

The Role Of Magic Oil As A Modification Substitute Of Plant-Based Side Dish Tofu Curry Based On Nutritional Content And Organoleptic Properties At Dr. Moewardi Regional General Hospital

Martini¹, Fadzillah², dan Halimah Nurul Hidayah³

^{1,2,3}Nutrition Installation of Dr. Moewardi Regional General Hospital Nutrition Installation Dr. Moewardi Regional General Hospital, Nutrition Installation Dr. Moewardi Regional General Hospital

*Corresponding: halimahnurul22@gmail.com

Abstract:

Background: The use of spices and herbs in the nutrition installation of Dr. Moewardi Regional General Hospital to make kitchen seasoning generates waste. The results of the researcher's interview with officers at the Food Production of Nutrition Installation of Dr. Moewardi Hospital, it was discovered that there was no utilization of spices and herbs waste. The spices and herbs waste was thrown away. Therefore, the researchers initiated to use herbs waste such as onion peels, garlic peels, leek, kaffir lime leaves, lemongrass, pandan leaves, and ginger as an alternative to additional seasoning in the form of oil called magic oil to increase the taste of patients' food, especially plant-based side dishes because based on the results of a study by Martini et al, 2022 it is discovered that there is more than 20% of leftover plant-based side dishes. Hence, a study to be conducted on the nutritional content and organoleptic properties of the variety of plant-based side dishes with the substitution of spice waste oil called magic oil. The plant-based side dish to be used was tofu curry because tofu curry was one of the plant-based side dishes used in previous study. In addition, tofu curry uses one of the basic seasonings, namely yellow seasoning.

Purpose of the Study:

Discovering the nutritional content and organoleptic properties of plant-based side dish modification with magic oil substitution.

Method of the Study:

The study used observational analytic design with its experimental nature. This study describes the nutritional content and organoleptic test of the modification of tofu curry with magic oil substitution. Nutritional content data were processed using the Shapiro-Wilk test because the number of samples <50. The results were normally distributed, subsequently it was continued

using the Anova test and Post-Hoc test. Data on organoleptic properties were processed using the Shapiro-Wilk test because the number of samples <50 results were not normally distributed, therefore it was tested using the Kruskal-Wallis test and continued with the Mann-Whitney test, providing that it was significant.

Results: Based on the results of the Anova test, there was a significant difference in nutritional content data and continued with post-hoc test. It was discovered that the treatment groups, namely B, C, and D, had high nutritional content compared to group A. The highest water, mineral, and protein content was discovered in group D, the highest fat and fiber content was discovered in group B, and the highest carbohydrate content was discovered in group C. In organoleptic tests consisting of color, taste, aroma, and texture, and it had a p value of <0.05 which means the data was not normally distributed therefore it used Kruskal-Wallis test and continued with Mann-Whitney test, providing that it was significant. After the Kruskal-Wallis test, the most influential was the taste factor in group D with a median value in taste of 3 which means "like".

Conclusion: The results of the Nutritional Content Test and Organoleptic Test of Tofu Curry Magic Oil Substitution show significant differences between group A (standard) and treatment groups, namely groups B, C and D. The higher the level of Magic Oil substitution, the higher the nutritional content and acceptability of organoleptic properties to the modification of Tofu Curry.

Keywords: *Magic Oil, Curry Seasoning, Nutritional Content, and Organoleptic Properties*

Introduction:

Background of the problem: Based on a study conducted by Ayun., et al (2020) there is a study result in making salted eggs with the addition of rendang spices that does not affect the color of salted egg whites, but reduces the color of yolks in salted eggs and can reduce the fishy aroma of salted eggs so as to improve the taste of salted eggs.

Purpose: Discovering the nutritional content and organoleptic properties of plant-based side dish modification with magic oil substitution.

Materials And Methods:

Study Design: The study used observational analytic design with its experimental nature.

Population and Sample: The study sample used was a plant-based side dish in the form of tofu. Tofu samples were taken from each of the treatment groups A, B, C and D in a simple random manner. The subjects of the study to analyze organoleptic properties were adults with inclusion criteria: (1) Adult men or women aged 18-60 years (2) Having good condition of the senses to test (3) Non-smoking (4) Willing to participate in the study.

Object of the Study: The object of study in the form of tofu was taken from each treatment group A, B, C and D.

- A = Treatment of plant-based side dish with 100% standard herbs
- B = Treatment of plant-based side dish with 90% standard herbs and 10% modified herbs (magic oil)
- C = Treatment of plant-based side dish with 80% standard herbs and 20% modified herbs (magic oil)
- D = Treatment of plant-based side dish with 70% standard herbs and 30% modified herbs (magic oil)

Subjects of the Study: The subjects of the study were adult men or women aged 18 – 60 years who were a semi-trained panel, consisting of 15 people who were previously trained to know certain sensory properties. Semi-trained panel could be selected from a limited circle by previously testing its sensitivity and meeting the inclusion criteria.

Materials: (a) Sample of Tofu Curry for nutritional content testing at the Food

Science and Technology Laboratory, Faculty of Agriculture, Universitas Sebelas Maret, Surakarta (b) Ms. Excel to input organoleptic properties test data. (c) Organoleptic Test Form to discover organoleptic properties

Study Work Procedure: The study was carried out with the following steps: (a) Making magic oil and tofu curry, Nutritional Content Test procedures (b) Submitting an application letter for nutritional content testing to the Food Science and Technology Laboratory, Faculty of Agriculture, Universitas Sebelas Maret Surakarta, (c) Conducting the nutritional content test of tofu curry. Organoleptic Property Test Work Procedure (d) Distributing the Organoleptic Test form (e) Collecting organoleptic test result data (f) Inputting nutritional and organoleptic test result data using Ms. Excel.

Data Processing and Analysis: Data processing using Statistical Package for the Social Sciences (SPSS) software and NutriSurvey software to see the percentage of nutritional content and organoleptic properties of tofu curry seasoning magic oil substitution.

Results Of The Study:

Data Description: Nutritional Content Data Collection was taken from 4 (four) varieties of treatment groups A, B, C and D in a simple random manner with a total of 3 samples per group with 3 repetitions. While the Organoleptic Properties Data were taken from 4 (four) varieties of treatment groups A, B, C and D in simple random with a total of 1 sample per group against 15 semi-trained panelists.

**Results and Discussion:
Nutritional Content Test**

The nutritional content test of tofu curry seasoning magic oil substitution in this study consisted of the content of Water, Minerals, Protein, Fat, Carbohydrates, and Fiber on Tuesday, July 15, 2023 at the Food Science and Technology Laboratory, Faculty of Agriculture, Universitas Sebelas Maret, Surakarta.

This study used the Shapiro-Wilk normality test due to the number of samples <50. The results of the normality test can be seen in the following table:

Table 1. Normality Test on Nutritional Content

	Shapiro-Wilk
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Nutritional Content	Statistic	Df	Nilai-P
Water	0.900	12	0.160
MineralS	0.887	12	0.108
Fat	0.902	12	0.168
Protein	0.959	12	0.769
Carbohydrate	0.916	12	0.255
Fiber	0.963	12	0.831

Based on *table 1*. The data normality test on the nutritional content of tofu consisting of water, minerals, fat, protein, carbohydrates, and fiber had a p value of >0.05 which means

the data were normally distributed therefore it used the Anova test and continued with the Post-Hoc test.

Table 1. Nutritional Content Comparison Test

Variables		N	Mean±SD	p-value
Water	A	3	61.04±0.33	0.000
	B	3	63.07±0.03	
	C	3	62.20±0.04	
	D	3	63.22±0.31	
Minerals	A	3	1.26±0.03	0.000
	B	3	1.23±0.15	
	C	3	1.37±0.04	
	D	3	1.51±0.03	

Variables		N	Mean±SD	p-value
Fat	A	3	15.23±0.09	0.000
	B	3	12.83±0.03	
	C	3	13.59±0.04	
	D	3	14.13±0.09	
Protein	A	3	11.10±0.18	0.000
	B	3	11.23±0.54	
	C	3	10.12±0.71	
	D	3	9.98±0.09	
Carbohydrate	A	3	11.37±0.27	0.000
	B	3	11.64±0.56	
	C	3	12.71±0.74	
	D	3	11.13±0.40	
Fiber	A	3	1.24±0.18	0.000
	B	3	0.51±0.08	
	C	3	0.79±0.07	
	D	3	0.89±0.03	

Based on *table 2*. The results of Anova test on tofu nutritional content of curry seasoning as follows:

For the water content of group A it obtained a mean value of 61.04±0.33, group B of 63.07±0.03, group C of 62.20±0.04 and group D of 63.22±0.31 with a value of p = 0.000<0.05 which means there were significant differences across the four treatment groups on the water content.

For the mineral content of group A it obtained a mean value of 1.26±0.03, group B of 1.23±0.15, group C of 1.37±0.04 and group

D of 1.51±0.03 with a value of p = 0.000<0.05 which means there were significant differences across the four treatment groups on the mineral content.

For the fat content of group A it obtained a mean value of 15.23±0.09, group B of 12.83±0.03, group C of 13.59±0.04 and group D of 14.13±0.09 with a value of p = 0.000<0.05 which means there were significant differences across the four treatment groups on the fat content.

For the protein content of the group it obtained a mean value of 11.10±0.18, group

B of 11.23 ± 0.54 , group C of 10.12 ± 0.71 and group D of 9.98 ± 0.09 with a value of $p = 0.000 < 0.05$ which means there were significant differences across the four treatment groups on the protein content.

For the carbohydrate content it obtained the mean value in group A of 11.37 ± 0.27 , group B of 11.64 ± 0.56 , group C of 12.71 ± 0.74 and group D of 11.13 ± 0.40 with a value of $p = 0.000 < 0.05$ which means there were significant differences across the four treatment groups on the carbohydrate content.

For the fiber content of group A it obtained a mean value of 1.24 ± 0.18 , group B of

0.51 ± 0.08 , group C of 0.79 ± 0.07 and group D of 0.89 ± 0.03 with a value of $p = 0.000 < 0.05$ which means there were significant differences across the four treatment groups on the fiber content.

Based on the results of the Anova test, it was discovered that there were significant differences in the four treatments, namely groups A, B, C and D on the content of water, minerals, fat, protein, carbohydrate, and fiber, therefore it continued with the post-hoc test to discover which group was the most influential on the nutritional content of plant-based side dish tofu curry magic oil substitution.

Table 2. Multiple Comparison (Post-Hoc) of Nutritional Content

Dependent Variable	Group (I)	Group (J)	Mean Difference (I-J)	P-value
Water	A →	B	-2.033*	0.000
		C	-1.163*	0.000
		D	-2.183*	0.000
Minerals	A →	B	0.030	0.217
		C	-0.110*	0.001
		D	-0.247*	0.000
Fats	A →	B	2.400*	0.000
		C	1.637*	0.000
		D	1.097*	0.000
Protein	A →	B	-0.133	0.729
		C	0.973*	0.031
		D	1.120*	0.017
Carbohydrate	A →	B	-0.263	0.552
		C	-1.333*	0.014
		D	0.243	0.582
Fiber	A →	B	0.727*	0.000
		C	0.450*	0.001
		D	0.350*	0.003

Description: *Significant.

Based on the Post-hoc test in table 3. above it can be seen that:

Determining the water content in foodstuffs is important to determine the shelf life of these ingredients. In addition, water affects the appearance, texture, and taste of food (Dewi, 2015). The results showed that the water content of tofu curry ranged from 61.04% - 63.22%. The highest water content was in group D because it had the highest mean-difference of -2.183 with $p = 0.000 < 0.05$.

The mineral content of tofu curry ranged from 1.26% - 1.51%. The highest mineral content was in group D because it had the

highest mean-difference of -0.247 and $p = 0.000 < 0.05$.

The fat content of tofu curry ranged from 12.83% - 15.23%. The highest fat content is group B because it had the highest mean-difference of 2,400 and $p = 0.000 < 0.05$.

The protein content of tofu curry ranged from 9.98% - 11.10%. The highest protein content was in group D because it had the highest mean-difference of 1.120, and $p = 0.017 < 0.05$

The carbohydrate content of tofu curry ranged from 9.98% - 11.10%. The highest carbohydrate content was in group C

because it had the highest mean-difference of -1.333 and $p = 0.014 < 0.05$.

The fiber content of tofu curry seasoning from 0.51% - 1.24%. The highest fiber content was in group B because it had the highest mean-difference of 0.727 and $p = 0.000 < 0.05$.

Organoleptic Property Test

The organoleptic nutritional properties test on tofu curry magic oil substitution in this study was from the aspects of taste, aroma, color, and texture with ordinal scale parameters of value 1 (strongly dislike),

value 2 (dislike), value 3 (like) and value 4 (strongly like) conducted by 15 trained panelists consisting of Nutritionists and Chefs of Dr. Moewardi Hospital toward 4 samples with varieties of treatment A (100%:0%), B (90%:10%), C (80%:20%) and D (70%:30%) on Tuesday, July 15, 2023 at the Nutrition Installation of Dr. Moewardi Hospital.

This study used the Shapiro-Wilk data normality test due to the number of samples < 50 . The results of the normality test can be seen in table 4.as follows.

Table 4. Tofu Organoleptic Normality Test

	Shapiro-Wilk		
	Statistic	Df	P-Value
Color	0.648	60	0.000
Taste	0.824	60	0.000
Aroma	0.760	60	0.000
Texture	0.659	60	0.000

Based on table 4. The normality test on organoleptic data consisting of color, taste, aroma and texture had a value of $p < 0.05$

which means the data were not normally distributed, therefore it used the Kruskal-Wallis test and it continued with the Mann-Whitney test providing that it was significant.

Table 3 Kruskal-Wallis Organoleptic Test.

Group		Color	Taste	Aroma	Texture
A	Minimum	3	2	2	2
	Maximum	4	4	4	4
	Median	3.00	3.00	3.00	3.00
	Mean	3.20	2.87	3.07	3.07
	Std. Deviation	.414	.743	.704	.458
B	Minimum	2	1	2	2
	Maximum	4	4	3	4
	Median	3.00	2.00	3.00	3.00
	Mean	3.13	2.27	2.80	2.87
	Std. Deviation	.516	.704	.414	.640
C	Minimum	3	2	2	3
	Maximum	4	4	4	4
	Median	3.00	3.00	3.00	3.00
	Mean	3.33	3.20	3.20	3.13
	Std. Deviation	.488	.561	.676	.352
	Minimum	2	2	2	2

D	Maximum	4	3	4	4
	Median	3.00	3.00	3.00	3.00
	Mean	3.13	2.73	3.00	3.07
	Std. Deviation	0.640	0.458	0.535	0.458
P-value		0,719	0,003	0,312	0,487

Based on table 5, the following results are obtained:

There was no significant color difference across the four treatments where the p value = 0.719 > 0.05.

There were significant differences in taste across the four treatments where the value of p = 0.003 < 0.05.

There was no significant difference in aroma across the four treatments where the value of p = 0.312 > 0.05

There was no significant difference in texture across the four treatments where the value of p = 0.487 > 0.05.

Based on the results of the Kruskal-Wallis test above, there were significant differences across the four treatments on the Taste factor, therefore it continued with the Mann-Whitney test to discover the most significant effect on the treatment group with the Taste factor.

Table 4. Mann-Whitney test on taste factor

Groups	Mean Rank	Median ± SD	P-Value
Group A - Group B	18,73-12,27	3,00±0,743 - 2,00±0,704	0,028
Group A - Group C	13,57-17,43	3,00±0,743 - 3,00±0,676	0,178
Group A - Group D	16,10-14,90	3,00±0,743 - 3,00±0,458	0,668
Group B - Group C	10,40-20,60	2,00±0,704 - 3,00±0,676	0,001
Group B - Group D	12,23-18,77	2,00±0,704 - 3,00±0,458	0,023
Group C - Group D	18,47-12,53	3,00±0,676 - 3,00±0,458	0,022

Based on table 6. The Mann-Whitney test on taste factors discovered the smallest mean rank value in group B of (10.40) compared to group A, group C and group D. This shows that the taste factor in group D was the most influential because it had a median value of 3 which means "like" and had a mean rank of 12.53, lower than group C with a mean rank of 18.47. Although group B had a lower rank of 10.40, it had a median value of 2 which means "dislike" the taste.

The results indicate that based on the nutritional content test there were significant differences across groups A, B, C, and D with a p value of >0.05 which means that the data were normally distributed, therefore it used the Anova test and it continued with the Post-Hoc test. Based on the results of the nutritional content test, it was discovered that the treatment groups B, C, and D had a high nutritional content compared to group A. The highest content of water, minerals,

and protein were discovered in group D, the highest fat and fiber content were discovered in group B, and the highest carbohydrate content was discovered in group C.

The organoleptic tests consisting of color, taste, aroma and texture have a value of p < 0.05 which means the data were not normally distributed therefore it used the Kruskal-Wallis test and it continued with the Mann-Whitney test, providing that it was significant. After the Kruskal-Wallis test, the most influential was the taste factor in group D with a median value in taste was 3 which showed panelists liked tofu curry magic oil substitution.

Magic oil is an alternative seasoning derived from spices waste consisting of onion skin, garlic skin, pre leaves, kaffir lime leaves, lemongrass stems, ginger, pandan leaves and oil. Spices according to Hakim (2015) are in the form of plants or plant parts that function as flavoring agents in food. Spice

plants according to Yana, et al (2018) are in the form of certain parts of plants that are used as seasoning, flavor enhancers, fragrances, and food preservatives with limited use. Spices are often known as dried herbs. Examples of spices that we often encounter include: star anise flowers, cardamom, candlenut, pepper, coriander, and others. So that the addition of magic oil to tofu curry can affect the organoleptic properties in terms of taste.

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