

THE SUBSTITUTION OF DIFFERENT CONCENTRATION OF OKARA FLOUR IN BROWNIES FORMULATION ADDED OF FLAXSEED (*LINUM USITATISSIMUM*) AS LOW-GLUTEN HEALTHY FOOD

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ABSTRACT

Processing tofu dregs which have not been widely used to become derivative products is a serious concern. In addition, on a production scale, a tofu factory produces relatively 500 kg of pulp which have not been widely used. Therefore, this research was conducted with the aim of utilizing the remaining processed waste in the form of dregs from the harmonious processing of tofu which is quite abundant in Bandungan District, Semarang Regency. Tofu/okara waste contains various nutrients such as minerals, calcium, potassium, iron, antioxidants, and isoflavones. Substitution of okara flour mixed with flaxseed, which is a grain that contains biologically active nutrients, including omega-3, fatty acids, dietary fiber, and protein, will produce a food product in the form of low-gluten and high-fiber brownies. Consumer acceptance of color, unpleasant fragrance, soybean fragrance, sweet taste, texture, and preference was measured using an experimental research method using a RAL method with four treatments to get the best formulation. Determination of the best formulation was carried out by organoleptic test on 20 panelists and analyzed by a One-way ANOVA test followed by a DMRT test. The results of the scoring test showed that variations in wheat flour formulations and okara flour substitution had a significant effect ($p < 0.05$) on the organoleptic value aspect. Brownies F2 (1:2) is the best formulation with the highest average value (4.75), which contains 12% wet gluten, 4.3% dry gluten, 0.07% protein, and 47.46% fiber. The product brownies with okara flour substitution and additional flaxseed can be an alternative for healthy food that is lower in gluten and high in fiber and can be developed into souvenirs typical of Bandungan.

Keywords: brownies; okara; flaxseed; healthy; food

ABSTRAK

Pengolahan ampas tahu yang belum banyak dimanfaatkan menjadi produk turunan menjadi perhatian serius. Selain itu, dalam skala produksi, satu pabrik tahu memproduksi ampas relatif 500 kg. Oleh karena itu, penelitian ini dilakukan dengan tujuan memanfaatkan sisa olahan berupa ampas dari pengolahan tahu yang cukup melimpah di Kecamatan Bandungan Kabupaten Semarang. Ampas tahu/okara mengandung berbagai nutrisi seperti mineral, kalsium, potasium, zat besi, antioksidan, dan isoflavon. Substitusi tepung okara yang dicampur dengan flaxseed, yaitu biji-bijian yang mengandung nutrisi aktif biologis, antara lain omega-3, asam lemak, serat pangan, dan protein, akan menghasilkan produk pangan berupa brownies rendah gluten dan tinggi serat. Penerimaan konsumen terhadap warna, fragrance tidak sedap, fragrance kedelai, rasa manis, tekstur, dan kesukaan diukur menggunakan metode penelitian eksperimen menggunakan metode RAL dengan empat perlakuan untuk mendapatkan formulasi terbaik. Penentuan formulasi terbaik dilakukan dengan uji organoleptik terhadap 20 panelis dan dianalisis dengan uji One-way ANOVA dilanjutkan dengan uji DMRT. Hasil uji skoring menunjukkan bahwa variasi formulasi tepung terigu dan substitusi tepung okara berpengaruh nyata ($p < 0,05$) terhadap aspek nilai organoleptik. Brownies F2 (1:2) merupakan formulasi terbaik dengan nilai rata-rata tertinggi (4,75), yang mengandung gluten basah 12%, gluten kering 4,3%, protein 0,07%, dan serat 47,46%. Produk brownies dengan substitusi tepung okara dan tambahan flaxseed dapat menjadi alternatif makanan sehat yang rendah gluten dan tinggi serat serta dapat dikembangkan menjadi oleh-oleh khas Bandungan.

Kata kunci: brownies; okara; flaxseed; sehat; pangan

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INTRODUCTION

A total of 515 kg of pulp produced by the Serasi Oom Shin Bandungan Tofu Factory each week, only 80 kg (20%) is utilized as food, namely traditional food in the form of tempe gembus. While 435 kg (80%) is still rushed as animal feed, the large capacity of okara is still not optimal in terms of its utilization. Whereas okara is also a source of vegetable protein, which has the potential to cause a reduction in saturated fat intake in the body (Hosokawa et al., 2016). Okara can also be used to make various products and has been previously studied as a component of food ingredients such as biscuits, cakes, pastries, and pasta (Suzuki et al., 2021).

Brownies are a popular cake product, according to research by Anam and Sanjaya (2018), making brownies packed as a product with high caloric value, and low in food fiber. Wheat flour contained in brownie dough contains considerable gluten, which is 80% of the total protein in flour (Dahlia., 2014). It is known that consuming gluten-containing foods too often in the long term is certainly not good for health, one of which is celiac disease (Mirhosseini et al., 2015). This disease is still rarely found in Indonesia, which may be related to the dietary habits of Indonesian people who are low in gluten (Oktadiana et al., 2017).

Okara from the remaining processing of soy milk and tofu can be used as a substitute in making brownies to reduce the use of wheat flour. According to research conducted by Mbaeyi-Nwaoha, et al (2016), dried Okara consists of about 57-59% dietary fiber (42-57% insoluble, 2-17% soluble), 15-34% protein, 6-16% fat. Okara also contains large amounts of mineral elements such as calcium, potassium, iron, antioxidants, and isoflavones (Santos et al., 2019). With these rich elements, Okara can help prevent diabetes, cardiovascular disease, obesity, and improve gut health through its prebiotic function (Hosokawa et al., 2016).

Flaxseed was chosen to partially replace the use of eggs in brownies. Flaxseed which is utilized as an egg substitute or emulsifier is the mucilage part (Kajla, Sharma and Sood, 2015). The addition of

flaxseed to cereal-based products is an efficient strategy to improve the nutritional status of food products (Ahmad et al., 2020). This product can also be a healthy food alternative that is low in gluten and reduces the risk of celiac disease.

This research offers a solution in the form of developing healthy food products, namely low gluten and high fiber brownies with okara flour substitution and the addition of flaxseed.

MATERIALS AND METHOD

Tools and Materials

The tools used in making brownies are scales, spoons, knives, cutting boards, blenders, mixers, steamer, spatulas, bowls, basins, sieves, oyang, baking paper, and ovens. While the ingredients used in making brownies are okara flour, wheat flour, cornstarch, flaxseed, eggs, white chocolate bar, butter, sugar, baking powder, and ovalet (cake emulsifier). Tofu pulp (okara) was obtained from Oom Shin Serasi Tofu Factory, Bandungan, Semarang Regency, Central Java. Flaxseed was obtained from online purchase at Granology Store. Other ingredients were obtained from Gloria Plastik store in Ambarawa, Semarang Regency, Central Java.

Experimental design

The experimental design used in this study was a completely randomized design (CRD) with three replications. The treatment carried out on the experimental unit was the ratio of wheat flour and okara flour for F0 (1:0), F1 (1:1), F2 (1:2), and F3 (1:3). The formulation for each treatment (wheat flour : okara flour), is as follows F0 (120gr : 0gr), F1 (60gr : 60gr), F3 (40gr : 80gr), and F4 (30gr : 90gr).

Chemical response to the selected okara brownie product formula includes analysis of Gluten Content testing in this study using the Gravimetric Method, Lowry Method Protein Content based on (Sudarmadji., 1997), and Fiber Content based on (AOAC, 2005).

Organoleptic response used is scoring test. As an

acceptance test, the assessment scale according to specifications was changed to a numerical scale of 1 to 5 with the following details, (1= very not., 2 = not., 3 = a little., 4 = just right., 5 = very..). This product was tested on 20 panelists with an age range (20-60 years). The organoleptic quality test of brownies was carried out to determine the specific impression of panelists on the attributes of white color, chocolate fragrance, unpleasant fragrance and chocolate fragrance, sweet taste, brownie aftertaste, texture hardness when bitten, and crunchy texture when chewed in the mouth, overall liking.

Analytical Design

Data processing was carried out using Microsoft Excel 2019 and Statistical Package for the Social Science (SPSS) version 26.0 for Windows. Organoleptic test data were averaged and then analyzed descriptively to see the percentage of panelist acceptance at various levels of treatment. Data on the effect of treatment on the level of liking and sensory quality were analyzed using the One-Way ANOVA test, if the treatment showed a significant effect followed by the DMRT test with a significant difference value ($p < 0.05$).

RESULTS AND DISCUSSION

Analysis of Organoleptic Testing (Scoring Test) on Okara Brownies

Organoleptic testing on brownies substituted with okara flour and flaxseed is a scoring test with 6 testing parameters. Test data obtained using the organoleptic test with a scale of 1 to 5. The results of organoleptic testing with the scoring test can be seen in table 1.

Color

In food ingredients, color is the initial determinant of the appearance captured by the senses. The yellowish white color of brownies is influenced by the formulation of okara flour used as the basic ingredient in the dough. In addition, the formation of a yellowish white color on okara brownies is also influenced by additional raw materials such as eggs and butter which are melted with white

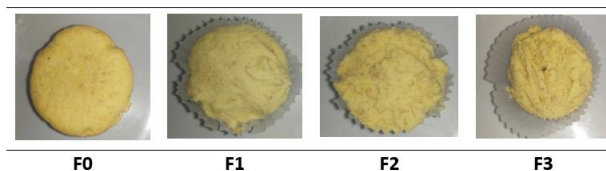
chocolate.

Table 1. Mean Scoring Test Value of Okara Brownies

Parameters	Mean scoring test value of Okara brownies			
	F0	F1	F2	F3
Color	3.90 ^a ± 0.31	3.25 ^a ± 0.44	4.75 ^a ± 0.44	2.45 ^a ± 0.83
Unpleasant Scent	2.15 ^a ± 0.67	2.30 ^a ± 0.66	3.10 ^{ab} ± 0.45	3.90 ^a ± 0.55
Soybean Fragrance	2.35 ^a ± 0.75	2.45 ^a ± 0.83	3.25 ^a ± 0.55	3.25 ^a ± 0.64
Sweet Taste	3.80 ^a ± 0.70	3.10 ^a ± 0.45	3.20 ^a ± 0.62	3.05 ^a ± 0.39
Texture	4.00 ^a ± 0.32	3.05 ^a ± 0.22	3.10 ^a ± 0.31	3.00 ^a ± 0.32
Likeability	4.75 ^a ± 0.72	3.8 ^a ± 0.52	3.85 ^a ± 0.59	3.10 ^a ± 0.45

Description: the results of numbers followed by the same letter mean that there is a significant difference at the 0.05 test level according to the DMRT test.

Based on the results of organoleptic testing using the scoring test, it is known that F2 is the best formula according to the color aspect, namely with the ratio between wheat flour and okara flour 1: 2. It can be seen in the table that F2 shows the highest score (4.75) compared to other formulas, in line with Suryani et al (2018) color can be an indicator of maturity, whether or not the process of mixing the ingredients of a product.



Description: Brownie formulations with the ratio of wheat flour and okara flour, for F0 (1:0), F1 (1:1), F2 (1:2), and F3 (1:3)..

Figure 1. Visualization of Brownies with Various Formulations

From the results of the scoring test in table 1, it shows that the amount of added okara flour ingredients in the brownie formulation affects the panelists' interest in brownie products. Brownies with a substitution of 80 grams of okara flour (F2) were chosen by most panelists as an attractive product.

Fragrance

Fragrance appears when food enters the oral cavity, this is then received by the nasal cavity nerves in the form of stimulation. In making okara brownies,

the amount of okara flour formulation used affects the fragrance of the product after cooking. In this study, there are 2 parameters of fragrance characteristics measured, namely unpleasant fragrance and soy fragrance.

Unpleasant fragrance

The distinctive fragrance caused by beans, as well as soybeans, is a unpleasant fragrance. This fragrance arises due to the work of the lipoxygenase enzyme found in soybean seeds. The lipoxygenase enzyme will react with fat when soybean seeds are ground, especially if grinding is done with the addition of cold water. In soybeans there are several volatile compounds, which are compounds that easily evaporate, especially ethyl-phenol-ketone is the least reaction result (Widodo et al., 2012).

Based on the results of organoleptic testing with the scoring test, it is known that F3 with a score of (3.90), is the best formula according to the aspect of unpleasant fragrance. Judging from Table 1 (F3) is the brownie product with the lowest level of sharpness of the smell. The low level of sharpness of the unpleasant fragrance indicates that the more okara flour substituted in the brownie product does not affect the increase in unpleasant fragrance in the product, otherwise the product with a lower substitution (F2) has a more unpleasant fragrance than F3.

Soy fragrance

Tofu dregs flour (okara) has a strong fragrance in savory fragrances, in okara brownie products it succeeds in bringing out a fragrant and creamy savory fragrance, similar to instant packaged soymilk products that are often found in the market. This fragrance also tends to be preferred by most panelists, because it adds to the impression of pleasure in consuming okara brownies. Therefore, the soy fragrance succeeded in becoming one of the advantages (characteristics) of this product.

Based on the results of organoleptic testing with the scoring test, it is known that F2 and F3 with a score of (3.25), are the best formulas according to the aspect of soy fragrance. Judging from Table 1

(F2 and F3) is the brownie product with the highest level of sharpness of soy fragrance. The high sharpness of the soy fragrance indicates that the more okara flour substituted in the brownie product affects the increase of soy fragrance in the product, otherwise the product with lower substitution (F1) has a lower soy fragrance.

Sweet Taste

Flavor is a sensory characteristic that is caused when food enters the mouth and is captured by the sense of taste, namely the tongue. In a product, taste plays an important role, the suitability of taste determines whether the product will be accepted by the public or consumers (Unzilattirrizqi et al., 2022). In the scoring test of okara brownies, the flavor aspect tested was sweetness.

Based on organoleptic testing with a scoring test according to the sweetness aspect, table 1 shows that F2 with an average score of 3.20 is the best formula, with the sweetness most chosen by panelists. From the results of determining the selected formula in the aspect of sweetness, it shows that the sugar added has a significant effect along with the addition of okara flour substitution. It can be seen that F3 has the lowest sweetness of the other two formulations, but most panelists are more suitable for the sweetness of the F2 brownie formulation, namely the product with the ratio of wheat flour and okara flour (1: 2).

Texture

Texture characterizes the shape of particles captured by the senses of taste and flavor in a food product. Texture is also a determinant of panelists on brownies, products that have texture characteristics that suit the tongue will certainly be preferred. Texture characteristics become determinants of panelists in line with Unzilattirrizqi et al (2022), one of the factors that encourage panelists to like the product is the texture of the product.

Based on the results of organoleptic testing with a scoring test according to the texture aspect, shown in table 1, F2 (substitution of 80 grams of okara flour) with a score of 3.10 is the best formula for

brownie products that are most favored by panelists. The higher the addition of okara flour, the lower the softness texture of the brownies. This is also influenced by the amount of wheat flour used in making brownies, wheat flour has a higher water content than okara flour, this water content greatly affects the texture in the dough. Water content affects the texture of the dough in line with Ridhoresmi (2012) protein content in tofu pulp flour (okara) 10.0%, while the water content in wheat flour is 14.0%, the higher the concentration of okara flour added, the rougher the texture.

Favorite

The formulation of wheat flour and okara flour in brownie products affects the general liking of panelists. Based on the results of organoleptic testing with a scoring test according to the panelists' favorite aspects of the product, Figure 1 shows that F2 with a score of 3.85 is a brownie product with the best formula according to the level of favorites.

Table 1 also shows the results show that the increasing concentration of okara flour used in the brownie formulation, the panelists' level of liking for the product also shows a decrease. The results of this study are in line with Pujilestari and Larasati (2019), the level of general liking for the product decreases as the concentration of soybean pulp flour used in the product increases.

Results of Determination of the Best Formula

The results of determining the best formula for organoleptic testing with the overall scoring test attributes in table 1 show that the F2 brownie product is the ratio of wheat flour to okara flour of 1: 2, this result is based on the DMRT test scoring according to the aspect of liking with a score of (3.85). Furthermore, F2 as the best formulation is ready for further testing.

Brownies with a substitution of 80 grams of okara flour (F2) became the brownies with the best formula according to organoleptic testing. The F2 brownie product succeeded in bringing out the savory soy fragrance and taste as expected, of course, with the characteristics of sweetness and

soft texture that were liked by the panelists (being a product that can be well received by the public).

Analysis of Gluten Content in Okara Brownies Best Formula

Gluten is formed due to the combination of glutenin and gliadin proteins, where gluten is able to capture air during the shaking and baking process so that the product is able to expand and have good volume (Yuniastuti, 2018).

Table 2. Mean Wet and Dry Gluten Content of Okara Brownies

Formulation	Mean of the gluten (%)	
	Wet gluten	Dry gluten
F0	36 ± 0.24	12.3 ± 0.16
F2	12 ± 0.10	4.3 ± 0.08

Gluten is closely related to the texture of the product, the more gluten the better the development and softness of the product. However, too much gluten consumption will also have a negative impact on health (Zong G et al., 2018). Brownie product F2 in table 1 has a better texture than F1, also seen in table 2 the average value of gluten content of F2 is lower. This proves that the greater the gluten content in brownies, the higher the softness texture, because gluten is also a texture binder and retention of moisture.

Wet Gluten

Wet gluten testing is done to determine the amount and estimate of gluten contained in the dough with a predetermined concentration of wheat flour (AACC 2000). Based on the test results of wet gluten content in Table 2, okara brownie products with control formulation F1 (1:1) and the best formulation selected F2 (1:2), it can be seen that brownie products with 80 grams of okara flour substitution have a lower average wet gluten content.

Dry Gluten

Table 2 shows that the value of dry gluten content for both formulations is lower than the value of wet gluten, because gluten content will decrease due to the heating process. Based on the results of dry gluten content testing carried out on okara brownie products, namely between products with full wheat flour/control formulation (F1) and products with 1:2 formulation (F2) with the use of more okara flour than wheat flour, table 2 shows that products with less wheat flour content have lower gluten content. The lower gluten content in brownies with F2 formulation is in line with the research objective of producing healthier brownie products, with low gluten content.

Analysis of Dissolved Protein Content in the Best Okara Brownies Formula

Based on the results of protein testing using the lowry method, shown in table 3, the product with full use of wheat flour (100%), namely F0, has higher protein levels. High protein levels are also supported by the use of chicken eggs and without the use of 50% flaxseed in the dough.

Products with F0 with full formulation of wheat flour seen in table 2 after testing the gluten content showed a higher average value of gluten content in wet gluten and dry gluten. The higher value of gluten content in brownies with full concentration of wheat flour also proves that the protein content contained in wheat flour is mostly dominated by gluten, in line with Biesiekierski (2017) research that wheat flour contains 8%-15% protein, of which 10%-15% is albumin/globulin and 85%-90% is gluten. It should be underlined that gluten consumed too often and too much certainly has a negative impact on health.

The average value of protein content of okara brownie products with substitution of okara flour and the addition of flaxseed, when viewed from table 3, is not comparable to brownies with full concentration of wheat flour, but the combined protein content of the two is easier to digest and healthier than protein derived from gluten. The protein content of tofu pulp also has a higher biological value, the content of compounds in tofu

pulp which is quite potential is as a source of natural antioxidants (Suryani, 2018). While the protein content in flaxseed is also dominated by functional fatty acids, one of which is omega 3. So, the substitution of okara flour and the addition of flaxseed to brownies will certainly be better for health.

Table 3. Mean Value of Protein Content and Fiber Content in Brownies

Sample	Mean Value of Protein Content and Fiber Content in Brownies	
	Protein (%)	Fiber (%)
F0	0.15 ± 0.05	33.52 ± 15.80
F2	0.07 ± 0.002	47.46 ± 2.36

Analysis of Rough Food Fiber Content in the Best Okara Brownies Formula

Based on the results of testing fiber content using the gravimetric method, table 3 shows that F2 has a higher fiber content (47.46%), F2 is a brownie product with a formulation of 80 grams of okara flour and the addition of 50 grams of flaxseed in the dough.

Formulation F2 contains 47.46% fiber content, so that the brownies produced from this study can support fiber intake by 47.46%. According to AKG (2013) the fiber requirement for children aged 7-9 years is 26 grams, for children aged 10-12 years (boys) is 30 grams and for children aged 10-12 years (girls) is 28 grams. Therefore, okara brownies can meet fiber needs by substituting okara flour and adding flaxseed evenly into the dough, in line with the research objective of producing okara brownies products that are high in fiber content. Fiber is very good for health, especially in the digestive tract.

CONCLUSION

From this study it can be concluded that the substitution of okara flour in brownies succeeded in bringing out the fragrance and taste of savory and creamy soybeans. Brownies F2 is the best

formula, the substitution of okara flour and the addition of flaxseed in brownie dough prove the research hypothesis, which has a significant effect in increasing organoleptic values according to the scoring test, reducing gluten levels in brownies, and increasing fiber levels in brownies.

The author hopes that the okara brownies product, in addition to absorbing the waste of the serasi tofu processing industry in the form of pulp (okara), will also increase the selling value of tofu pulp as a local food potential. This brownies product can also be developed into a healthier Bandung souvenir with low gluten content and high fiber content.

All in all, the food waste processing must tackle properly either having derivative products or fertilizer for plants. On the other hand, we would like to encourage the producers for preventing the pollution either in the air or in the water.

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REFERENCES

- AACC. (2000). Approved Method of American Association of Sereal Chemist, 11 th ed. AACC. St Paul. MN.
- AKG. (2013). Angka Kecukupan Gizi Vitamin Yang Dianjurkan Bagi Bangsa Indonesia. Lampiran Peraturan Menteri Kesehatan Republik Indonesia Nomor 75 Tahun 2013. <https://peraturan.bpk.go.id/Home/Download/130524/Permenkes%20Nomor%2075%20Tahun%202013.pdf>. (Diakses 22 November 2022).
- AOAC. (2005). Official Methods of Analysis. 18th edn. Association of Official Analytical Chemists. Arlington, VA, USA.
- Ahmad, A., Zulfiqar, S., & Chatha, Z. A. (2020). Development of roasted flax seed cookies and characterization for chemical and organoleptic parameters. *Pakistan Journal of Agricultural Sciences*, 57(1), 229–235.
- Biesiekierski, J. R. (2017). What is gluten? *Journal of Gastroenterology and Hepatology* (Australia), 32, 78–81. <https://doi.org/10.1111/jgh.13703>
- Dahlia, Lies. 2014. Hidup Sehat Tanpa Gluten. Jakarta: *Elex Media*.
- Hosokawa M, Katsukawa M, Tanaka H, et al. (2016) Okara ameliorates glucose tolerance in GK rats. *J Clin Biochem Nutr*. 58:216-222.
- Kajla, P., Sharma, A., & Sood, D. R. (2015). Flaxseed—a potential functional food source. *Journal of food science and technology*, 52(4), 1857-1871.
- Ligarnasari, I. P., C. Anam, and A. P. Sanjaya. (2018). Physical, chemical and sensory properties of brownies substituted with sweet potato flour (*Ipomoea batatas* L.) with addition of black cumin oil (*Nigella sativa* L.). *IOP Conference Series: Earth and Environmental Science*.102:01.
- Mbaeyi-Nwaoha IE, Uchendu NO. (2016). Production and evaluation of breakfast cereals from blends of acha and fermented soybean paste (okara). *J Food Sci Tech*. 53(1):50-70.
- Mirhosseini, H., Rashid, N. F. A., Amid, B. T., Cheong, K. W., Kazemi, M., & Zulkurnain, M. (2015). Effect of partial replacement of corn flour with durian seed flour and pumpkin flour on cooking yield, texture properties, and sensory attributes of gluten free pasta. *LWT-Food science and Technology*, 63(1), 184-190.
- Oktadiana, H., Abdullah, M., Renaldi, K., & Dyah, N. (2017). Diagnosis dan Tata Laksana

- Penyakit Celiac. *Jurnal Penyakit Dalam Indonesia*, 4(3), 157.
<https://doi.org/10.7454/jpdi.v4i3.131>
- Pujilestari, S. (2021). Karakteristik Kue Semprong Hasil Formulasi Tepung Ampas Kedelai (*Glycine max L.*). *Jurnal Teknologi Pangan Dan Kesehatan (The Journal of Food Technology and Health)*, 1(1), 38–48.
- Ridhoresmi, D. (2012). Pengaruh Substitusi Tepung Ampas Tahu Terhadap Kadar Protein dan Daya Terima Brownies Kukus (Doctoral dissertation, Universitas Muhammadiyah Surakarta).
- Sudarmadji, S., Bambang, H, dan Suhardi (1997). *Prosedur Analisa Untuk Bahan Makanan dan Pertanian*. Libert: Yogyakarta.
- Suryani, N., Erawati, C. M., & Amelia, S. (2018). Pengaruh Proporsi Tepung Terigu dan Tepung Ampas Tahu terhadap Kandungan Protein dan Serat serta Daya Terima Biskuit Program Makanan Tambahan Anak Sekolah (PMT-AS). *Jurnal Kedokteran Dan Kesehatan*, 14(1), 11.
- Suzuki, A., & Banna, J. (2021). Improving Diet Quality for Chronic Disease Prevention with Okara “Food Waste.” *American Journal of Lifestyle Medicine*, 15(1), 14–18.
- Unzilatirrizqi, Y. E. R., & Rizkiyani, S. S. (2022). Pemanfaatan Limbah Ampas Tahu menjadi Bolu Batik Kukus terhadap Tingkat Kesukaan. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 5(7), 2573–2578.
<https://doi.org/10.54371/jiip.v5i7.720>
- Widodo, W., Wahyono, F., & Sutrisno, S. (2012). Kecernaan bahan kering, kecernaan bahan organik, produksi VFA dan NH3 pakan komplit dengan level jerami padi berbeda secara in vitro. *Animal Agriculture Journal*, 1(1), 215-230.
- Yuniastuti, M. C. (2018). Penggunaan Tepung Keto dan Tepung Almond dalam Pembuatan Choux sebagai Alternatif Produk Pastry Non Gluten. *Barista: Jurnal Kajian Bahasa dan Pariwisata*, 5(1), 49-58.
- Zong, G., Lebwohl, B., Hu, F. B., Sampson, L., Dougherty, L. W., Willett, W. C., ... & Sun, Q. (2018). Gluten intake and risk of type 2 diabetes in three large prospective cohort studies of US men and women. *Diabetologia*, 61, 2164-2173.