

Development of Function Well-Being Breads with Addition of Pigmented Rice Powder Using Sensory Evaluation

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Abstract: The present study aimed to promote health through the development of well-being breads by using pigmented rice powder and to be helpful in activating the local economy by enhancing the consumption of pigmented rice powder. The present study used the pigmented rice powder that was purchased on March 2018 at Kimjae in Chunbook Province. The survey for the pigmented rice powder well-being breads was performed from May 1-30 in the year of 2018 by subjecting 40 cooking major students and food specialists and frequency analysis was used for the statistical technique. For the questionnaire completion method, self-administration method was used. The results of the study are as follows. First, developed products are healthier than other products because they are dietary fiber and crude protein are excellent in moisture and low in lipid and saccharide. Second, in sensory analysis, green rice powder and red rice powder added bread showed high scores on flavor, texture, overall acceptability, showed higher than control group. The recognition results for low calorie well-being breads showed significantly high as the food for the prevention of adult disease which was followed by the food as diet and taste. Based on the questionnaire survey results, the development for green pigmented rice wellbeing bread (sponge cake), red pigmented rice well-being breads, sample products were performed along with the development for their processing techniques.

Key words: Function, well-being breads, pigmented rice powder, development, health through, questionnaire

INTRODUCTION

The life cycle of modern people gets shortened and purchase behavior is also changing with diverse pattern. Recently, customer's interest in healthy, nutritious and functional food is increasing with the well-being trend. Thus, bakery sector produces and sells many functional products that functional foods are added. Increases in general economic and income levels have resulted in changes.

One of main concerns of modern people is health. Healthy life is considered as the most important issue in life. In the diet, decreases in activity and increases in consumption of animal-source foods and flour, causing nutritional imbalance (Kim *et al.*, 2005) Industrial advancement increased the demand for bakery products as well as the consumption for the convenient foodstuff which is simple, increased. Moreover, whereas lack of nutrition was a problem in the past, today, we face excessive nutrition. Accordingly, illnesses such as obesity and other illnesses that afflict the adults are emerging as a social problem. As a solution measure, consumption of functional food is expected to alleviate chronic illnesses and illnesses that afflict adults. Likewise, there are many attempts to include functional food when producing convenient preferred food with extensive sweet

taste and fat substances (Park *et al.*, 2017). Pigmented rice is superb in terms of taste and it is good priced as well. It helps to treat obesity since it contains considerable amount of the substances that are very effective for treating illnesses that afflict adults. It contains significant amount of the substances of the body modulating function. Thus, it is effective for reducing plasma lipid concentration level arteriosclerosis and anti-oxidation. It also contains considerable vitamins, minerals and fibers. Fiber which is the representative function of the pigmented rice is characterized by significant moisture retention ability (Prior *et al.*, 2005)

Therefore, the present study aimed to promote health through the development of well-being breads by using pigmented rice powder and to be helpful in activating the local economy by enhancing the consumption of pigmented rice powder.

Study method

Study subject: Total 40 person (20 male, 20 female) in Gwangju who culinary major student and food specialist were selected. For questionnaire completion method, the self-administration method was used. For research tools to measure awareness and preference based on questions used by Choi and Jung (2006).

Data processing: For data analysis, the questionnaires with answers completed were collected, data with double entry or no-entry was excluded and valid samples were coded according to the guideline of coding. The coded data was input individually into the computer and then frequency analysis, Duncan's multiple range test ($p < 0.05$) was used to determine the difference among the treatment mean of SPSS Windows 18.0 Version statistical program.

Proximate composition: Compositional properties of red pigmented rice wellbeing bread and green pigmented rice wellbeing bread were performed using AOAC. Moisture content was determined by weight loss after 12 h of drying at 105°C in a drying oven (SW-90D, Sang Woo Scientific Co. Korea), Crude fat content was determined by soxhlet method with a solvent extraction system (Soxtec® Avati 2050 Auto System, Foss tecator AB, Sweden) and Crude protein was determine by Kjeldahl method with an automatic Kjeldahl nitrogen analyzer (Kjeltec®2300 Analyzer Unit, Foss Tector AB, Sweden), crude ash determined according to AOAC method 923.03. Dietary fiber and carbohydrate were determined with Standard procedures. Protein was estimated from total nitrogen using a conversion factor of 5.85.

Sensory evaluation: Sensory evaluations were performed using trained panelists. Recruitment, selection and training of panelists were performed according (Meilgaard *et al.*, 1999) and 40 panelists were chosen from 100 potential panelists using basic taste identification tests to sensory evaluation. Breads were cooked a $180 \pm 10^\circ\text{C}$ for around 1 h, air-cooled to $8-10^\circ\text{C}$ and cooked sample were cooled to room temperature at 21°C , cut into quarters and served to the panelists in random order. Sensory evaluations were performed by the panelists under fluorescent lightning (350 Lux). The cooked sample were evaluated using a 10-point descriptive scale (1 = Extremely undesirable, 7 = Extremely desirable).

MATERIALS AND METHODS

Pigmented rice was purchased from a farmer's association in Kimje City, Cheonbuk and used as a blender (Brown/Poland, MR-5550MFP). Strong flour (Daehan flourmills Co, Seoul, Korea, sugar (CJ Corp, Seoul, Korea), yeast (Jenic, Seoul, Korea), skim milk (Seoulmilk, Seoul, Korea), salt (Hanjusalt, Ulsan, Korea) were purchased from Gwangju Metropolitan City.

The preparation of pigmented rice well-being bread was made by AACC (Anonymous, 2014). The mixing ratio is as shown in Table 1 and the standard

Table 1: Formulas of green pigmented rice wellbeing bread (Sponge cake)

Ingredient	Quantity	Food photography
Egg yolk	320 g	
Egg whole	60 g	
Sugar	240 g	
Egg white	260 g	
Green rice powder	400 g	
Flour hard	150 g	
Baking powder	10 g	
Low fat milk	450 mL	
Olive oil	300 mL	

Table 2: Formulas of Red pigmented rice wellbeing bread

Ingredient	Quantity	Food photography
Red rice	300 g	
Flour hard	700 g	
Sugar	100 g	
Hamcho salt	20 g	
Egg whole	100 g	
Dry yeast	20 g	
Malt powder	5 g	
Water	650 mL	
Fermentation dough	200 g	
*Filling material		
Red rice	1k g	
Traditional soy sauce	10 mL	
Water	100 mL	
Brown sugar	50 g	
Cinnamon powder	20 g	
Red bean	100 g	
Chestnut	100 g	
Walnut	100 g	
Black sesame	20 g	
Sunflower seed	100 g	
Pea	50 g	

process is shown in. Table 2 shows the proportion of well-being bread using red rice shows the standard cooking process.

RESULTS AND DISCUSSION

Proximate compositions of green rice, red rice wellbeing breads: Table 3 shows the results of analyzing the general components of the pigments rice powder wellbeing breads according to Korean Food Standards Codex. The general composition analysis results for the green pigmented rice bread revealed to contain 12.56% of moisture, 1.12% crude ash, 9.76% of crude protein, 2.15% of crude fat, 10.30% of dietary fiber and 77.41% of carbohydrates. In case of red RRB: Green Rice well-being Bread, GRB: Green Rice well-being Bread rice, it revealed to contain 11.98% of moisture, 1.43% of crude ash, 10.07% of crude protein, 1.95% of crude fat, 11.96% of dietary fiber and 74.57% of carbohydrates. It shows superior characteristics in terms of nutritional components than other comparative groups. Therefore, according to the change of eating habits of modern people, it seems to be beneficial to the insufficient dietary fiber intake and it seems that it has fulfilled the functional condition as wellbeing bread (Fig. 1 and 2).

Table 3: Proximate composition of Green rice, red rice wellbeing bread and control group

Variables	Crude protein (%)	Dietary fiber (%)	Carbohydrates (%)	Crude fat (%)	Moisture (%)	Crude ash (%)
GRB	9.76±0.1 ^A	10.30±0.01 ^C	77.41±0.01 ^C	2.15±0.01 ^C	12.56±0.31 ^A	1.12±0.72 ^D
RRB	10.07±0.11 ^A	11.96±0.02 ^A	74.57±0.09 ^A	1.95±0.02 ^D	11.98±0.31 ^D	1.43±0.30 ^A
F1	9.12±0.05 ^B	5.82±0.04 ^B	79.82±0.05 ^B	6.30±0.12 ^B	9.18±0.32 ^C	1.10±0.21 ^A
F2	8.16±0.12 ^A	6.75±0.05 ^B	82.75±0.08 ^B	6.28±0.01 ^C	10.03±0.34 ^D	1.11±0.71 ^C

A-D: Means with different superscript in the same column significantly differ at p<0.05; GRB: Green Rice wellbeing Bread, RRB: Green Rice wellbeing Bread; F1~F2: The control group Breads (sold at a large mart by 2 different companies)

Table 4: Sensory evaluation of Green rice, red rice wellbeing breads and control group by different companies in Korean market

Sample	Color	Flavor	Taste	Texture	Overall preference
GRB	6.20±0.10 ^A	5.70±0.10 ^C	6.20±0.40 ^C	5.00±0.40 ^B	5.60±0.30 ^C
RRB	5.70±0.90 ^B	5.40±0.50 ^A	6.90±0.10 ^C	5.30±0.60 ^A	5.40±0.10 ^C
F1	5.20±0.20 ^C	5.30±0.80 ^B	4.40±0.50 ^C	4.80±0.30 ^B	4.80±0.40 ^B
F2	5.30±0.02 ^A	4.24±0.12 ^C	5.22±0.10 ^C	4.25±0.10 ^C	4.30±0.25 ^B
F-value	7.21*	3.37	1745**	4.05*	7.45*
p-value	0.005	0.053	0.000	0.033	0.005

A-D: Means with different superscript in the same column significantly differ at p<0.05; GRB: Green rice well-being Bread, RRB: Green rice well-being Bread; F1~F2: The control group breads (sold at a large mart by 2 different companies); Values are mean±SD. Values with different superscripts are significantly different (p<0.05) by Duncan's multiple range test; *p<0.05, **p<0.01

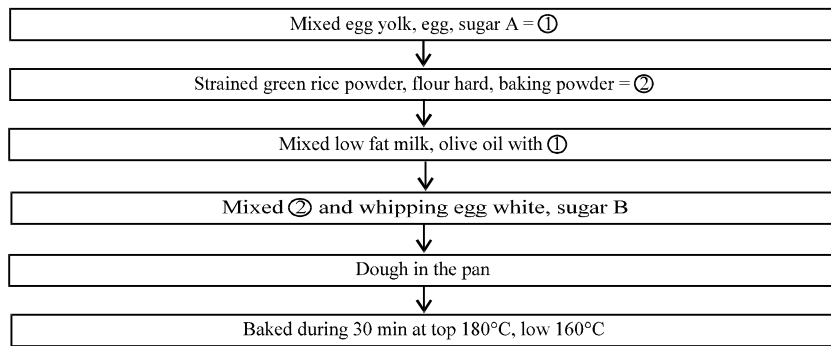


Fig. 1: Manufacturing process of green pigmented rice wellbeing bread (Sponge cake)

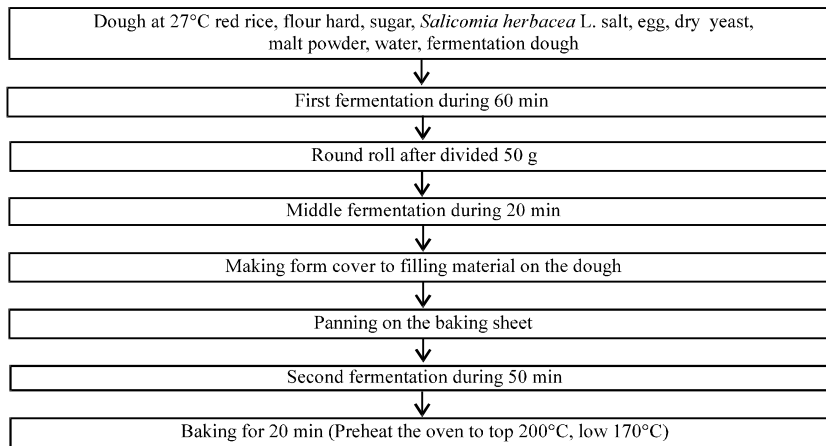


Fig. 2: Manufacturing process of red pigmented rice wellbeing bread

Sensory evaluation analysis of pigmented rice power well-being breads: Table 4 compares the sensory evaluation results of the well-being bread prepared by pigmented riced powder to the comparison group. In case of color, well-being bread with green rice showed the

highest score and it was higher than control group. Here, was no significant difference in flavor between the samples. The taste of green bread and well-being bread with red rice showed high scores. The texture score showed the highest score in the well-being bread with

green rice and the green rice well-being bread and the red rice well-being bread were higher than the control. In the sensory evaluation of this experiment, the well-being bread containing green rice powder and red rice powder was higher than the control group in taste, texture and overall acceptability.

CONCLUSION

The purpose of this study is to development of well-being breads using pigmentation rice powder. In addition, the developed product was compared with the commercial product and the sensory evaluation analysis was conducted. The results of the study through the above research process are as follows.

First, developed products are healthier than other products because they are dietary fiber and crude protein, are excellent in moisture and low in lipid and saccharide. The era of eating a lot of food has passed and the time has come to search for food that is beneficial to health. Therefore, it is necessary to develop a variety of products that are good for health.

Second, in sensory analysis, green rice powder and red rice powder added bread showed high scores on flavor, texture, overall acceptability, showed higher than control group.

Based on the questionnaire survey results, the development for green rice sponge cake, red rice well-being breads sample products were performed along with the development for their processing techniques.

Pigment rice has the value of developing various products as a food because it has high health functionalities. Therefore, it is desirable to develop products in the form of confectionery bakery using nutritionally excellent color pigments in accordance with the tendency of the next generation.

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