Jurnal Pertanian Terapan of JURNAL ROCE (AGROSCIENCE)
https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
Vol. 3, No. 1, Thn. 2026
https://doi.org/10.71275/roce.v3i1.178

ORGANOLEPTIC ANALYSIS OF SOYBEAN TEMPE WITH THE ADDITION OF SATURATED LEAVES (*Saurapus andogynus* L)

ANALISIS UJI ORGANOLEPTIK TEMPE KEDELAI DENGAN PENAMBAHAN DAUN KATUK (*Saurapus andogynus* L)

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Abstract

Tempeh is one of Indonesia's traditional foods that is now widely available throughout the country and well known internationally. Tempeh is made from soybeans and offers many health benefits because it provides nutrients that support the body's needs, including protein, fat, carbohydrates, and more. This study aims to determine the effect of adding katuk leaves to soybean tempeh on the organoleptic properties of the resulting product. Data collection and analysis in this study used a completely randomized design (CRD) with katuk leaf concentration as a factor, comprising 4 treatments: T0=0% (control), T1=50%, T2=75%, and T3=100%. Each treatment was repeated 5 times, resulting in 20 experimental units. The results showed that adding katuk leaves to tempeh production had no significant effect on the organoleptic properties of aroma, taste, and texture, but did have a significant effect on color. The highest acceptance by the panelists for tempeh products with katuk leaf addition in terms of color, aroma, taste, and texture was found in treatment T1 = 50% (3.10%) for color, T1=50% (3.10%) for taste, T0=0% (3.02%) for aroma, and T1=100% (3.07%) for texture.

***Keywords**: Katuk leaves, Soybeans, Tempe*

Abstrak

Tempe merupakan salah satu makanan tradisional Indonesia yang saat ini sudah banyak tersebar di seluruh Indonesia dan sudah terkenal di dunia Internasional. Tempe terbuat dari kacang kedelai sebagai bahan utamanya dan memiliki banyak manfaat terutama bagi kesehatan, karena memiliki kandungan gizi yang mendukung kebutuhan tubuh seperti protein, lemak, karbohidrat dan lainnya. Adapun penelitian ini bertujuan untuk mengetahui pengaruh penambahan daun katuk pada pembuatan tempe kedelai, secara organoleptik yang terkandung di dalam produk yang dihasilkan. Pengumpulan data dan analisa pada penelitian ini menggunakan Rancangan Acak lengkap (RAL) dengan faktor konsentrasi penambahan daun katuk yang terdiri dari 4 perlakuan yaitu T0=0% (kontrol), T1=50%, T2=75% dan T3=100% setiap perlakuan dilakukan 5 kali ulangan, sehingga diperoleh 20 satuan percobaan. Hasil yang diperoleh menunjukkan bahwa pembuatan tempe dengan penambahan daun katuk tidak berpengaruh nyata terhadap organoleptik aroma, rasa dan tekstur, tetapi berpengaruh nyata terhadap organoleptik warna. Penerimaan tertinggi panelis pada produk tempe dengan penambahan daun katuk dari segi warna, aroma, rasa, dan tekstur terdapat pada perlakuan T1=50% (3,10%) untuk warna, T1=50% (3,10%) untuk rasa, T0=0% (3,02%) untuk aroma, dan T1=100% (3,07%) untuk tekstur.

Kata kunci: Daun katuk, Kedelai, Tempe

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
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INTRODUCTION

Tempeh is a traditional Indonesian food that is now widely distributed throughout Indonesia and is well-known internationally. Tempeh is made from soybeans and offers numerous health benefits, particularly due to its nutritional content, which supports the body's needs, including protein, fat, carbohydrates, and other nutrients. Furthermore, tempe's antioxidant content, derived from isoflavones, gives it relatively high antioxidant capacity (BSN, 2012).

Tempeh production spread throughout Indonesia as Javanese people migrated throughout the archipelago (Astawan, 2013). Tempeh is made through fermentation using the microorganism *Rhizopus oligosporus*, which forms fine, white, threadlike hyphae that overlap to form a white mycelium (Suknia & Rahmadi, 2020). According to Sarwono (2008), this fermentation process produces tempeh mold, which produces enzymes that break down the soybean substrate into smaller, simpler molecules, making it easier to digest. Soybean fermentation can eliminate the unpleasant taste of tempeh and the anti-nutritional compounds found in raw soybeans, resulting in a delicious, toxin-free product.

Tempeh can improve the immune system. Tempeh contains beneficial bacteria (probiotics) and the antioxidant isoflavones. Therefore, consuming tempeh will help boost immunity (Astawan, 2013; Azizah, 2020). Tempeh can also help prevent osteoporosis due to its high calcium and vitamin K content, which support bone formation (Azizah, 2020).

Generally, the main ingredient in tempeh is soybeans, but as the processed food industry has diversified, other ingredients can be added to its production. One such ingredient is katuk leaves (Saururus androgynus), also known as katuk, which come from the Euphorbiaceae family. Katuk leaves are dark green and contain chlorophyll, which supports cell rejuvenation and benefits the circulatory system (Selvi & Bhaskar, 2012). Katuk leaves are a potential alternative treatment because they contain many vitamins and nutrients. The active compounds in katuk leaves include carbohydrates, proteins, glycosides, saponins, tannins, flavonoids, steroids, and alkaloids that are effective as antidiabetics, antiobesity agents, antioxidants, inducers of lactation, anti-inflammatory agents, and antimicrobials (Sampurno, 2007). Some uses of katuk leaves include increasing breast milk production and treating fever, ulcers, and boils. Katuk leaves contain many compounds, including tannins, saponins, flavonoids, alkaloids, proteins, calcium, phosphorus, and vitamins A, B, and C, and thus have potential for use in natural medicine (Wiradimadja, 2006).

Processed food products, whether traditional or modern, pay close attention to nutritional content and appearance. The tempeh-making process in this study used a food commodity: katuk leaves. Besides its medicinal uses, katuk leaves can be used as a natural green dye. Products that use katuk leaf dye do not affect their quality, because katuk does not affect sensory properties. (Hardjati, 2008). Based on the explanation above, a problem arises: determining whether adding katuk leaves to soybean tempeh affects the organoleptic properties.

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RESEARCH METHODS

This research uses equipment such as a stove, gas, bucket, wooden spoon, steamer, scales, chopping board, tray, knife, plastic, toothpicks, press machine (Double Leopards), cauldron, and large spoon. The ingredients used are soybeans, katuk leaves, yeast, water, and cooking oil.

The experimental design used in this study was a Completely Randomized Design (CRD) with a concentration factor of katuk leaf addition consisting of 4 treatments, namely To = 0% (control), T1 = 50%, T2 = 75%, and T3 = 100% each treatment was repeated 5 times to obtain 20 experimental units. The arrangement of treatment combinations is shown in Table 1.

Table 1. Arrangement of Treatment Combinations

Treatment	Test				
	1	2	3	4	5
T0=0%	AU1	AU2	AU3	AU4	AU5
T1=50%	BU1	BU2	BU3	BU4	BU5
T2=75%	CU1	CU2	CU3	CU4	CU5
T3=100%	DU1	DU2	DU3	DU4	DU5

The resulting data will be analyzed statistically using ANOVA (Analysis of Variance), with the following linear model:

$$Yiju = \mu + Ti + \varepsilon ij$$

Information :

Yij = Observation value of treatment i and replication j
μ = General mean value
Ti = Effect of treatment i
εij = Experimental error (mistake) in the i-th treatment and j-th replication

If the test results show a significant effect between treatments, it will be continued with a further test of the Least Significant Difference (LSD) at the 5% level with the following formula:

$$BNT\alpha = t\alpha\ (x)\ \frac{\sqrt{2\ KTG}}{n}$$

Information:

tα (x) = Standard value (t) in the test letter (α) and degree of error freedom (x)
KTG = Mean sum of squares of error
n = Number of repetitions

Research Procedures

The procedure for making soybean tempeh with the addition of katuk leaves is to prepare 2 kg of soybeans and clean them with running water then soak them in water for 3-4 hours, after

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soaking the beans are peeled with clean water then steamed for 40-45 minutes, after steaming is complete, the soybeans are cooled on a tray until the water in the beans is reduced (dry).

Fresh katuk leaves are washed thoroughly to remove any dirt, then steamed for 15 minutes. After steaming, the katuk leaves are drained through a sieve and squeezed to remove the water. Then, they are placed on a cutting board and cut into small pieces using a knife. The chopped katuk leaves are then placed in a tray to dry.

The dried katuk leaves and soybeans are then mixed and stirred until evenly distributed. Two grams of tempeh yeast is added to each sample. Once fully mixed, the mixture is placed in a clear plastic bag and sealed using a press. A small hole is then poked into the plastic bag using a toothpick to allow the tempeh to ferment properly.

Soybean tempeh with added katuk leaves was fermented for two days and analyzed. For organoleptic testing, the tempeh was first fried in hot oil at 100 °C to ensure it was fully cooked.

Organoleptic Test

Organoleptic testing is a method of measuring, assessing, or testing the quality of a commodity using the sensitivity of the human senses, namely the eyes, nose, tongue, and fingertips. Organoleptic testing is also called subjective measurement because it relies on human responses. The aspects tested were color, aroma, taste, and texture.

Research on soybean tempeh with the addition of fresh katuk leaves was conducted using a semi-trained/untrained panel of 25 laypeople selected based on ethnicity, socioeconomic status, and education (Setyaningsih, 2010). This hedonic test was carried out on color, taste, aroma, and texture on 5 scales, namely:

1. Very dislike: 0.00-1.49
2. Dislike: 1.50-2.49
3. Somewhat like: 3.50-3.49
4. Likes: 3.50-4.49
5. Really like: 4.50-5.49

RESULTS AND DISCUSSION

Test analysis, or commonly called sensory testing, is a method that uses human senses such as taste, smell, hearing, and sight as the main tools to measure a product's acceptability (Alexandra & Nurlina, 2014). Organoleptic testing is carried out using a hedonic scale from 1 (very dislike) to 5 (very like). The higher the panelists' attribute rating, the more the researchers like the attribute (Arza *et al*., 2018). Organoleptic tests conducted on tempeh products containing katuk leaves evaluate color, taste, aroma, and texture.

Color

The tempeh's color is due to the addition of katuk leaves, which can make it slightly darker green, making tempeh with added katuk leaves less popular among panelists. The green color of leaves is caused by chlorophyll, a pigment found in plants, algae, and photosynthetic

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bacteria. According to Krisnadi (2015), katuk leaves have a high chlorophyll content, which can influence the color of the resulting tempe.

The expected color of soybean tempeh with the addition of katuk leaves is greenish. The resulting color analysis data ranges from 2.32 to 3.32 (somewhat like the acceptance level), with an overall average of 2.88 (somewhat like the acceptance level). The results of the analysis of variance show that the treatment with different concentrations of katuk leaves (0%, 50%, 75%, 100%) has a significant effect (P>0.01) on the color of the resulting soybean tempeh.

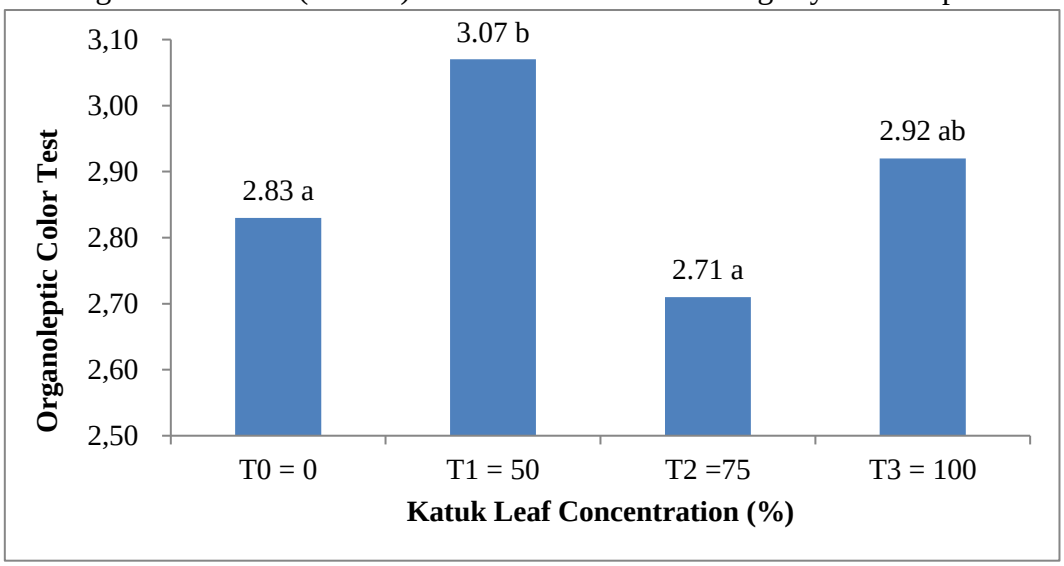

Figure 1. Graph of the effect of katuk leaf concentration on the organoleptic test of tempeh color (values followed by the same letter indicate no significant difference, BNT 0.01 = 0.23, KK = 6.01%

Figure 1 shows that the highest organoleptic color value was obtained in the treatment of adding katuk leaves T1 (3.07) at a slightly liking level of acceptance, which was not significantly different from treatment T3 (2.92), but significantly different from treatment T0 (2.83) and T2 (2.71), also at a slightly liking level of acceptance. The lowest value was found in treatment T2 (2.71), at a slightly liking level of acceptance, which was not significantly different from treatments T0 (2.83) and T3 (2.92), but significantly different from treatment T1 (3.07).

Color is the first sensory element visible to the panelists. Determining the quality of food ingredients generally depends on their color; a color that deviates from the expected color gives a different impression to the panelists (Oktaviana, 2016). Determining the quality of a food ingredient depends on several factors, but before other factors are considered, color is the first indicator. The panelists preferred the tempeh with a 50% addition of katuk leaves because it was not too dark.

Flavor

Tempeh has a slightly bitter taste, with a distinct soy flavor. The distinctive flavor of tempeh is due to tannins in katuk leaves, which are phenolic compounds that impart a bitter, astringent taste and can react with and coagulate proteins and other compounds. other organic compounds containing amino acids and alkaloids. Most alkaloids have a bitter taste, are weakly

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basic, and are slightly soluble in water and soluble in non-polar organic solvents such as diethyl ether and chloroform (Julianto, 2019). Katuk leaves contain antibacterial compounds, including saponins, tannins, glycosides, and flavonoids, a group of phenolic compounds with antioxidant, anti-inflammatory, and antimicrobial activities (Majid & Muchtaridi, 2018).

The expected taste of soybean tempeh with the addition of katuk leaves is not bitter and tastes like tempeh. Based on organoleptic tests, the resulting taste value ranges from 2.64 to 3.36 (somewhat within the acceptance range). The overall average score for the organoleptic taste test of katuk leaf tempeh is 2.96 (somewhat like the acceptance level). The analysis of variance showed that the treatments with katuk leaves (0%, 50%, 75%, 100%) did not have a significant effect on the taste of the resulting soybean tempeh ($P < 0.05$). Soybean tempeh with katuk leaves is bitter because the leaves are added during tempeh production.

The highest panelist acceptance value was in treatment T1 (3.10), with a slightly liking level of acceptance, and the lowest was in treatment T0 (2.86), with a slightly liking level of acceptance. This shows that adding katuk leaves affects tempeh taste, as the treatments differed in the proportions of the addition.

Aroma

Aroma is the smell caused by chemical stimuli and is detected by the olfactory nerves in the nasal cavity. Aroma is one of the most important organoleptic indicators of a food product's acceptability. Through aroma, panelists or consumers can identify the ingredients in a food product and determine whether it is suitable for consumption (Sangur, 2020).

The expected aroma of tempeh with the addition of katuk leaves is slightly tempeh-scented. From the organoleptic test results for the aroma of soybean tempeh with katuk leaves added, the values ranged from 2.28 to 3.52 (dislike to like). The overall average for the organoleptic test of the aroma of soybean tempeh with katuk leaves was 2.86. (The level of acceptance is somewhat favorable. The analysis of variance results showed that the different treatments with katuk leaves (0%, 50%, 75%, 100%) did not have a significant effect on the aroma of the resulting tempeh ($P < 0.05$).

The study found that the highest panelist acceptance was in treatment T0 (3.02), at a slightly liking level. The lowest was in treatment T2 (2.65), at a slightly liking level of acceptance, where the panelist acceptance level for the aroma of soybean tempeh with the addition of katuk leaves was not very significant. Panelists somewhat liked the aroma of soybean tempeh with fewer katuk leaves. However, some panelists somewhat liked the aroma of soybean tempeh with high concentrations of katuk leaves. Different treatments for adding katuk leaves affected the level of panelists' acceptance of the tempeh aroma.

The slightly pungent aroma of tempeh is due to the higher concentration of katuk leaves used, resulting in a more pronounced katuk aroma in soybean tempeh. The same blanching *treatment* causes the evaporation of volatile compounds in the katuk plant, so the addition of katuk leaves resulted in no significant difference in aroma scores. Both boiling-water and steam blanching reduce the aroma of katuk flour because, during blanching, volatile compounds partially evaporate (Anwar & Wahyuni, 2020).

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Texture

Texture is the sensation of pressure that can be observed with the mouth or felt with the fingers, and consistency is thick, thin, and smooth. Texture is an important factor influencing quality and consumer acceptance; it is a product quality parameter (Setiyaningsih, 2010).

The results of the organoleptic texture test of tempeh with the addition of katuk leaves showed that the texture organoleptic value ranged from 2.64 to 3.32 (slightly favorable for acceptance). The overall average value for the organoleptic texture test of katuk leaf tempeh was 3.01. (the level of acceptance is somewhat like). The analysis of variance showed that the treatments with katuk leaves (0%, 50%, 75%, 100%) did not have a significant effect on the texture of the resulting tempeh ($P < 0.05$).

Based on the study results, the highest panelist acceptance of the tempeh texture was in treatment T3 at 3.07 (somewhat liked), and the lowest was in treatment T2 at 2.92 (somewhat liked). In this test, the panelists somewhat liked the texture of the tempe product with treatment T3, namely 3.07 with the addition of 100% katuk leaves, T1, namely 3.01 with the addition of 50% katuk leaves and T0, namely 3.04 without the addition of katuk leaves, while in treatment T2 with the addition of 75% katuk leaves, the panelists' acceptance was still at the level of somewhat liked even though the value obtained was 2.92. However, the level of panelists' acceptance of all treatments was not very significant. This is because the panelists' assessment is subjective, so each panelist has their own sensitivity to the product being tested.

Texture quality is influenced by water content and the components of food ingredients, resulting in a soft, chewy tempeh texture, which is an important aspect of evaluating food products. These characteristics significantly influence the shelf life of tempeh (Meilina, 2012).

CONCLUSION

Adding katuk leaves to tempeh did not significantly affect the organoleptic aroma, taste, or texture, but it significantly affected the organoleptic color. The highest acceptance of panelists on tempeh products with the addition of katuk leaves in terms of color, aroma, taste, and texture was found in treatment T1 = 50% (3.10 %) for color, T1 = 50% (3.10%) for taste, T0 = 0% (3.02%) for taste, and T1 = 100% (3.07%) for texture.

REFERENCES

Anwar E N, Wahyuni R. (2020). Pengaruh Proporsi Penambahan Daun Katuk (*Sauropus androgynu* Merr) Terhadap Sifat Fisiko Kimia Selai Lembaran Apel. *J. Teknologi Pangan:* Media Informasi dan Komunikasi Ilmiah Teknologi Pertanian,

Alexandra, Y., & Nurlina. (2014). Aplikasi *edible coating* dari Pektin Jeruk Songhi Pontianak (*Citrus nobilis* var microcarpa) pada Penyimpanan Buah Nanas. *J.* Kimia Khatulistiwa, 3 (4): 11–20.

https://jurnal.rocewisdomaceh.com/index.php/roce e-ISSN : 3032-4505
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https://doi.org/10.71275/roce.v3i1.178

Arza, P, A. Satriana, N., & Ilham, D. (2018). Pengaruh Penambahan Eksrak Daun Katuk (*Sauropus androgynus* L. Merr) Terhadap Mutu Organoleptik dan Kadar Vitamin C pada Donat. Padang : STIKes Perintis Padang.

Astawan, M. (2013). *Jangan Takut Makan Enak: Sehat dengan Makanan Tradisional*. Jilid 2. Jakarta: PT Kompas Media Nusantara.

Azizah, K. 2020. *12 Manfaat Tempe Bagi Kesehatan, Makanan Murah dengan Khasiat Mahal*. https:// w.w.w.merdeka.com/trending (diakses tanggal 12 April 2020).

Badan Standarisasi Nasional. 2012. *Tempe:persembahan indonesia untuk dunia,* jakarta tersedia dalam: http;//www.bsn,go.id/uploads/dowload/ booklet_tempe-printed21. Pdf Diakses pada tanggal 2 Desember 2018.

Hardjati,S. 2008. Potensi Daun Katuk Sebagai Sumber Zat Pewarna Alami dan Stabilitasnya Selama Pengeringan Bubuk Dengan Menggunakan Binder Maltodekstrin. *Jurnal Penelitian Saintek, Vol. 13, No 1:1-8.*

Julianto, T. S (2019). *Fitokimia Tinjauan Metabolit Sekunder dan Skrining Fitokimia,* Universitas Islam Indonesia Yogyakarta. 2019.

Krisnadi 2015, 'Katuk Super Nutrisi', Gerakan Swadaya Masyarakat Penanaman dan Pemanfaatan Tanaman Katuk Dalam rangka mendukung Gerakan Nasional Sadar Gizi. *Jurnal Kesehatan Masyarakat*.

Majid TS, Muchtaridi M (2018). Aktivitas Farmakologi Ekstrak Daun Katuk (Sauropus androgynus (L.) Merr). *Jurnal Farmaka*. 16(2):398-405

Meilina, 2012 *Ragi Tempe dan Jamur Rhizopus Teknologi Tepat Guna*. Wahyu Media. Jakarta.

Oktaviana, D. (2016). Penerapan RPP Berbasis Multiple Intelligences untuk Meningkatkan Aktivitas dan Hasil Belajar Siswa pada Materi Kalor dan Perpindahan Kalor Kelas X Mia SMA Negeri 3 Kota Jambi, Edukasi:, *J* Pendidikan Fisika 1 (1).

Sampurno. 2007. Obat herbal dalam perspektif medic dan bisnis. *J Traditional Med;* 12(42):1828

Sangur K.2020. Uji Organoleptok dan Kimia Selai Berbahan Dasar Kulit Pisang Tongkat Langit (*Musa troglodytarum* L.). *J Biopendik*. Biologi Pendidikan, Teknologi dan Terapan. Universitas Patimura. Ambon

Sarwono, 2008. *Membuat Tempe*. Penebar Swadaya. Jakarta

Selvi, S., & Bashkar (2012). Anti-inflammatory and analgesic activities of the *Sauropus androgynus* (L) Merr. (*Euphorbiaceae*) plant in experimental animal models. *Der Pharmacia Lettre* 4(3):782–785.

Setiyaningsih, 2010 *Analisis Sensori Untuk Industi Pangan Dan Agro. Bogor:* IPB Pres.

Suknia, S.L., dan Rahmadi, T. P. D. (2020). Proses pembuatan tempe home industry berbahan dasar kedelai (*Glycine max* (L.*)* meer dan kacang merah *(phaseolus vulgaris* L.*)* Di Candiwesi, Salatiga. *Southeast Asian Journal of Islamic Education*, 03(01), 59–76.

Wiradimadja, R. (2006). Peningkatann Kadar Vitamin A Pada Telur Ayam Melalui Penggunaan Daun Katuk *(Sauropus androgynus* L., Merr).