

REGULAR ARTICLE

SENSORY QUALITY EVALUATION OF MINI BUN (BURGER) BASED ON DIFFERENCES IN FLOUR TYPES*Mohammad Mardiyanto^{*1}, Mokhamad Fatoni Kurnianto¹, Elok Bashirah Yuliana²***Address:**¹Politeknik Negeri Jember, Department Teknologi Pertanian, Jl. Mastrip 164 Jember, 61821, 0331-333532²Institut Teknologi Pembangunan Surabaya, Fakultas Teknik, Teknik Elektro.*Corresponding author: mohammad.mardiyanto@polije.ac.id**ABSTRACT**

Bun bread is one type of bread that is marketed and applied for ready-to-eat food products. Bun bread can be marketed and distributed in 2 (two) forms, namely marketing for fresh and frozen products (frozen storage). Bun bread is included in the classification of lean dough bread types that have special characteristics of the ratio of sugar and margarine. In the process of making bun bread, there is no difference with making sweet bread in general, only in the storage process which is generally done frozen or cold. One factor that affects the process of making bun bread is the oven temperature. The purpose of this study was to determine the effect of differences in oven temperature on the sensory quality of bun bread products. The parameters tested in the study were sensory quality of color, taste, aroma and texture.

Keywords: Bun bread, oven temperature, sensory quality**INTRODUCTION**

Bun bread is one type of bread that is marketed and applied for ready-to-eat food products. Bun bread can be marketed and distributed in 2 (two) forms, namely marketing for fresh and frozen products (frozen storage). Basically, bun bread products are used as the main ingredient in making burgers. Bun bread is included in the classification of lean dough bread which has the special characteristic of a sugar and margarine ratio of less than 10% (Mansoorreh et al., 2017). The results of Nikmah and Rosidah's (2023) study show that the main characteristics of bun bread lie in the protein content which ranges from 1.52% and the distinctive physical form with the addition of sesame to the product.

Currently, research related to the development of processed bread products has been widely developed by utilizing several types of raw materials as substitutes. The results of Muthaharoh and Sutrisno (2017) research show that the combination of raw materials from tubers and cereals can produce bread products and their derivatives. In addition, several studies show that the development of bread-making procedures can utilize differences in the types of microbes used, including yeast microbes obtained from fruit extraction (Ma'ruf et al., 2011) and microbes from kefir milk fermentation (Mansoorreh et al., 2017). In addition, other factors that affect the quality of the final bread product are the baking time and temperature.

In general, bun bread products have a size of 35-45 grams of dough weight, while in the study the weight of the dough used was 17-22 grams. The oven temperature used in making bread ranges from 170-210°C, so the purpose of the study was to determine the effect of differences in oven temperatures on the organoleptic quality of mini bun bread. In terms of marketing, it is expected to become a specific segmented product for MSMEs, hotels, and other types of small industries.

MATERIAL AND METHODS

The method used in this study is an experimental design, which aims to determine the effect of certain treatments on the controlled process. The treatment used in this study was the difference in oven temperature in the process of making mini buns. The oven temperature levels used were 170°C, 180°C, and 190°C. The testing parameters used in the study were organoleptic tests of taste, aroma, texture, and appearance. The formulation used in this study can be seen in **Table 1**.

Table 2. Bread bun formulation

No.	Ingredients	Count (%)
1	Wheat flour high protein	45,7
2	Wheat flour low protein	11,4
3	Yeast	0,9
4	Salt	0,6
5	Water	27,4
6	Sucrose	6,9
7	Margarine	4,6
8	Milk	2,3
9	Bread Improver	0,3

Research Procedures

The process of making mini buns is no different from the process of making other types of sweet bread. The basic difference in making mini buns lies in the weight of the dough used. The process of making mini buns is as follows:

- Preparation:** The process of preparing tools and materials is carried out to ensure that the tools used are clean and safe in accordance with hygiene-sanitation standards in the food industry. The preparation of materials is divided into two large parts, namely raw materials with wet and dry categories.
- Mixing and Homogenizing:** The mixing process begins with dry ingredients first, then added with wet ingredients. The time required for the process ranges from 35-45 minutes at room temperature. The type of equipment used in the mixing and stirring process is a dough mixer. The success of the stirring and mixing process is at the level of smoothness of the resulting dough.
- Fermentation batch 1:** At this stage, the dough that has been kneaded is removed from the mixer and rested for 15 minutes at a controlled temperature of 26-27°C. This fermentation process aims to increase the volume of the dough. The ratio of dough development is at least 1:1.5 of the initial dough height.
- Weighing and Molding:** At this stage, it is the key to forming mini bun dough, this is because the size of the dough is one of the CCP (critical control points) for types of bread with special sizes. In making mini buns, the size of the dough used is 17-22 grams, with a maximum diameter of 5-6 cm. The dough that has been weighed is then grounded into a circle and placed in a special mold according to the desired size.
- Fermentation batch 2:** In this second fermentation process, the aim is to redevelop the dough that has been formed. This fermentation process is carried out using a proofer with controlled temperature and time conditions. The time required for the fermentation process ranges from 40-50 minutes with a temperature of 40-55°C. The expected development ratio at this fermentation stage is 1:1.5 of the height of the dough in the mold
- Oven:** The baking process in making mini buns is included in the CCP section. Conditions controlled in the baking process include temperature and time used. The aromatic formation process is produced during the baking process. Interaction between ingredients will be stimulated during the baking process, so that aroma, color, and distinctive taste will be formed.
- Cooling, Cutting and Packaging:** The cooling process is carried out to rest the resulting product. This process is carried out at room temperature (recommended at a temperature of 25-27°C). If the product has reached the ideal temperature in the next cooling process, it is cut in the middle with a special knife. This process is carried out slowly by paying attention to the pattern of the mini bun. Furthermore, the bread is packed in vacuum plastic and stored in cold temperatures.

Parameters

Observation parameters conducted in this study include organoleptic parameters consisting of color, taste, aroma, and texture testing of mini buns. Testing of these parameters was conducted on 25 panelists consisting of employees in the Tefa Bakery environment and active students of the Jember State Polytechnic.

Data Analysis

The data collection technique used in this study used a quantitative method. The data obtained were the results of organoleptic testing, then the average and standard deviation were calculated. The data obtained were then discussed descriptively. The type of treatment used in this study was the difference in oven temperature on the quality of the resulting product.

RESULTS AND DISCUSSION

In this study, bun bread products were packaged and stored in frozen form. The weight of the dough used was 17-20 grams, packaged using PET plastic in vacuum conditions. The freezing process was carried out using an ABF machine, a capacity of 50 kg with a time of 3-4 hours for 1 rolling tray. Frozen bun bread products with vacuum packaging can be seen in **Figure 1**.



Figure 1. Frozen buns with vacuum packaging

Color Characteristics

Color is one of the important parameters in determining the quality of frozen bun products. In this study, the results of color testing from various oven temperatures can be seen in **Table 2**.

Table 2. Colour results

Temperature	Color Mean	St-dev
Control	3,94	±0,57
170°C	3,72	±0,61
180°C	4,16	±0,55
190°C	3,76	±0,60

Based on the results of the color test, the bun bread products had significant color differences in each treatment. The color characteristics of the bun bread tend to be pale brown on the top, while the bottom has a bright brown color. The results of the sensory test showed that the bun bread baked at a temperature of 180oC had the highest acceptance value, which was 4.16 ± 0.55 . The color difference in each treatment was caused by the difference in the oven temperature used. The results of the study by Mardiyanto et al., (2024) showed that the process of baking bread and cookies products has a major influence on the quality of the products produced, so the oven temperature must be set precisely and ensured to be evenly distributed.

In this study, the type of oven used is a rotary oven which has a capacity of 12 trays in one batch so that adjustments need to be made to the conditions of the oven room, so that the heat distribution process can take place evenly (Hariono, et al., 2023), this is also in line with research conducted by Kumolontang (2015) that conditioning the oven room will affect heat distribution, so that other factors such as temperature and oven duration can be conditioned and optimized.

Flavor Characteristics

Taste parameters are one of the important parameters in sensory testing of a food product. Based on consumer acceptance, taste parameters are one of the references for products to be developed. The results of the taste parameter test for bun bread products can be seen in **Table 3**.

Table 3. Taste Results

Temperature	Taste Mean	St-dev
Control	4,08	±0,72
170°C	3,88	±0,67
180°C	4,28	±0,46
190°C	4,04	±0,61

Based on the data obtained, the results of the sensory taste test ranged from 3.88-4.28. Based on the results obtained, the panelists had a taste preference that tended to be sweet and had a light smookie aftertaste. The existence of this taste preference was at an oven temperature of 180°C. The ovening process has a significant effect on taste quality. The results of the study by Mardiyanto and Kurnianto (2025) showed that flavonoid and fat compounds in the ingredients would be distributed throughout so that they could affect the taste quality of the resulting product.

In addition, the composition of the ingredients is one of the important aspects in influencing the taste of a product. The results of the study by Sariyani et al (2019) showed that the main ingredients and substitutes have a significant influence on processed bread and cookies products, so that from a broader perspective, the selection of raw materials for frozen bun products is one of the CCPs in the food safety system. Basically, frozen bun products have certain taste standards and can be modified according to needs and substitute

ingredients (Valentim et al., 2024). Based on its quality attributes, the taste of buns can be described as having a bland taste, not sweet, and having strong butter.

Aroma Characteristics

Aroma parameters are one of the tests in determining the quality of frozen bun products, this is because buns will emit a distinctive and specific aroma during the baking process for making burgers. The results of the frozen bun aroma parameter test can be seen in **Table 4**.

Table 4. Flavour Results		
Temperature	Flavour Mean	St-dev
Control	3,72	±0,51
170°C	3,64	±0,64
180°C	4,24	±0,72
190°C	3,76	±0,72

Based on the data above, the results of the color parameter test on bun bread showed values ranging from 3.64-4.24. The oven treatment with a temperature of 180°C had the highest acceptance value, namely 4.24. In general, the difference in the oven temperature used resulted in a significant difference in the quality of the aroma of the resulting product. In processed bread and cake products, volatile compounds play an important role in developing aroma during the baking process (Gmosr et al., 2021).

The results of research conducted by Mardiyanto et al. (2024) showed that the aroma produced from baked bread and cake products comes from volatile compounds of raw materials and basic ingredients used. In addition, the baking temperature factor also affects the creation of aromatic compounds in the product. The optimal temperature of the baking process depends on the type of product, raw materials used, dough thickness, and material dimensions. The combination of raw materials, temperature and baking time will improve product quality, especially in terms of aroma (Hasan et al., 2020).

Texture Characteristics

Texture parameters are one of the important aspects of testing in determining the quality of the resulting product. The detailed results of testing the aroma parameters of frozen buns can be seen in **Table 5**.

Table 5. Texture Results		
Temperature	Texture Mean	St-dev
Control	4,01	±0,73
170°C	3,76	±0,28
180°C	4,16	±0,69
190°C	3,96	±0,79

Based on the data above, the texture parameter value is in the range of 3.76-4.16. The use of a temperature of 180°C in the baking process has the highest hedonic texture value from consumers, namely 4.16. In the texture parameter, one of the factors that consumers prefer in the assessment is the level of softness of the bun. In general, the factors that affect the level of softness in bread, pastry and cookies products are the types of supporting ingredients used such as margarine and the type of emulsifier (Rosida et al., 2020). Meanwhile, the baking process has a non-dominant effect on the formation of texture in bun products. The results of Astuti's (2015) research showed that the components of the ingredients that play a role in forming the texture of a product are ingredients that have high protein content and ingredients that have large pores in their tissues.

CONCLUSION

Based on the data obtained, the difference in oven temperature in making buns has an effect on the results of sensory testing. The highest test results were at an oven temperature of 180°C, the data on each parameter are as follows: color parameter 4.16±0.55, taste parameter 4.28±0.46, aroma parameter 4.24±0.72, and texture parameter 4.16±0.69. From these data, it shows that the panelists have a level of preference for buns that are oven-baked at a temperature of 180°C.

ACKNOWLEDGMENTS

We would like to express our gratitude to the management of UPA P5 Jember State Polytechnic who has provided all the needs so that this research activity can run smoothly. We would also like to thank the leadership of Jember State Polytechnic who have provided funding, so that this research gets optimal results.

REFERENCES

1. Gmosr R, Lennartson P. R, Taherzadeh M. J (2021) From surplus bread to burger using filamentous fungi at bakeries: Techno-economical evaluation: *Cleaner Environmental Systems* 2:100020
2. Hariono B, Erawantini F, Brilliantina A, Kurnianto M. F, Supriono S (2023) TQuality nutrition, metal content, and health risks in soy milk products using aluminum and stainless steel cookers: *AcTion: Aceh Nutrition Journal* 8 (4), 526-532
3. Hasani Sh, Ojagh M. H, Ghorbani M, Hasani M (2020) Nano-Encapsulation of Lemon Essential Oil Approach to Reducing the Oxidation Process in Fish Burger during Refrigerated Storage 10:35-46
4. Kumolontang, N. (2015). Pengaruh Penggunaan Santan Kelapa dan Lama Penyimpanan terhadap Kualitas Cookies Santang. *Jurnal Penelitian Teknologi Industri* Vol.7 No.2.
5. Ma'aruf, A., Z. Aisyikee, A.Sahilah, dan A. .Khan. (2011). Leavening ability of yeast isolated from different local fruits in bakery product. 40(12):1413–1419.
6. Mansooreh, S., M. Aalami, dan A. Mahoonak. 2017. Effect of exopolysaccharide extracted from iranian kefir grains on bread quality properties of medium protein wheat. 4:152–159.
7. Mardiyanto, M dan M. F. Kurnianto. (2024). Karakteristik Sensoris Edamame Crunchy Berdasarkan Perbedaan Waktu Pengovenan. *The 2nd National Conference on Innovative Agriculture*. e-ISSN 3062-8849
8. Mardiyanto, M., Fadhila, P. T., Nurwahyuningsih, N., & Rakhmadevi, A. G. (2024). Karakteristik Mutu Sensoris Cookies Tinggi Serat dengan Substitusi Tepung Okara. *Innovative: Journal Of Social Science Research*, 4(2), 1591-1597.
9. Muthoharoh, D.F. dan A. dan Sutrisno. 2017. Pembuatan roti tawar bebas gluten berbahan baku tepung garut, tepung beras, dan maizena (konsentrasi glukomanan dan waktu proofing). 5(2):34–44.
10. Nikmah, M. F dan Rosidah. (2023). Pengaruh Substitusi Tepung Kacang Kedelai Terhadap Daya Terima Masyarakat Serta Kandungan Protein dan Serat Pangan Roti Bun. *Food Science and Culinary Education Journal*. FOCUZE Vol. 12 No.1 (2023)
11. Rosida, D. F., N. A. Putri., dan M. Oktafiani. (2020). Karakteristik Cookies Tepung Kimpul Termodifikasi (*Xanthosoma sagittifolium*) dengan Penambahan Tapioka. *Agrointek* Vol.14 No.1
12. Sariani, A., L. Suranadi., dan R. Sofiyatin. (2019). Pengaruh Substitusi Tepung Kedelai (*Glycine Max L.*) terhadap Sifat Organoleptik Soybeans Cookies. *Jurnal Gizi Prima* Vol.4 No.1
13. Valentim J, Afonso C, Gomes R, Gomes-Bispo A. Prates J, Bandarra M. N, Cardoso C (2024) Influence of cooking methods and storage time on colour, texture, and fatty acid profile of a novel fish burger for the prevention of cognitive decline: *Heliyon* 10:e27171