Organoleptic Quality and Protein Content of Banana Blossom Jerky with Supplementation of Tofu Dregs

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ABSTRACT

Banana blossom jerky is a vegetable-based jerky made from banana blossom and spices. Banana blossom contains complete nutrients such as carbohydrates, fat and fiber, but its protein content is low, so it is necessary to add protein-rich ingredients to increase its nutritional value, such as tofu dregs.The purpose of this study was to determine the organoleptic quality and protein content of banana blossom jerky with supplementation of tofu dregs. This type of research is an experiment using a completely randomized design (CRD), namely 3 treatments, 1 control and 2 repetitions. Observations were made in two ways, namely subjective (hedonic test/organoleptic quality) analyzed by the variance test (ANOVA) which has been continued with the DNMRT test at the 5% level and objective (protein content test) with the Kjedhal micro method. The results of the study based on the variance test (ANOVA) found that banana blossom jerky in terms of color ranged from 2.84-3.02 (like), aroma ranged from 3.06-3.16 (like), taste ranged from 2.58-3.02 (like), and texture ranged from 2.52-3.04 (like). The results of this study show that the average acceptance is at the level of like and the best treatment in banana blossom jerky with supplementation of tofu dregs is treatment C with the addition of 40 grams of tofu dregs with a protein content of 3.92%. After the variance analysis test (ANOVA), there was a significant difference in terms of taste and texture of the added tofu dregs. Further research is recommended to examine the shelf life/durability of banana heart jerky with the addition of tofu dregs.

Keywords : Banana Blossom Jerky, Protein, Tofu Dregs

INTRODUCTION

Dendeng is a food made from beef that is slightly blackish in color, thin and wide in shape, and full of fragrant spices, and can last a long time. Nowadays, jerky is not only made from meat but also banana blossom. This banana blossom jerky has become a specialty food of Cimahi city, which is given the product name Denjapi which stands for banana blossom jerky (Rahman, 2018).

Banana blossom jerky can also be used as a meat substitute for vegetarians who abstain from food derived from living things (Putri & Herryani, 2019). The nutritional content in 100 grams of banana blossom jerky is 56.8 calories of energy, 1.8 grams of protein, 0.9 grams of fat, 13.6 grams of carbohydrates, and 3.2 grams of fiber (Kemenkes RI, 2019). The lack of protein content in banana blossom jerky can be increased by nutrifying the nutrients.

Nutrification is the addition of macronutrients to the food. The technique of nutrification is by combining one type of food with another, so that it has a balanced nutritional value compared to one type of food alone (Apriyanto, 2021). One of the terms for nutrification is supplementation, where supplementation is usually used for the addition of certain food ingredients to the main food ingredients, with the aim of complementing nutrient deficiencies or certain characteristics of existing products (Estiasih et al., 2015).

One of the vegetable proteins that can be used to increase the protein of banana blossom jerky is by utilizing tofu dregs. Tofu dregs are one of the wastes that can be reused through recycling or converted to other useful products. The waste still contains carbohydrates, protein, fat, fiber, organic acids, and minerals. The use of tofu dregs in banana blossom jerky is to increase the protein content, because the nutritional content of tofu dregs protein is higher than tofu, which in 100 grams of tofu dregs material has 26.6 grams of protein, while tofu has 7.8 grams of protein(Kemenkes RI, 2019).

The utilization of tofu dregs as an additional ingredient in a product is to increase the use value of tofu dregs in addition to the low price. Tofu dregs have been widely processed into tempeh gembus, crackers, soy sauce, or reprocessed into oncom and other preparations(Wisnu Broto, 2021). In general, this study aims to determine the organoleptic quality and protein content of banana blossom jerky with the addition of tofu dregs.

The benefits of this research for the author can increase the knowledge of researchers about how to increase nutritional value, especially protein in making banana blossom jerky with the addition of tofu dregs, while for the community it can provide a new alternative to the community about processed products of tofu dregs as a vegetable side dish of banana blossom jerky so that unused materials can be utilized properly and to get a product that contains high protein.

METHODS

Type and Design of Research

This type of research is an experiment by making a treatment method of making banana blossom jerky with the addition of tofu dregs in a certain ratio and then seeing the effect on organoleptic quality and protein content.

This research design uses a completely randomized design (CRD), where CRD is the simplest design compared to other designs. This design uses one control, three treatments, and two repetitions.

Table 1. Ingredients in Making Banana Blossom Jerky

Ingredients	Treatment			
	A	B	C	D
Banana Blasoom (gr)	200	200	200	200
Tofu Dregs (gr)	0	20	40	60
Shallots (gr)	25	25	25	25
Garlic (gr)	20	20	20	20
Coriander (gr)	1	1	1	1
Pepper (gr)	0,5	0,5	0,5	0,5
Palm Sugar (gr)	10	10	10	10
Cumin (gr)	0,5	0,5	0,5	0,5
Lime Leaves (gr)	0,5	0,5	0,5	0,5
Salt (gr)	3	3	3	3
Water (cc)	250	250	250	250
Cooking Oil (gr)	200	200	200	200

Place of Research

Banana blossom jerky production and organoleptic test were conducted at the Food Technology Laboratory of Poltekkes Kemenkes Padang. Test of protein content in banana blossom jerky was conducted at the Laboratory of Agricultural Product Technology, University of Andalas (UNAND).

Research Materials and Tools

The main ingredients used in making banana blossom jerky are banana blossom, tofu dregs, shallots, garlic, brown sugar, coriander, ground pepper, cumin, kaffir lime leaves, salt, water, and oil. Materials used for organoleptic tests are treatment samples, namely 3 samples, control samples, and mineral water.

The materials used for the protein content test at the Agricultural Product Technology Laboratory of Andalas University (UNAND) are concentrated H2SO4, HgO, K2SO4, NaOH-Na thio sulfate, 4% saturated boric acid, HCL 0.02 N, and Methyl red indicator - methylen mixture. The equipment used for making jerky consists of digital scales, basins, pans, cauldrons, risopan, drying racks or nyiru, cutting boards, knives, spoons and blenders. The tools used in making jerky must be in good condition, clean and not dirty.

The tools used for the organoleptic test are 25 white plates, organoleptic test forms. Tools that will be used for organoleptic tests must comply with the requirements, namely the plate must be white so as not to affect the color, aroma and taste. Chemical equipment used for protein content tests consists of microkjeldahl, beakers, measuring cups, measuring pipettes, test tubes, burettes, destructors, distillation apparatus, scales, stirring rods, suction pipettes, erlenmeyers, litmus paper and ovens.

Research Implementation

This research is a follow-up research from preliminary research which is applied based on the three best treatments with two repetitions. the three treatments that will be tested in the follow-up test are treatments with the addition of tofu dregs as much as 20 grams, 40 grams, and 60 grams.

Tofu Dregs Processing Stage

The tofu dregs used is first cleaned from the epidermis of soybeans that are still attached to the tofu dregs. Then steamed for 15 minutes to remove the languorous taste. Then squeezed until slightly dry to reduce the water content (not too clumpy).

How to Make Banana Blossom Jerky

Banana blossom are selected and prepared to be of good quality. The banana blossom is previously peeled until the banana blossom is slightly reddish white in color to avoid bitterness. Then wash with running water, after washing, cut into pieces. The banana blossom that has been washed and cut into pieces is boiled for 15 minutes with water that has been added a little salt, the

addition of this salt so that the banana blossom does not taste bitter due to the sap in the banana blossom.

After boiling, the banana blossom is pounded until the fibers are broken and crushed. The pounding process aims to facilitate the absorption of spices during curing. Sauté the mashed spices until fragrant, then mix with the mashed banana blossom mixture. Next, mix the dough with the addition of tofu dregs as much as 20 grams, 40 grams and 60 grams, then stir the dough until evenly mixed. Next, the seasoned banana blossom is molded on a baking sheet with a thickness of 3 to 5 mm.

The next stage is the drying process to remove the water content contained in foodstuffs through a heating process. Drying is done by direct sunlight for 2-3 days, characterized by the product can be easily broken by hand. The next stage is the frying process.

Data Processing and Analysis

The data obtained from the organoleptic test results are presented in tabular form, then the average is taken and processed statistically using the variance analysis test (ANOVA) at the 5% level. If there is a significant difference, it is continued with the DNMRT (Duncan New Multiple Range Test) test at the 5% level which aims to see which treatments are different. Data on protein levels in the control and best treatment were analyzed descriptively.

RESULTS AND DISCUSSIONS

Table 2. Average Panelist Acceptance of Banana Blossom Jerky Color with Added Tofu Dregs

No	Treatment	Average	Description
1	A (200 : 0)	2,9	Blackish brown
2	B (200 : 20)	3,02	Blackish brown
3	C (200 : 40)	2,84	Blackish brown
4	D (200 : 60)	2,86	Blackish brown

Based on Table 2, it can be seen that the average value of the panelists level of liking for the color of banana blossom jerky ranged from 2.84 - 3.02. The value is at the level of liking, meaning that the panelists liked each color of the banana blossom jerky treatment sample with the addition of tofu dregs.

Based on the results of the organoleptic test assessment of the color of banana blossom jerky with the addition of tofu dregs, it is in the level of liking, with a blackish brown color. The statistical test results showed that the addition of tofu dregs in making banana blosoom jerky was not significantly different from the color of banana blossom jerky produced. Based on column 2, the most preferred color of banana blossom jerky added with tofu dregs is treatment B with the addition of 20 grams of tofu dregs.

The results of the analysis of variance (ANOVA) test at the 5% level showed no significant difference from each treatment with the addition of tofu dregs on the color of banana blossom

jerky. The brown to blackish brown color of banana blossom jerky is also influenced by the non-enzymatic process, namely the Maillard reaction. The reaction between carbonyl groups of reducing sugars with amino groups of proteins is called the Maillard reaction which produces a brown color in the material, this is due to the use of brown sugar as a reducing sugar where brown sugar includes a type of carbohydrate group of sucrose and tofu dregs as a protein amino group(Apriyanto, 2021).

Table 3. Average Panelist Acceptance of Banana Blossom Jerky Aroma with Tofu Dregs Supplementation

No	Treatment	Average	Description
1	A (200 : 0)	3,16	Fragrant flavor of seasoning
2	B (200 : 20)	3,16	Fragrant flavor of seasoning
3	C (200 : 40)	3,06	Fragrant flavor of Seasoning and a hint of tofu dregs
4	D (200 : 60)	3,16	Fragrant flavor of Seasoning and a hint of tofu dregs

Based on the organoleptic test assessment of the aroma of banana blossom jerky with the addition of tofu dregs, the average favored by panelists ranged from 3.06 - 3.16. Statistical test results showed that the addition of tofu dregs in making banana blossom jerky was not significantly different from the aroma of banana blossom jerky produced.

From the results of the variance test (Anova), it was found that treatment C with the addition of 40 grams of tofu dregs had the lowest average, while the highest was in treatment B with the addition of 20 grams of tofu dregs. The aroma of banana blossom jerky with the addition of tofu dregs is typical of herbs or spices typical of jerky.

This is different from the research conducted by Ayunir (2017) on the effect of tofu dregs flour substitution on the organoleptic quality of sweet bread, which states that the higher the substitution of tofu dregs flour used, the lower the average acceptance of panelists on the aroma of sweet bread(Ayunir et al., 2017).

Table 4. Average Panelist Acceptance of Banana Blossom Jerky Flavor with Tofu Dregs Supplementation

No	Treatment	Average	Description
1	A (200 : 0)	2,62ac	Sweet and spice
2	B (200 : 20)	2,58a	Sweet and spice
3	C (200 : 40)	3,02b	Sweet and spice
4	D (200 : 60)	2,7a	Sweet, spice and a hint of languor

Note: numbers in the same column followed by the same lowercase letter mean not significantly different according to the 5% DNMRT test.

The results of the organoleptic test assessment of the taste of banana blossom jerky with the addition of tofu dregs obtained an average value of the panelists' level of liking ranging from 2.58 to 3.02 with the category of like. The results of the analysis of variance test at the 5% level showed a significant difference between treatments. Then a further test was carried out with the DNMRT test at the 5% level which functioned to determine which treatment pairs were significantly different. The results obtained from the treatment pairs are treatment C is significantly different from treatment D, C with A, C with B, and D with A, while treatment D is not

significantly different from treatment B, and treatment A is not significantly different from treatment B.

This is in line with research conducted by Sidup (2022) on banana heart jerky with the addition of black soybean tempeh flour. In Sidup's research (2022), it was found that banana heart jerky that had a strong black soybean tempeh flour flavor was less preferred by panelists(Sidup et al., 2022). The more tofu dregs the less preferred, this is due to the more dominant langu in tofu dregs considering that tofu dregs come from soybeans, the langu flavor in soybeans is caused by the work of the enzyme lipoxygenase in soybean seeds(Sidup et al., 2022), so that treatment B is less preferred by panelists.

Table 5. Average Panelist Acceptance of Banana Blossom Jerky Texture with Tofu Dregs Supplementation

No	Treatment	Average	Description
1	A (200 : 0)	2,52b	Slightly crispy
2	B (200 : 20)	2,74a	Slightly crispy
3	C (200 : 40)	3,04c	crispy
4	D (200 : 60)	2,86a	crispy

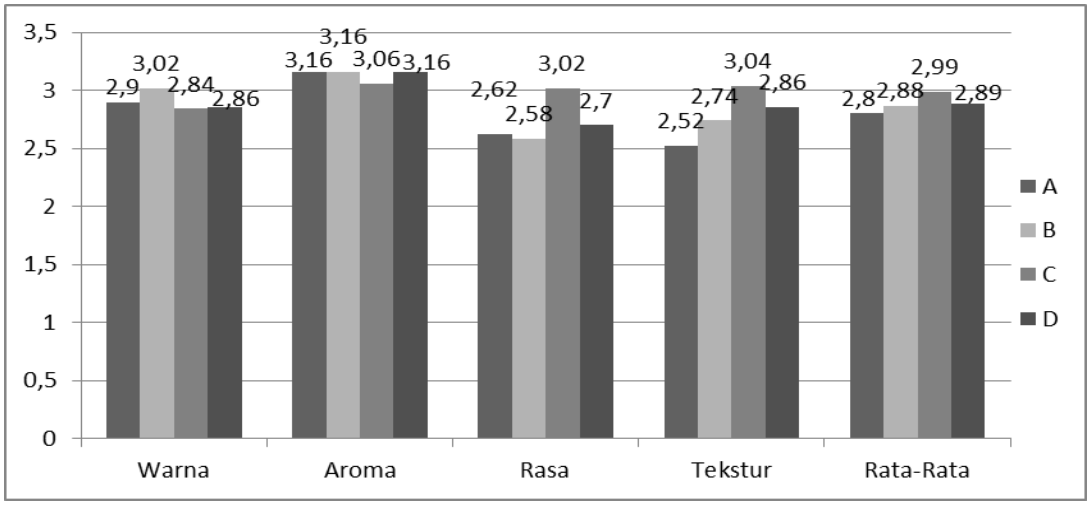
Note: numbers in the same column followed by the same lowercase letter mean not significantly different according to the 5% DNMRT test.

Based on Table 5, it is known that the average value of the panelists level of liking for the texture of banana blossom jerky ranged from 2.52 - 3.04. This value is at the liking level. The highest average value of panelists liking level on texture was found in banana blossom jerky in treatment C with the addition of 40 grams of tofu dregs, which is 3.04 at the liking level while the lowest average value was found in banana blossom jerky in treatment A without the addition of tofu dregs, which is 2.52.

Based on the results of the organoleptic test assessment of the texture of banana blossom jerky with the addition of tofu dregs, it is in like, with a little crunchy to crunchy. This is because the tofu dregs contain quite high fiber so the more the provision of tofu dregs, the more crunchy the texture of banana blossom jerky becomes.

The results of the analysis of variance (ANOVA) test at the 5% level showed a significant difference between treatments. Then a further test was carried out with the DNMRT test at the 5% level which functioned to determine which treatment pairs were significantly different. The results obtained from the treatment pairs are treatment C is significantly different from treatment D, C with B, C with A, D with A, and B with A, while treatment D is not significantly different from treatment B.

Best Treatment



Graph 1. Average Value of Color, Aroma, Taste, and Texture of Banana Blossom Jerky with Added Tofu Dregs Based on Organoleptic Test

Description:

A : 200 grams of banana blossom: 0 gram of tofu dregs (Control)

B : 200 gram banana blossom: 20 grams of tofu dregs

C : 200 grams banana blossom: 40 grams of tofu dregs

D : 200 grams of banana blossom: 60 grams of tofu dregs

The best treatment is one of the treatments that has the highest average of color, aroma, taste and texture. The average acceptance of banana blossom jerky with the addition of tofu dregs from four treatments which is the best result is treatment C with the addition of 40 grams of tofu dregs because it has the highest average of 2.99. This is due to the combination of banana blossom and tofu dregs with the addition of 40 grams of tofu dregs which produces banana blossom jerky. This is because the combination of banana blossom with tofu dregs with the addition of 40 grams of tofu dregs produces banana blossom jerky with characteristics such as sweet and delicious taste, blackish brown color, distinctive aroma of spices and crunchy texture.

Banana blossom jerky with the addition of tofu dregs can be used as a meat substitute for vegetarians/lifestyle who abstain from food derived from living things(Putri & Herryani, 2019) , where banana blossom jerky with the addition of tofu dregs consists of vegetable-based ingredients. Based on the results of the analysis of variance (ANOVA) obtained, the treatment of the results of the addition of tofu dregs has a significant effect on the color, aroma, taste and texture of banana blossom jerky.

Protein Content

In this study, protein was tested to see the effect of the addition of tofu dregs on the protein content of banana blossom jerky. The protein test was conducted on the best treatment, namely

treatment C with the addition of 40 grams of tofu dregs, the protein content of the best treatment C was 3.92%.

The control banana blossom jerky contains 1.8% protein. Banana blossom jerky with the addition of tofu dregs has a higher protein content compared to the control banana blossom jerky. This is because 100 grams of tofu dregs contain 26.6 grams of protein so that if banana blossom jerky with the addition of tofu dregs will increase the nutritional value of protein in the banana blossom jerky. The higher the addition of tofu dregs, the higher the protein content produced.

CONCLUSION

1. The average value of the panelists level of preference for the color of banana blossom jerky with the addition of tofu dregs is at the level of liking.
2. The average value of the panelists level of liking for the aroma of banana blossom jerky with the addition of tofu dregs is at the level of liking.
3. The average value of the panelists level of preference for the taste of banana blossom jerky with the addition of tofu dregs was at the level of liking.
4. The average value of the panelists level of preference for the texture of banana blossom jerky with the addition of tofu dregs was at the level of liking.
5. The best treatment results that are most favored by panelists on banana blossom jerky with the addition of tofu dregs is treatment C, namely with the addition of 40 grams of tofu dregs.
6. The best treatment protein content in banana blossom jerky is 3.92%.

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