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Effect of Wi-Fi Wave Frequency 2.4 GHz to Water Content, Fat and Protein of Chicken Egg Based on Electromagnetic Waves Barrier

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Abstract: Chicken Egg is one of the most food consumption in public because of it's low price but high nutrition. In this research, chicken eggs placed 0,25 meter from wi-fi router and given electromagnetic waves barrier such as zinc and wood. The function of wi-fi router as radiating adder of wi-fi radio wave frequency 2,4 GHz. From the research,with the value of electromagnetic field is 18.24 × 10^{-13} W/m, the highest reduction of water contect, fat dan protein is given from sample of chicken egg that placed 0.25 meter from wi-fi router without electromagnetic waves barrier. The value of reduction are 5.629 gram; 2.815 gram; 2.9 gram or 11.7%; 38.38%; 35.14%. Meanwhile, the sample of chicken eggs that placed 0.25 meter from wi-fi router and given electromagnetic waves barrier such as zink and wood, the higher reduction of water content, fat and protein is in wood. the value of water content, fat and protein are 3.0745 gram; 1.811 gram; 2.218 gram or 6.319%; 24.69%; 26.87%.

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INTRODUCTION

Wi-Fi is a wireless technology, telecommunication relations between the device with other devices using electromagnetic waves instead of cables. The use of wi-fi as media access wireless networks are increasing with the development of technology wi-fi as well as devices that support it. In wi-fi, which is used for this study is the access point. The function of the access point is to send and receive data, conversion radio frequency (RF) signals into digital signals to be routed through a cable or WLAN devices with reconverted into radio frequency signals.

When electromagnetic waves crashing into a material, the wave will be weaker. Most of the signal energy is absorbed and converted into other energy forms and others passed propagates. The magnitude of the signal power attenuation that occurs depending on the type of material.

Behind the advantages of wi-fi, there are a lot of public assumption about the negative impact of wi-fi. Research carried out on eggs, it was found that the closer the distance of eggs with wi-fi, the more proteins decreased in the egg. Eggs are an ingredient of food derived from poultry, high nutrition and easily processed. Obtained from an egg perfectly nutrition because it contains nutrients that is complete and easy to digest, and the price is relatively cheap compared to the other food producing substances protein and fat.

Based on the above, this research will be discussed about the effect of wi-fi in water content, fat, and protein when added to chicken eggs and given electromagnetic wave barrier. This study used two types of electromagnetic wave barrier, they are wood and metal (zinc).

Preparation Of Test Object, The Radiation, Electromagnetic Waves Barrier And Measuring Tool

Tools and materials used in this study include:

A. Wi-Fi Router as The Radiation

Wi-Fi router that used in this research is type Huawei ZTE F660 with the TX Maximum Power 100 mW.

B. Electromagnetic Wave Barrier

Barrier material used to block electromagnetic wave that emitted by wi-fi router antenna to sample (chicken eggs). The dimension of the each materials are 0,15x0,15x0,15x0,003 meters.

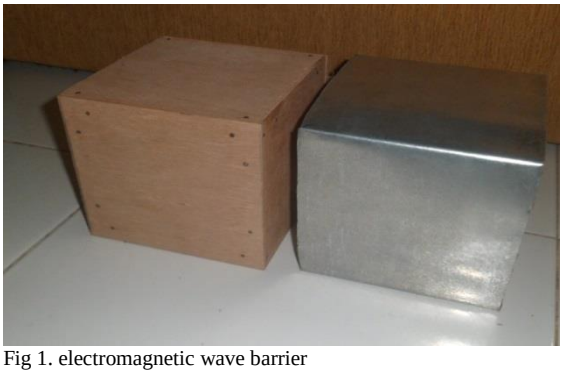

Fig 1. electromagnetic wave barrier

C. Field Strength Meter

In this study used field strength meter type Protek 329ON. Field strength meter is used to measure the electromagnetic field emitted by wi-fi router antenna.

D. Test Object

Chicken eggs that used in this research has a weight of each egg is 65 grams. The samples used 20 chicken eggs. Determination of the number of samples of chicken eggs which in this study conducted four types of treatment, so there are 4 groups sample of chicken eggs. Each group consist of five eggs. Thus, the number of eggs tested in this study was 20 chicken eggs.

Testing The Object

Three groups samples of chicken eggs placed 0.25 m from wi-fi router antenna. One group was given a sample of a barrier material such as zinc, the next sample group by barriers of wood, the other group without any barrier. Meanwhile, a group of other samples placed in areas without radiating of wi-fi wave. Before testing on samples of eggs, measuring electromagnetic field of wi-fi router antenna

Fig 2. Testing The Object

Measurement of Electromagnetic Fields Emitted By WiFi Router Antenna

The field strength measurement results of electromagnetic wave that transmitted by wi-fi router antenna is with the power of wi-fi router at 0.1 Watt, the power measurement results obtained wi-fi router antenna in free space is -93.41 dBm. If the measurement results are converted into watts are:

$$-93{,}41 \text{ dBm} = 10^{\log \frac{P\,(Watt)}{10^{-3}}}$$

$$-9{,}341 = \log P - \log 10^{-3}$$

$$-9{,}341 = \log P + 3$$

$$-12{,}341 = \log P$$

$$P = 4{,}56 \times 10^{-13} \text{ Watt}$$

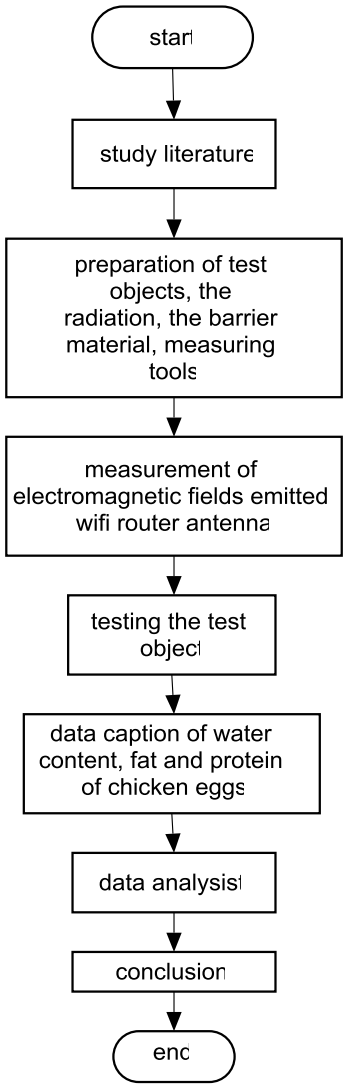

Fig 3. Flowchart Research

Thus, the power of wi-fi router antenna in free space is -93.41 dBm or $4{,}56 \times 10^{-13}$ Watt. The distance between the wi-fi router antenna with a test object (eggs) is 0.25 meters. Thus, a large electromagnetic field strength is $18{,}24 \times 10^{-13}$ W/m.

Results of The Test Object

From figure 4, In samples of chicken eggs without added radiating of wi-fi wave, after five days, decreased the water content of 0.182 grams, or at 0.378%. In samples with added chicken eggs in radiating wi-fi wave, a decrease in water content is highest in chicken eggs without any barriers of electromagnetic waves. The decline in water content in the samples of chicken eggs without

barrier of electromagnetic wave that is equal to 5.629 grams or 11.7%.

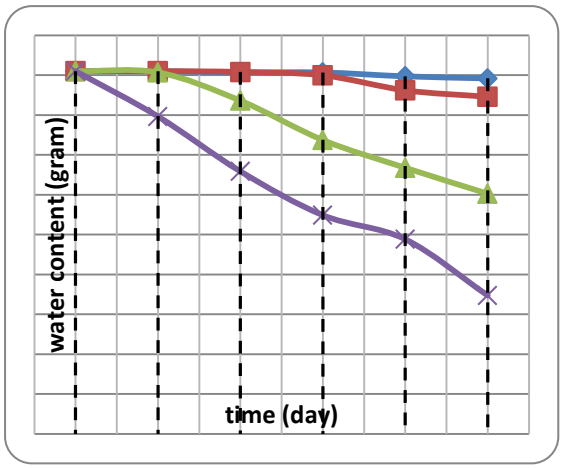

Fig 4. Water Content of Chicken Eggs

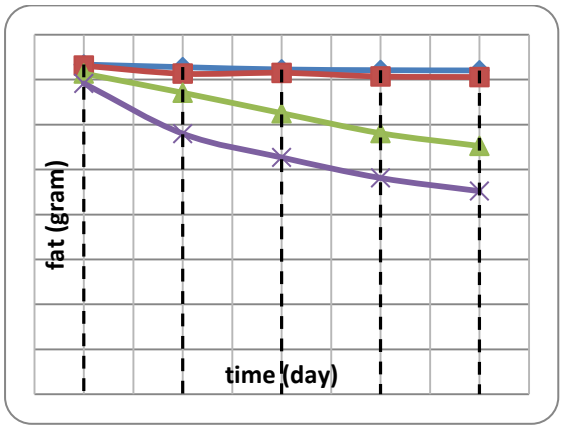

Fig 5. Fat Content of Chicken Eggs

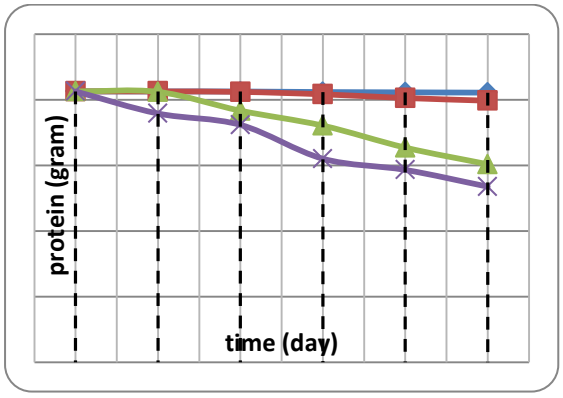

Fig 6. Protein Content of Chicken Eggs

Caption of figure 4,5,6:

Without Radiation Of Wi-Fi Waves
Added Radiation Of Wifi And Barrier (Zinc)
Added Radiation Of Wifi And Barrier (Wood)
Added Radiation Of Without Barriers

In samples with added chicken eggs in the radiating of wi-fi wave and a barrier of electromagnetic waves, after five days of treatment, a decrease in water content is highest in the chicken egg samples with barrier of electromagnetic waves such as wood, that is equal to 3.0745 gram, or 6.391% ,

From figure 5, In samples of chicken eggs without added radiating of wi-fi wave, after five days decreased the fat content is 0.131 grams, or 1.78%. In samples with added chicken eggs in in radiating wi-fi wave, a decrease in fat content is highest in chicken eggs without any barrier of electromagnetic waves. The decrease in water content in the samples of chicken eggs without any barrier of electromagnetic wave is 2,815 grams, or 38.38%.

In samples with added chicken eggs in radiating of wi-fi wave and a barrier of electromagnetic waves, after five days of treatment, decrease the fat content is highest in the chicken egg samples with barrier of electromagnetic waves such as wood, which amounted to 1,811 grams, or 24.69% ,

From figure 6, In samples of chicken eggs without added radiating of wi-fi wave, after a five days, decrease in the protein content of 0.036 grams, or at 0.4362%. In samples with added chicken eggs in radiating wi-fi wave, a decrease in protein content is highest in chicken eggs without any barrier of electromagnetic waves. A decrease in the protein content in the samples of chicken eggs without any barrier of electromagnetic wave that is equal to 2.9 grams, or 35.14%.

In samples with added chicken eggs in the radiating of wi-fi wave and a barrier of electromagnetic waves, after five days of treatment, a decrease in protein content highest in the chicken egg samples with barrier of electromagnetic waves such as wood, in the amount of 2.218 grams, or 26.87% ,

CONCLUSIONS

From the research data and analysis, it could be concluded that, with the power on wi-fi router at 0.1 Watt, the value of electromagnetic field is 18,24 $\times 10^{-13}$ W/m. The decrease in water content, fat and highest protein found in sample of chicken eggs were placed 0.25 meters of wi-fi router without any barrier. The resulting decrease are 5.629 gram; 2,815 grams; 2.9 grams or 11.7%; 38.38%; 35.14%.

Meanwhile, in the samples of chicken eggs were placed 0.25 meters from the router wi-fi and added barrier by electromagnetic waves of wood and zinc, a decrease in water content, fat and protein produced by the samples of chicken eggs with barrier of wood that are equal to 3, 0745 grams; 1,811 grams; 2.218 grams, or 6.391%; 24.69% 26.87%.

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