



"Tema 7 - Ilmu Dasar dan Rekayasa Keteknikan"

**ANTIOXIDANT ACTIVITY OF FUNCTIONAL CEREAL DRINKS
WITH THE ADDITION OF KECOMBRANG POWDER**

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Abstract. Cereal drink can be the choice of the community as a nutritious breakfast menu with easy and practical presentation. Kecombrang has potential as an antioxidant, but is still rarely used for food processing. Kecombrang flowers have a large antioxidant component to reduce free radical compounds so as to prevent oxidation. This research was to examine the addition of kecombrang flower powder to the antioxidant activity of cereal drinks. The material used is kecombrang flower powder and ingredients to make cereal drinks. The experimental design used in this study was a Complete Randomized Design (RAL) with 6 treatments and 3 repeats. The formulation analyzed in this study was divided into 6 treatments in the form of giving kecombrang flower powder with a concentration of 2%, 4%, 6%, 8%, 10%, 12%. The data analysis used was Analysis of Variance (ANOVA) at a significance level of 5%. The results showed that the addition of kecombrang flower powder had a significant effect ($p < 0.05$) on the antioxidant activity of cereal drinks. The treatment with the addition of 12% kecombrang flower powder was the treatment with the highest antioxidant activity

1. Introduction

Before activities, breakfast is typically comprised of staple foods, side dishes, and snacks. According to the General Guidelines for Balanced Nutrition, breakfast is one of the ten essential components of a balanced diet. People are increasingly seeking out food that is useful, nourishing, and advantageous to their health [1]. People may prefer instant cereal powder or cereal drinks as a filling breakfast option with a simple and useful presentation. Cereal is a grain product that has been processed; it is typically eaten for breakfast but may also be used as a snack.

Kecombrang (*Etlingera elatior*) is a spice plant native to Indonesia which is generally used as medicine and traditional cooking flavoring by Indonesian people [2]. Apart from being a medicine and flavoring agent, kecombrang also has potential as an antioxidant, but it is still rarely used for food processing. Kecombrang flowers have many benefits, including being antibacterial and antioxidant. According to [3] kecombrang has a dominant bioactive compound content that varies in each part of the plant. The dominant active compounds in combrang flowers consist of alkaloids, flavonoids, polyphenols, steroids, saponins, and essential oils. Kecombrang flowers have many benefits including antibacterial and antioxidant.

Antioxidants in the human body normally neutralize free radicals produced in the body. However, with increasing age and irregular lifestyle and eating patterns, the production of antioxidants in the body decreases, so that antioxidant compounds are needed from outside the body [4]. Antioxidant compounds have components to delay, inhibit, reverse and prevent the fat oxidation process which is called antioxidant activity, so they can protect cells from oxidative damage caused by free radicals such as singlet oxygen and others [5].

2. Research Methodology



2.1. Time and Place of Research

The research was carried out at the Food and Nutrition Laboratory, Faculty of Agriculture, Jenderal Soedirman University, from November 2022 to March 2023.

2.2. Experimental Design

The method used in this research was experimental and the experimental design used was a Completely Randomized Design (CRD). Concentrations of adding kecombrang powder to 100 g of flour.

T1 = 2%

T2 = 4%

T3 = 6%

T4 = 8%

T5 = 10%

T6 = 12%

2.3. Analysis Method

The manufacture of cereal drinks adapts to the previous researcher's method [6] and slightly modified with the addition of kecombrang flower powder. Making cereal drinks is carried out in 2 stages, namely making flakes and mixing ingredients. The first step is the preparation of ingredients. The ingredients used include kecombrang powder, rice flour 65 grams, banana flour 10 grams, mung bean flour 15 grams, corn bean flour 10 grams, sugar, salt, margarine, water, liquid milk and egg yolks. The ingredients are dissolved in water and liquid milk of 100 ml each and stirred using a spatula until nothing coagulates. Cooking for 8 minutes on the stove while continuing to stir. Add 2 ml of egg yolk and add vanilla essence. Then the dough is placed on baking paper and baked for 40 minutes with a temperature of 130 ° C. The process of reducing the size of the sheet into flakes (flakes) is done manually. At the final stage, mixing flakes with mixed beverage ingredients is carried out, so that cereal drink products are obtained. The ingredients of the drink mixture consist of milk powder, creamer, and sugar. The resulting flakes are processed into cereal drinks. Antioxidant analysis was analyzed using DPPH method. be measured absorbance using a spectrophotometer at a wavelength of 517 nm.

2.4. Data Analysis

Data obtained from the research were analyzed using the Analysis of Variance (ANOVA) statistical test. If there is a real difference between treatments, then proceed with further testing.

3. Result and Discussion

The compounds that can ward off free radicals and avoid the dangers of oxidation reactions are known as antioxidants. This compound can work to prevent possible degenerative diseases and aging. Antioxidant compounds have components to delay, inhibit, reverse and prevent the process of fat oxidation, cell or tissue damage, autoimmune diseases, degenerative diseases and cancer, all of which can be exacerbated by the body's reactive free radicals. Antioxidants are needed to protect the body from free radical attacks by reducing the bad effects of free radical compounds. The results of the ANOVA analysis of variance showed that the addition of kecombrang flower powder had a significant effect on the antioxidant activity of cereal drinks with the addition of kecombrang flower powder. The percentage of antioxidant activity of cereal drinks with the addition of variations of kecombrang flower powder can be seen in Figure 1.

Table 1. Antioxidant activity of cereal drinks with variations in the addition of kecombrang flower powder.

Sampel	Antioxidant Activity (%)
Kecombrang Powder (2%)	41.54
Kecombrang Powder (4%)	56.39
Kecombrang Powder (6%)	61.18
Kecombrang Powder (8%)	69.39
Kecombrang Powder (10%)	73.27
Kecombrang Powder (12%)	77.92

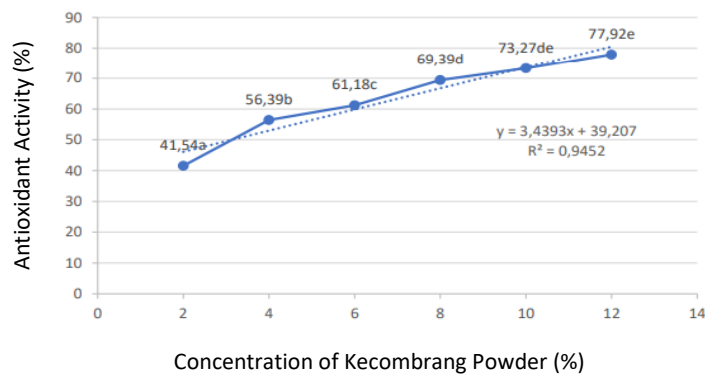


Figure 1. Antioxidant activity of cereal drinks with variations in the addition of kecombrang flower powder

The addition of variations of kecombrang flower powder showed the lowest antioxidant activity found in cereal drinks with the addition of 2% kecombrang powder with an antioxidant content of 41.54% and the highest antioxidant activity was 77.92% at the highest concentration of kecombrang flower powder addition (12%). There was an increase in antioxidant activity in cereal drinks after adding kecombrang flower powder. The results of analysis of variance showed that the addition of kecombrang flower powder had a significant effect on the antioxidant activity of cereal drinks ($P < 0.05$). There are significant differences in each concentration of kecombrang flower powder based on the DMRT test in Figure 1.

The increase in antioxidant activity contained in cereal drinks provides health benefits for the human body by balancing free radicals with the antioxidant activity contained in kecombrang flower powder. Antioxidant activity is a component contained in antioxidant compounds which functions as a delayer, inhibitor and prevents fat oxidation reactions, so that it can protect cells from oxidative damage caused by free radicals. The antioxidant content can neutralize free radicals through the mechanism of high antioxidant activity, so that it can prevent various chronic degenerative diseases. Therefore, adding kecombrang flower powder to cereal drinks can increase antioxidant activity which can fight free radicals in the body and provide benefits for the health of the human body. Kecombrang (*etlingera elatior*) is one type of spice plant native to Indonesia. All parts of the kecombrang plant can be utilized, ranging from rhizomes, stems, leaves and flowers. The results of recent years show that the antioxidant and antibacterial activity of kecombrang has the potential to be developed as a functional food product. kecombrang has active compounds



and antioxidant activity as functional foodstuffs. kecombrang flowers have strong antioxidant activity, making it good for functional foods [7]

Cell or tissue damage, autoimmune diseases, degenerative diseases, and cancer can all be exacerbated by the body's reactive free radicals. Antioxidants are needed to protect the body from free radical attacks by reducing the adverse effects of free radical compounds. Flavonoids are phenolic substances that have very strong antioxidant activity and have properties as antihistamines (allergies), anti-inflammatory, antimicrobial, insecticides, antifungals, anticancer and antiviral [8]. [9] states that chemical compounds of combrang plants can inhibit tumor growth and kill cancer cell cultures. The presence of antioxidants contained in kecombrang flowers (*Etlingera elatior*) can provide great benefits for the human body, so that kecombrang flowers (*Etlingera elatior*) are very good to be used as food.

4. Conclusion

Variations in the addition of kecombrang flower powder (41,54- 77,92 %) have an effect on antioxidant activity. Treatment with the addition of kecombrang flower powder with a concentration of 12% produced a cereal drink with the highest level of antioxidant activity, namely 77.92%, so it can be used as a functional drink.

References

- [1] Riana, R. L. M., Aini, N., & Dwiyantri, H. 2015. Formulasi dan Optimasi Flakes Kaya Serat Berbasis Pati Garut Resisten Tipe III Menggunakan Response Surface Methodology. *Jurnal Litbang Provinsi Jawa Tengah*, 13(2), 193–202
- [2] Muawanah, A., Djajanegara, I., Sa'duddin, A., Sukandar, D., & Radiastuti, N. 2012. Penggunaan Bunga Kecombrang (*Etlingera elatior*) Dalam Proses Formulasi Permen Jelly. *Jurnal Kimia VALENSI*, 2(4). <https://doi.org/10.15408/jkv.v2i4.270>
- [3] Naufalin, R., Tri, Y., dan A. Sulistyaningrum. 2013. Pengaruh jenis dan konsentrasi pengawet alami terhadap mutu gula kelapa. *Jurnal Teknologi Pertanian* 14(3): 165-174.
- [4] Kumalaningsih, S. 2007. *Antioksidan Alami*. Surabaya: Tribus Buana
- [5] Samichah, Ahmad, Syauqi. 2014. Aktivitas Antioksidan dan Penerimaan Organoleptik Sari Wortel (*Daucus Carrota L.*). *Journal Of Nutrition College*. 3(4) : 504
- [6] Putri, R., Rahmi, A., & Nugroho, A. 2020. Karakteristik kimia, mikrobiologi, sensori sereal flakes berbahan dasar tepung ubi nagara (*Ipomoea batatas L.*) dan tepung jewawut (*Setaria italica*). *Jurnal Teknologi Agro-Industri*, 7(1): 1- 11.
- [7] Naufalin, R., Sutrisna, E., & Wicaksono, R. 2021. Antioxidant potential ingredient of kecombrang plants (*Etlingera elatior*). *IOP Conference Series: Earth and Environmental Science*, 653(1). <https://doi.org/10.1088/1755-1315/653/1/012130>
- [8] Farida, S., & Maruzy, A. 2016. Kecombrang (*Etlingera elatior*): Sebuah Tinjauan Penggunaan Secara Tradisional, Fitokimia dan Aktivitas Farmakologinya. *Jurnal Tumbuhan Obat Indonesia*, 9(1), 19–28
- [9] Muawanah, A., Djajanegara, I., Sa'duddin, A., Sukandar, D., & Radiastuti, N. 2012. Penggunaan Bunga Kecombrang (*Etlingera elatior*) Dalam Proses Formulasi Permen Jelly. *Jurnal Kimia VALENSI*, 2(4).