

Effect of Eco Enzyme on Television Electromagnetic Radiation

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ABSTRACT

Research has been carried out on the effect of eco enzymes on television electromagnetic radiation. This research aims to determine the amount of electromagnetic radiation on live television before and after using an eco enzyme. Measurements were made of the amount of electromagnetic radiation from the television when it was off, and the television when it was on before and after using eco enzyme, using 2 types of eco enzyme (pineapple eco enzyme and organic material eco enzyme) with a volume of 1 liter (for 1 bottle) and 2 liters (for 2 bottles). The position of the eco enzyme with the surface of the bottle cover open is placed in front of the television screen at a measuring distance of 25 cm, 50 cm, 75 cm, 100 cm, 125 cm, 150 cm, 175 cm, and 200 cm. Television electromagnetic radiation in the form of the highest electric field and magnetic field when the television is on before using eco enzyme at a measuring distance of 25 cm respectively is 30 V/m and 0.22 μ T. After using the eco enzyme, the highest reduction in electromagnetic radiation occurred at a measurement distance of 25 cm. Treatment using 2 liters of pineapple eco enzyme can reduce television electromagnetic radiation in the form of electric fields and magnetic fields respectively, namely 6 V/m and 0.18 μ T. In the treatment using eco enzyme, a variety of organic materials with a volume of 2 liters can reduce television electromagnetic radiation in the form of electric fields and magnetic fields respectively, namely 7 V/m and 0.19 μ T.

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1. Introduction

Radiation is energy emitted in the form of waves or particles [1]. Sources of radiation can come from high-energy electrical devices such as electronic devices [2]. One electronic device that can emit electromagnetic radiation is a television. The wavelength and frequency of electromagnetic radiation emitted on a television monitor screen will be captured by the cornea of the eye so that it can have a negative impact on symptoms including eye fatigue, headaches, nausea, anxiety, and hypertension [3].

Efforts are made to reduce the negative impacts of electromagnetic radiation from television or can be anticipated in several ways, including limiting viewing time, maintaining distance from radiation sources, and using natural ingredients that have been produced into eco enzyme liquid. Eco enzyme (EE) liquid was first introduced by Dr. Rasukon Poompanvong, a researcher and environmental observer from Thailand, in his research using leftover kitchen ingredients (organic waste) [4]. Eco enzyme is the result of the fermentation of organic waste from vegetables, fruit, and

fruit peels which is added with water and brown sugar [5]. Several enzymes contained in eco enzymes such as lipase, trypsin, amylase which can kill or prevent pathogenic bacteria, acetic acid (H_3COOH) which can kill germs, viruses, and bacteria as well as the nitrate (NO_3), and carbon trioxide (CO_3) content needed by soil for plant growth. Apart from its benefits in agriculture, there are many benefits of eco enzymes in everyday life, namely that it can clean air from pollution, clean polluted water, act as a floor cleaner, reduce chemicals, and reduce levels of electromagnetic radiation [6].

Eco enzyme liquid also contains flavonoids which come from organic fruit and vegetable waste which is one of the basic ingredients for processing eco enzyme [7]. Flavonoids contain conjugated aromatic systems so they show strong absorption bands in the UV and visible spectrum regions [8]. The basic principle is that if electromagnetic radiation in the ultraviolet region and visible light passes through compounds that have double bonds, some of the radiation is usually absorbed by the compound [9]. Absorption of radiation rays is caused by a reduction in the energy of the radiation rays when electrons in low-energy orbitals are excited to higher-energy orbitals [10].

2. Method

This research method uses 2 types of the eco enzyme (pineapple eco enzyme and eco enzyme variations of organic matter, varying the volume of the eco enzyme, 1 liter (see Fig. 1.a) and 2-liter volume (see Fig. 1.b). The position of the eco enzyme is placed in front of the LED television screen with the bottle cap open and the measuring instrument parallel to the surface of the bottle mouth.

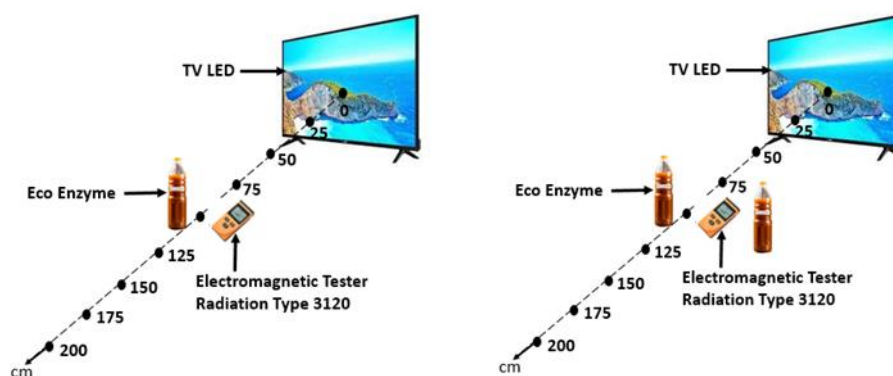


Fig. 1. Treatment eco enzyme to television by using a. 1 L EE, b. 2 L EE

Television electromagnetic radiation measurements were carried out at measuring distances varying from 25 cm to 200 cm with durations of 5 minutes, 10 minutes, 15 minutes, 20 minutes, 25 minutes, and 30 minutes. For each measurement distance, the duration of the measurement is 5 minutes to 30 minutes, whether the treatment uses 1 liter or 2 liter of eco enzyme.

3. Results and Discussion

The results of this research are that the amount of television electromagnetic radiation decreases after the influence of the eco enzyme. Television electromagnetic radiation in the form of electric field values experienced the highest decrease at a measurement distance of 25 cm when a 2-liter pineapple eco enzyme was used. Television electromagnetic radiation in the form of electric field values experienced the lowest decrease at a measurement distance of 200 cm. Television electromagnetic radiation in the form of unstable magnetic field values decreased after using 1 liter or 2 liter of eco enzyme. The results of research on large amounts of television electromagnetic radiation in the form of large electric and magnetic fields before and after using eco enzymes can be seen in Fig. 2 and Fig. 3.

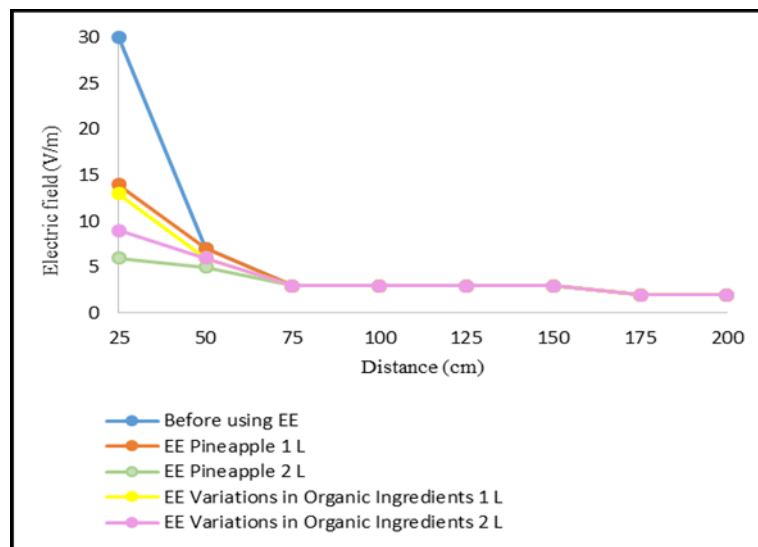


Fig. 2. Effect of Eco Enzyme to electric field LED TV

Figure 3 shows that at a distance of 25 cm the highest electric field value when the television was on before using eco enzyme was 30 V/m and the lowest electric field value was at a distance of 200 cm, namely 2 V/m. Based on the graph above, the highest decrease occurred at a distance of 25 cm for treatment using pineapple eco enzyme and eco enzyme, a variety of organic materials with a volume of 2 liters, namely 6 V/m - 9 V/m.

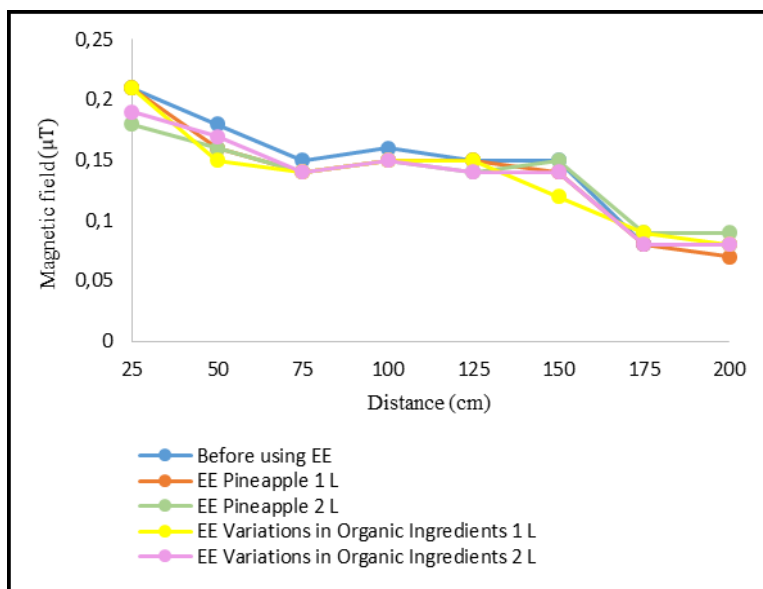


Fig. 3. Effect of Eco Enzyme on Magnetic Field LED TV

Figure 3 shows that the magnitude of the magnetic field experienced the highest decrease at a distance of 25 cm after using 2-liter pineapple eco enzyme and 2-liter BO variant eco enzyme. The farther the measurement distance, the greater the magnetic field decreases. The lowest magnetic field size before and after using eco enzyme was at a distance of 200 cm with the lowest magnetic field size of 0.07 μ T

4. Conclusion

The conclusion obtained in this research is that the amount of television electromagnetic radiation decreased after using the eco enzyme, whereas the electromagnetic radiation of live television before using the eco enzyme had a large electric field and magnetic field respectively, namely 30 V/m and 0.22 μ T. After using eco enzyme, the highest reduction in television electromagnetic radiation occurred in the treatment using 2 liters of pineapple eco enzyme at a measuring distance of 25 cm, namely 6 V/m and 0.18 μ T. In this research it can also be concluded that the distance of the radiation source influences the amount of radiation generated from the radiation source, the further the measurement distance from the radiation source, the lower the radiation generated.

References

- [1] B. Kurniawan., I. Wahyuni.: The Relationship between Electromagnetic Wave Radiation and Other Factors with Subjective Complaints in GE Electronics Industry Workers in Yogyakarta. *Jurnal Promosi Kesehat Indonesia Bagian Keselamatan dan Kesehatan Kerja FKM* 3(2),128–129 (2008).
- [2] N. M. Senior., B. W. Dharma.: Counseling on How to Reduce the Dangers of Electromagnetic Wave Radiation on Health in the Pagutan Barat District of Mataram. *Jurnal Bakti Nusa*. 2(1), 32–38 (2021).
- [3] M. Akmalia.: Analysis of TV Signal Reception Field Strength in the NET TV Transmission Station Service Area. Skripsi. Pendidikan Teknik Elektro. Department of Electrical Engineering, Faculty of Engineering. Semarang: Semarang State University (2019).
- [4] E. A. Prabulingga., Andari Puji Astuti and E. T. Maharani.: Effect of Ecoenzyme Composition of Household Waste on the Quality and Shelf Life of Kersen and Raja Banana. *Seminar Nasional Edusaintek Fak. UNIMUS*. Semarang 2016, vol. 20, pp. 295–310 (2020).
- [5] A. Nazurahani, R. N. C. Pasaribu and A. P. Ningsih.: Manufacturing Ecoenzym As A Household Waste Processing Effort. *Jurnal Pendidikan Pembelajaran Ilmu Pengetahuan Alam Indonesia (JPPIPAI)* 2(1), 16–22 (2022).
- [6] Lolita Endang Susilowati, Mansur Ma'Shum and Zaenal Arifin.: Learning About The Use Of Household Organic Waste As Raw Material For Eco-Enzymes. *Jurnal Pengabdian Magister Pendidikan IPA* 4(4), 356–362 (2021).
- [7] H. Ramadhan, D. Baidah, N. P. Lestari and K. A. Yuliana.: Antioxidant Activity of 96% Ethanol Extract of Terap (*Artocarpus Odorratissimus*) Leaf, Flesh and Peel Using Cuprac Method. *Farmasains*. vol. 7, no. 1, pp. 7–12 (2020).
- [8] Pietta, P.G.: Flavonoids as Antioxidants. *Journal of Natural Products* 63, 1035-1042 (2000).
- [9] Neldawati, Ratnawulan and Gusnedi.: Analysis of Absorbance Values in Determining Flavonoid Levels for Various Types of Medicinal Plant Leaves. *Jurnal Berkala Ilmiah Fisika* 2(1), 76–83 (2013).
- [10] Haeria, Hermawati, and A. T. U. D. Pine.: Determination of Total Flavonoid Content and Antioxidant Activity of Ethanol Extract of Bidara Leaves (*Ziziphus spina-christi* L). *Journal of Pharmaceutical and Medical Science* 1(2), 57–61 (2016).