

Test Activity Spice Traditional Balinese “Basa Genep” Against Growth *Escherichia Coli* During Storage on Temperature Room

Yasniana Dalima¹, Ni Made Ayu Suardani Singapurwa^{1*}, I Putu Candra¹, A.A. Made Semariyani¹, I Wayan Sudiarta¹

¹Department of Food and Technology, Warmadewa University, Indonesia.

*Corresponding author. Email: a.suardani@gmail.com

Abstract

*Basa genep is a mixed paste spice complete used in Lots Balinese cuisine as material base. This study aims to determine the characteristics of the "Basa Genep" seasoning during storage at room temperature. To determine the shelf life of the "Basa Genep" seasoning stored at room temperature, this study used a Completely Randomized Design (CRD) is simple, with descriptive microbial observations and shelf life observations. To determine the effect of each treatment, objective observations will be carried out (chemical analysis tests for pH, water content, and microbiological analysis tests for Total Plate Count (TPC), and *Escherichia coli*). And subjective observation is organoleptic testing). Storage practices produce even wet seasoning characteristics with a total plate count (TPC) of 2.3×10^3 colonies/g, *Escherichia coli* 4.4×10^2 colonies/g, water content 48.60%, pH value 5.66, with storage for 25 days at room temperature.*

Keywords: Seasoning, "Basa Genep" Traditional, Balinese, Storage, On Temperature Room.

1. Introduction

Bali is an exotic island in Indonesia which is famous for its natural beauty, rich culture and is famous for its tourist attractions and is also supported by typical Balinese culinary delights that reflect Indonesian characteristics which are rich in spices. Balinese cuisine offers uniqueness in taste, ingredients used, and cooking techniques. Basa genep is a mixed paste spice complete used in Lots Balinese cuisine as material base. Spice base or base genep This can used for cook with material standard meat, vegetables, and fish. With method stir-fry, marinate, grill, soup or curry [1]. Spice genep own many benefits Because contain compound functional bioactives tall as antioxidant and antimicrobial. Lots very study about compound bioactives that have done for interest health man [2].

During storage quality something product depend on condition storage that alone. One of factor affecting quality product that is temperature, which can be categorized as become two that is normal temperature and temperature extreme. Normal temperature is the temperature is not cause damage or decline quality, meanwhile temperature extreme or not normal will speed up decline quality product during storage [3]. Quality seasoning (wet) that Number Total plate is 1×10^4 colonies /g while the pH ranges between 5-6. Testing carried out on spice instant base genep includes Total Plate Count (TPC), *Escherichia coli*, total mold, pH, and water content [4].

Testing carried out on spice instant base genep including Total Plate Count (TPC), *Escherichia coli*, pH, and water content. This matter become reject measuring quality material food spice instant fulfil condition or No. Spice instant contain amount excess microbes limit maximum [5].

2. Material and Methods

Time and Location of Research

This research was carried out at the food processing Laboratory, Faculty of Agriculture Warmadewa University, Denpasar and the analysis was carried out at the food Analysis Laboratory, Faculty of Agriculture Warmadewa University from June - August 2023

Research Materials

Tools used in the process of making "Basa Genep" spices, namely: scales, basins, blenders, knives, stoves, thermometer, spoon for frying, glass bottle, and pan. Meanwhile, the equipment for analysis is, analytical balance, scissors, measuring cup, desiccator, measuring flask, petri dish, pH meter, autoclave (Aivlave HVE-50), sterile cabinet (Clean bench), media bottles, Bunsen burner, tube shaker (vortex), incubator, and oven.

The materials used in this research are bought at the Market Badung and Market Kereneng such as ginger, galangal, galangal, turmeric, shallots, garlic, cayenne pepper, Lombok chili, bangle, jangu, white pepper, black pepper, coriander, nutmeg, candlenut, tabaia bun, cloves, and mesui. And seasonings, shrimp paste, salt, red cucumber, granulated sugar, cooking oil, kaffir lime leaves, bay leaves and kaffir lime peel. Meanwhile, the materials used in the analysis are *Total Plate Agar* (PCA), EMBA, Aquades, NaCl, and filter paper.

Research Design

This research used a simple Completely Randomized Design (CRD), with descriptive microbial analysis and storage microbial observations.

The data obtained were then analyzed for variance and whether there was a significant effect, it was continued with the Least Significant Difference Test (BNT 5%) to find out the different pairs.

Research Implementation

The first step is to prepare the tools and ingredients used in the process of making spice basa genep such as ginger, galangal, turmeric, shallots, garlic, cayenne pepper, bangle, jangu, white pepper, black pepper, coriander, nutmeg, candlenut, tabiabun, cloves, and mesui. Weighed then blended for 2 minutes. Mix all the blended ingredients and add flavorings such as 50 g shrimp paste, 25 g brown sugar, 25 g granulated sugar, 25 pieces of kaffir lime leaves, 25 bay leaves, and 75 g of kaffir lime peel. Add 1 liter cooking oil and 100 g salt gradually. After everything is mixed well, continue the cooking process. Cook using low heat at a temperature of 60°C for 20 minutes. After the cooking process, the spices are left for 30 minutes. The packaging process uses 10 g and 50 g glass bottles. The process of storing basa genep room seasoning at a temperature of 20-25°C.

Observational variabel

To determine the effect of each treatment, objective observations will be carried out (chemical analysis tests for pH, water content, and microbiological analysis tests for Total Plate Count (TPC) and *Escherichia coli*). And subjective observation is organoleptic testing.

3. Results and Discussion

Total plate count (TPC)

Total Plate Count test results (TPC) seasoning base genep during storage on temperature room. The highest total bacterial base genep seasoning was obtained by storage treatment at room temperature for 25 days, namely 2.3×10^3 colony/g. Meanwhile, the lowest total bacteria was obtained from storage treatment at room temperature for 5 days, namely 1.3×10^2 colony/g. From the results Total Plate Count calculation shows that all spice fulfil condition quality BPOM RI No: 16 of 2016 concerning Criteria Microbiology In Food Processed category spice And condiment Ready use paste (wet) and ISO-4833-1-2013, namely limit maximum ALT 1×10^4 colony /g [6].

Factors that influence microbial growth are room temperature and humidity during storage, even though "Basa Genep" contains antimicrobials such as red chilies, turmeric, shallots, garlic and galangal. Red chilies contain essential oils as antimicrobials, shallots contain phenolics which function as antimicrobials, the curcuminoid content in turmeric has antimicrobial benefits and galangal contains cineol and eugenol as active antimicrobial components [7]. Antimicrobial herbs and spices is compound like phenols, flavonoids, acetate compound the can push growth microbes Because can nature coagulator enzyme so that formation wall cell inhibited [8].

Results Total Plate Count (TPC) colony/g test on Basa Genep Seasoning Samples During Storage at Room Temperature can be seen in Table 1.

Table 1
Total plate count test results (TPC) In Bumbu Samples Traditional Balinese " Genep Base " During Storage at Room Temperature.

| Treatment | Result Testing (colonies/g) | Information |
|----------------|-----------------------------|-------------|
| Storage day 0 | 1,9 x 10 ² b | ms |
| Storage day 5 | 1,3 x 10 ² b | ms |
| Storage day 10 | 2,4 x 10 ² ab | ms |
| Storage day 15 | 2,0 x 10 ³ a | ms |
| Storage day 20 | 2,2 x 10 ³ a | ms |
| Storage day 25 | 2,3 x 10 ³ a | ms |

Information : . a. Average values are followed by the same letter on the same column shows that the difference is not significant in the test Duncan 5%
b. Ms : Qualifie

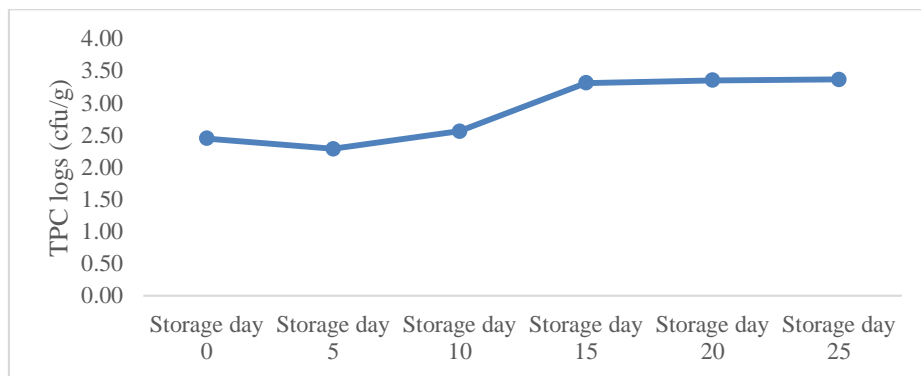


Figure 1. Total plate count test results (TPC) In Bumbu Samples Traditional Balinese " Genep Base " During Storage at Room Temperature

Escherichia coli

The results of testing for *Escherichia coli* on samples of the traditional Balinese seasoning basa genep during storage at room temperature all meet the requirements of BPOM RI Regulation No: 16 of 2016 based on ISO 4833-1- 2013. namely the maximum limit for *Escherichia coli* contamination of wet seasoning "Basa Genep". The lowest sample on day 0 of storage had a value of 1.0×10^2 colonies/g and the highest value on day 25 of storage had 4.4×10^2 colony/g. *Escherichia coli* is a bacteria that can cause poisoning in food products [9].

Content compound metabolites secondary on ginger especially flavonoids, phenols, terponoids and oil essential. Compound metabolites resulting secondary plant *Zingiberacea* This generally can

hinder growth harmful pathogenic bacteria life humans, among others bacteria *Escherichia coli*, *Bacillus Subtilis*, *Staphylococcus aureus*, *Neurospora fungus*, *Rhizopus sp*, And *Penicillium sp* [10].

Results Test *Escherichia coli* Spice Traditional Bali Basa Genep During Storage On Temperature Room can be seen in Table 2.

Table 2
Escherichia coli Testing on Traditional Balinese Seasoning Samples
"Base Genep" During Storage at Room Temperature

| Treatment | Result Testing (colonies/g) | Information |
|----------------|-----------------------------|-------------|
| Storage day 0 | 1,0 x 10 ² a | ms |
| Storage day 5 | 1,7 x 10 ² a | ms |
| Storage day 10 | 1,6 x 10 ² a | ms |
| Storage day 15 | 1,7 x 10 ² a | ms |
| Storage day 20 | 2,4 x 10 ² a | ms |
| Storage day 25 | 4,4 x 10 ² a | ms |

Description: a. The average value is followed by the same letter in the same column. The same showed no significant difference in the 5% Duncan test.

b. Ms: Qualifie

Water Content

The results of testing the water content of traditional Balinese seasoning "Basa Genep" during storage at room temperature, the highest water content was obtained in the 10 - day storage treatment which amounted to 48.60 % and the best water content was obtained in the 15- day storage treatment, which was 42.51 % . The water level is amount of water contained in material food available affecting appearance, texture, and taste on material food water level can determine freshness and power durable material food [11].

Water content becomes one always thing noticed on every product processed food because is wrong one quality parameter is used for determine quality something product the more tall temperature warm up, then subtraction water content on material will more fast. This matter caused Because the more tall temperature, then the more lots evaporating heat and time warmup to material the more fast [12].

Results Seasoning Water Content Test Traditional Balinese "Basa Genep" During Storage On Temperature Room can be seen in Table 3.

Table 3
Average Water Content (%) of Traditional Balinese Seasoning "Basa Genep"
During Storage at Room Temperature.

| Treatment | Average |
|----------------|---------|
| Storage day 0 | 45.88 a |
| Storage day 5 | 46.00 a |
| Storage day 10 | 48.60 a |
| Storage day 15 | 42.51 a |
| Storage day 20 | 43.75 a |
| Storage day 25 | 47.19 a |

Description: Average value followed by the same letter in the column

The same results show no significant difference in the Duncan 5% test.

pH test

Test results on the pH value of "Basa Genep" seasoning during storage at room temperature The lowest average pH value was obtained on the 25th day of storage treatment, namely 5.51, while the highest pH was obtained from the 10th day of storage treatment, namely 5.66.

Trend enhancement pH value is caused by ongoing various various chemical processes like overhaul carbohydrate become sugar simple that produces sour organic and exists influence growth microorganisms [13]. The decrease in pH during storage is caused by the formation or accumulation of acid from microbial activity which is able to break down the nutritional components in spices so that acid is formed as a result of metabolism. The resulting acid accumulation increases the longer

the storage time, causing the pH to decrease [14]. Material frequent spices used in spice instant pasta can hinder activity microbes, among others onion red and onion white [15]. Results Test the pH of Spices Traditional Balinese "Basa Genep" During Storage On Temperature Room can be seen in Table 4.

Table 4
Test Results on the pH Value of "Basa Genep" Seasoning
During Storage at Room Temperature

| Treatment | Average |
|----------------|---------|
| Storage day 0 | 5.55 bc |
| Storage day 10 | 5.63 ab |
| Storage day 15 | 5.66 a |
| Storage day 10 | 5.56 bc |
| Storage day 20 | 5.56 bc |
| Storage day 25 | 5.51 c |

Description: Average value followed by the same letter in the same column the same shows no significant difference in the 5% duncan test

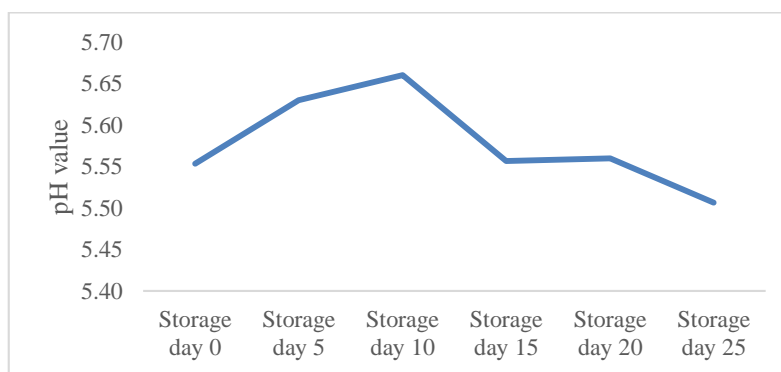


Figure 1. Test Results on the pH Value of "Basa Genep" Seasoning During Storage at Room Temperature

Subjective Observation

Flavor

The highest organoleptic value for "Basa genep" seasoning was on the 0th day of storage treatment a value of 5.40 (somewhat favorable), while the lowest value was on the 25th day of storage treatment, namely 4.00 (normal). In its lifetime, food is a combination of various flavors that are in harmony so that it has a delicious taste. Taste is one of the important components that influences consumer acceptance of a food product [16]. Factors that influence taste can also be caused by the aroma produced [17].

Aroma

The highest organoleptic aroma of "Basa genep" seasoning was in the long storage treatment on day 0 with a value of 5.70 (rather like it). Meanwhile, the lowest acceptability value for the "base genep" aroma spice parameter was the 15th day storage treatment and a value of 4,20 (average-rather like it).

Aroma is the most important tool used to assess the quality of food ingredients by testing sensory properties using the resulting sense of smell. Aroma can also provide the results of panelists' comments on the product given directly by assessing whether they like it or not. The aroma of the spices will appear due to the use of spices which produce a distinctive and attractive fragrant smell [18].

The long storage treatment for the "Basa genep" seasoning has an effect on the aroma produced. The panelists' preferences for aroma may be influenced by the complex volatile compounds found in the natural spices used in making genep base seasoning. However, the volatile compounds contained are also unstable when heated during the cooking process, this is the cause of aroma changes that occur during storage of the "Basa genep" seasoning [19].

Color

The highest color organoleptic test was on the "Basa genep" seasoning color parameter, namely on the 0th day storage duration treatment with a value of 5.60 (somewhat like-like), while the acceptability was on the "Basa genep" seasoning color parameter, namely on the 0th day storage duration treatment with the value 4.20 (average-somewhat like it).

Color is one of the determinants for identifying the quality and acceptance of food products. The characteristics of food products that have good color levels will influence consumers to determine the consumer's attractiveness to the product they choose. Chemical changes in spices will result in browning and caramelization reactions [20].

Texture

The highest organoleptic texture test on the texture parameter of "Basa genep" seasoning was on the 5th day of storage treatment with a value of 5.10 (somewhat like-like), meanwhile, the lowest acceptability for the texture parameter of "Basa genep" seasoning was on the 25th day of storage treatment with a value of 3.40 (a bit of a regular dislike). The specific texture on the "Basa genep" seasoning is that it is dense and looks wet. This happens because of the use of cooking oil when mixing the ingredients using a blender on then frying the "Basa genep" seasoning.

Texture is an important factor in determining the quality of the food produced and the characteristics and differences in each product. Texture is defined as a way to identify component elements and structural elements that are arranged and combined into micro and macro structures which provide outward structural expression in terms of flow and deformation [21].

Overall Acceptance

Based on physical analysis, it shows that the "Basa genep" seasoning treatment shows a very significant or non-significant effect ($p > 0.01$) on the overall recipient of the "Basa genep" seasoning and can be accepted by the panelists. The average value of the panelists preferences for the overall from table 5, it can be seen that the highest level of panelists liking was observation treatment 1 (day 0), namely 5.50 (somewhat like it).

Table 5.
Average level of Acceptance of Panelists for Flavor, Texture, Aroma, Color and Overall characteristics of "Basa genep".

| Treatment | Flavor | Texture | Aroma | color | Overall Acceptance |
|----------------|---------|---------|--------|--------|--------------------|
| Storage day 0 | 5.40 a | 4.70 ab | 5.70 a | 5.60 a | 5.50 a |
| Storage day 5 | 5.20 a | 5.10 a | 5.50 a | 5.30 a | 5.40 a |
| Storage day 10 | 4.80 ab | 4.50 ab | 5.30 a | 4.90 a | 4.90 ab |
| Storage day 15 | 4.10 b | 4.10 bc | 4.20 a | 4.20 a | 4.20 b |
| Storage day 20 | 5.30 a | 3.40 bc | 5.10 a | 4.80 a | 5.10 a |
| Storage day 25 | 4.00 b | 3.40 c | 4.40 a | 5.00 a | 4.40 b |

Description: The average value followed by the same letter in the same column indicates that the difference is not significant in the 5% Duncan test.

4. Conclusion

The storage treatment of "Basa Genep" seasoning at room temperature has a significant effect on the *Total Plate Count* (TPC) and pH, as well as a significant to very significant effect on the taste, texture, aroma and overall reception. The shelf life of basa genep seasoning is 10 days at room temperature with characteristics of water content 48.60, pH 5.66, *Total Plate Count* (TPC) 2.4×10^2 , *Escherichia coli* 1.6×10^2 , color 4.90 taste 4.80 texture 4.50 aroma 5.30 overall receipt of 4.90 has met the requirements according to BPOM RI standards No: 16 of 2016.

References

- [1] Ephanov, Nikita. (2023). What Is Balinese Base Genep and How Is It Used in Cooking? Accessed from <https://www.tastingtable.com/1213212/what-is-balinese-base-genepand-how-is-it-used-in-cooking>.

- [2] Prabowo, AY, T. Estiasih, I. Purwatiningrum. (2014). Gembili tubers (*Dioscorea esculenta* L.) as a food ingredient containing bioactive compounds: literature review. *Journal of Food and Agroindustry*. 2 (3): 129 – 135 .
- [3] Herawati , H. (2008). Determination Age Save On Product Food . *Journal R&D Agriculture* , 27 (4), 124–130.
- [4] BPOM RI No: 16. (2016). Criteria Microbiology In food Processed Category Seasonings And Condiments Ready Use Paste (Wet), Jakarta.
- [5] Yuniastri. (2019) . Microbial and Mold Content in Instant Seasoning, Makasar.
- [6] ISO-4833-1-2013.(2013). ALT On Spice And Condiment .
- [7] Wellyalina. (2017) . Identification of Phytochemical Compounds and Antimicrobial Power of Rendang Seasoning Main Spice Extracts Against (*Staphylococcus aureus*). *Journal of AgricultureUMSB*, 1(2), 29-37.
- [8] Sagar, N. A., & Pareek, S. (2020). Antimicrobial assessment of polyphenolic extracts from onion (*Allium cepa* L.) skin of fifteen cultivars by sonication-assisted extraction method. *Heliyon*, 6(11), e05478. <https://doi.org/10.1016/j.heliyon.2020.e05478>
- [9] Nugroho, M. (2014). Hygiene Conditions of Food Handlers and Canteen Sanitation at SMAN 15 Surabaya. *Journal of Environmental Health*, 7(2), 70–166.
- [10] Supriyanti . (2015). Content Compound Metabolites On Ginger . *Faculty Mathematics And Knowledge Knowledge Nature* . 7(2), 120-130.
- [11] Arini , LDD (2017). Factors reason And characteristics food impactful expiration bad on health public . *Journal Technology And Industry Food* , 2(1), 15-24. <https://doi.org/10.33061/jitipari.v2i1.1531>.
- [12] Kusnandar , F. (2010). Understanding Water Activities and The relationship with Durability Food . IPB. Bogor.
- [13] Rachamwati , L., Suranto , and R. Setyaningsih . (2005). Test Antibacterial Bacteria Sour Lactate origin Pickles Mustard To Bacteria Pathogens, *Biotechnology*, 2 (2): 43-48.
- [14] Renate D. (2009). Packaging of chili puree red with various type packaged plastic vacuum . *Journal Technology Industry And Results Agriculture*. 14(1): 80-89. DOI://dx.doi.org/10.23960/jtihp.V14i4i.80%2089.
- [15] Talib , A. (2011). Influence Type Packaging Regarding Shelf Life Spice Pasta Curry . *Journal Results Study Industry* , 24 (2) : 83-87.
- [16] Darmansyah, U, E., & M, K. (2016). Analysis of Consumer Acceptance of Presto Food Processed By-Catch Pepetek Fish. *Journal of Aquatic Resources*, 10(2),39–45
- [17] Khairun, AM, P, YA, & P, L. (2014) . Changes in the Quality of Shallots (*AlliumAscalonicum* L.) during Storage at Different Levels of Water Content and Temperature. *Postharvest Journal*, 11(2), 108–115 .
- [18] Setyaningrum, H and Saparinto, C. (2014). Complete Guide to Agarwood. Jakarta: Self-Help Spreader.
- [19] Farah, (2008). Making and Storing Red Spices. Thesis.
- [20] Tahir, MM, Abdullah, N., Rahmadani, R. (2014) . Formulation of seasoning based on anchovies (*Stolephorus*spp.) and picung (*Pangium edule*) flesh with the addition of spices. Proceedings of the 2014 FKPT-TPI National Seminar and Workshop. Riau .
- [21] Gozali T., AD Sutrisno, and D. Ernida. (2001). The Effect of Steaming Time and Comparison of Oyster Mushrooms with White Bread on the Characteristics of White Oyster Mushroom Nuggets (*Pleurotus florida*). Collection of Papers at the National Seminar on Food Technology. Association of Indonesian Food Technology Experts (PATPI) .