 kHz on objects. The time duration value at distances 24 cm of the sampled propagation is used to calculate wave velocity. Measurement of attenuation coefficient is done by measuring the received voltage at the receiver sensor and observed on the oscilloscope. The value of peak-to-peak voltage is used to calculate the attenuation coefficient on each object. These two methods are used to compare which method is more appropriate to detect the purity of cow's milk.

In this study, based on the results of the analytical approach to density on each object, the attenuation method was not positively correlated with the density and the R^2 value is 0.0486. Whereas the ultrasonic wave propagation method results in a very well positive correlation with the density, $R^2 = 0.8896$. The average wave propagation velocity in pure milk is 1508.88 m/s. The rate of detection accuracy of the testing system to detect pure milk is 70%.

Keywords— NDT, pure milk, wave attenuation, wave velocity