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Different factors affecting to sweet bread bakery

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Abstract
Bread is important parts of the diets of people in many countries, and when made from whole grains, only lacks a few essential nutrients. Our study investigates different factors affecting to sweet bread bakery. The results show that raw material wheat supplied from Dai Phong Co. Ltd can manufacture sweet bread with high nutrition and sensory characteristics. Dough moisture 40.13%, butter 8%, sugar 15%, yeast 1%, fermentation time 5 hours are main technical factors contributing to soft, fine, sponginess structure; yellow-brown color and delicious flavour of bread.

Keywords: wheat, dough, bread, nutrition, sensory

1. Introduction

Cereal grains and legumes play an important role in supplying the nutrients, as well as over 70% of the daily energy requirements, of over two-thirds of the world's population. Bread may be made from various cereals, grains, and legumes. Wheat, being the oldest cereal known to man is the most common. Today, wheat is the world's dominant cereal crop. Since bread and wheat products are such an important part of daily food consumption, it follows that such food items be healthy and wholesome. Many ingredients may be included in bread, in addition to the basic ingredients of flour, water, leavening, and salt, to increase its nutritional value. Many vitamins are sensitive to light, temperature, and moisture, so milling, processing, and storage conditions affect their stability. B vitamins are susceptible to destruction by heat. During baking, proteins are denatured, which implies that they lose their three-dimensional structure, and become easier to digest, and less activating energy is required for enzyme hydrolysis the crust, which undergoes more severe heating, has as a result, a lower amino acid availability due to the Maillard reaction.

There are several researches mentioned to the different factor affecting to bread bakery:

Ken J Quail et al., (1990) examine the effect of baking temperature/time conditions and dough thickness on arabic bread quality. A new scoring system for the evaluation of Arabic bread is presented which allows discrimination between flour samples. This system is suitable for the evaluation of bread in commercial bakeries. Dough thickness and baking temperature/time conditions were varied: doughs sheeted to <3.0 mm thick require baking temperatures higher than 500°C whereas doughs that are thicker than this will benefit from temperatures lower than 500°C. Thinner doughs baked at higher temperatures for shorter times produced better quality bread. The processing variables identified as being optimal in this study were incorporated into a test baking method. This method gave reproducible results and greater discrimination between flour samples than a previous method.

D. P. Puhr and B. L. D'appolonia (1992) investigated the effect of baking absorption on bread yield, crumb moisture, and crumb water activity. Bread was baked from this flour using both the straight dough and sponge and dough methods at five absorption levels with each system. From the two higher absorption flours, bread yield loss was greater with the sponge and dough procedure than with the straight dough method. As the absorption levels in the baking formula increased, an increased bread yield loss was noted. Total bread weights increased, an increased bread yield loss was noted. Total bread weights absorption flours. Bread crumb moisture, as determined by the two-step oven method, decreased over a four-day storage period. Water activity values for the bread crumb ranged from 0.995 to 0.975 in the study.

Costas G. Biliaderis et al., (1995) showed the effect of arabinoxylans on bread-making quality of wheat flours. Two highly purified arabinoxylan preparations of different molecular weight (HMW, [η] = 5.48 dl/g and LMW, [η] = 3.69 dl/g) were used to study the effect of these water-soluble polysaccharides on the bread-making quality of two wheat flours: a Canada western red spring (CWRS) composite sample and a Canada prairie spring (CPS), cv. HY 368.

Both preparations significantly increased the farinograph water absorption and the dough development time for the two flours; the HMW arabinoxylans exerted significantly ($P < 0.01$) greater effects than the LMW preparation. The HMW arabinoxylans maximally improved the loaf volume of CWRS and CPS breads at a level of 0.5% (w/w) supplementation. The LMW arabinoxylans maximally increased the loaf volume of CWRS and CPS breads at 0.7 and 1.1% (w/w), respectively. Breads containing HMW arabinoxylans retained significantly ($P < 0.01$) more water than the breads with LMW polymers at 0.5-0.9% (w/w) supplementation levels. Because of their higher moisture content the arabinoxylan-fortified breads exhibited a greater rate of starch retrogradation as assessed by calorimetry. Nevertheless, these breads had softer breadcrumbs than the controls; breads fortified (0.3-0.9% w/w) with HMW arabinoxylans were significantly ($P < 0.01$) less firm than those with LMW polymers over the 7-day storage period.

Keith R. Morgan et al., (1997) demonstrated the effect of antistaling α-amylase. A novel starch bread that contained no gluten was found to firm at a rate comparable to a normal standard bread made from wheat flour. Treatment of both the starch and the standard bread with Novamyl, an antistaling enzyme mix, inhibited firming. ^{13}C CP/MAS NMR studies showed that the decreased firming of the Novamyl-treated starch bread was correlated with decreased starch retrogradation. For the Novamyl-treated bread the increase in retrograded starch over six days following baking was about 11% compared to an increase of over 200% for the untreated bread. These results suggested that starch retrogradation was sufficient to cause bread firming.

P. Baardseth et al., (2000) examined the effects of bread making process and wheat quality on French baguettes. The quality of baguettes can be evaluated by defined sensory attributes and image analyses. The effect of flour quality, production process (traditional French and industrially modified), mixing and proofing time were studied. Process accounted for 40% of the variation in baguette quality whereas flour quality accounted for 16% of the variation when principal component analysis was applied on the sensory attributes. Baguettes produced using a soft dough and gentle treatment (traditional French process) had a higher sensory score for porosity, elasticity, crispness of crust, crackles on the crust, and porosity and volume as measured by image analysis, than baguettes produced using a stiff dough and rough treatment (modified industrial process). Mixing and proofing time also affected the porosity and area of the cut surface. Porosity, crackles on the crust, glossiness and volume were related to flour quality.

Pablo D. Ribotta et al., (2001) studied the effect of freezing and frozen storage of doughs on bread quality. The effects of freezing and storage in frozen conditions on bread quality, crumb properties, and aggregative behavior of glutenins were analyzed. The effect of different additives on bread quality was also studied. The results obtained showed that freezing and storage at −18 °C decreased the bread quality. Samples stored in frozen conditions supplemented with diacetyl-tartaric acid ester of monoglycerides, gluten, and guar gum produced breads of greater volume and more open crumb structure than those prepared with the base formulation (without additives). All additives analyzed increased the proof time. Crumb firmness increased with dough frozen storage and bread aging time at 4 °C. A decrease in the amount of gluten in subunits of high molecular mass was observed by electrophoresis analysis of the SDS-soluble proteins aggregates extracted from the frozen dough. This result suggested that the protein matrix of bread underwent depolymerization during storage in frozen conditions.

Hardeep Singh Gujral et al., (2003) studied the effect of cyclodextrinase on dough rheology and bread quality from rice flour. Gluten-free breads are usually characterized by deficient quality characteristics as compared to wheat breads. Problems related to volume and crumb texture are associated with gluten-free breads even when rice flour is used, which seems to be the best raw material for this type of bread. The potential use of cyclodextrin glycosyl transferase (CGTase) as a rice bread improver is presented. The effect of CGTase addition to rice flour on dough rheology and bread quality was investigated. In addition, an experimental design was developed to optimize the levels of CGTase, hydroxypropylmethylcellulose (HPMC), and oil. The addition of CGTase produced a reduction in the dough consistency and also in the elastic modulus. With regard to the rice bread quality, better specific volume, shape index, and crumb texture were obtained. The amount of cyclodextrins in the bread crumb was quantified to explain the action of this enzyme. The data indicate that the improving effect of the CGTase results from a combination of its hydrolyzing and cyclizing activities, the latter being responsible for the release of cyclodextrins, which have the ability to form complexes with lipids and proteins.

Anna Czubaszek, Zofia Karolini-Skaradziñska (2005) examined the effects of wheat flour supplementation with oat products on dough and bread quality. The aim of this research was to determine the effects of adding oat flour, bran and flake on the properties of wheat flour, wheat-oat dough and baked products. Two wheat flours of different quality were used in this study as test samples. Blends were made by replacing wheat flour with 5, 10, 15 and 20% of oat products. The blends were analysed for wet gluten content, sedimentation value, farinographic and extensigraphic parameters, and subjected to baking tests. Increases in the percentage of oat products in the blends were observed to be markedly responsible for decreases in the sedimentation value and quantity of wet gluten washed from the blends. Water absorption estimated using a farinograph increased as substitution with the oat product increased. The addition of oat products to weak-quality wheat flour (commercial wheat flour – CWF) extended the peak time. After adding oat products to strong flour (lab-milled flour – LMF), the time to breakdown was shortened. Unlike oat flour, the presence of oat bran and flakes in the dough was responsible for extending the peak time and had a better effect on dough extensibility measured by an extensigraph. Based on the evaluation of dough energy, it was shown that wheat-oat mixes containing 5 and 10% of oat products recorded average baking values. The same percentage of oat products brought about the improvement in loaf volumes baked with CWF, whereas baked products from strong flour (LMF) enriched with oats demonstrated a smaller volume and worse crumb structure than the wheat breads. Wheat-oat dough and bread containing 5 and 10% of oat products were characterised by fairly good quality, whereas oat flakes and bran exerted a more beneficial effect on their quality, compared to oat flour.

Mumtaz Shaheen et al., (2005) investigated the eeffect of rice bran supplementation on quality of bread. This project was designed to evaluate the suitability of processed and treated rice bran for the supplementation of bread. Freshly milled rice bran was treated with acetic acid and cooked by passing through an extruder cooker. The treated and extruded rice bran was supplemented @ 5, 10, 15, 20, 25 and 30% in wheat flour for the production of bread. The bread was analyzed for different physicochemical parameters and subjected to sensory evaluation. The results showed an increase in crude protein from 11.87 to 12.94%, crude fat from 3.64 to 8.63%, crude fiber 0.62 to 2.15% and ash 1.52 to 4.18%. The sensory evaluation showed significant ($P \leq 0.01$) differences in the scores for volume, color of crust, symmetry of form and character of crust. However, evenness of bake showed non-significant differences among various (PRB) breads. The breads supplemented with PRB @ 15% increased the sensoric scores. It can be concluded from the results that up to 15% PRB can be successfully incorporated in the bread to improve the sensoric and nutritional attributes.

Halina Gambuś et al., (2007) showed the effect of composition of hydrocolloids on properties of gluten-free bread. Sensory parameters of gluten-free bread depend on the amount and type of hydrocolloids used as gluten replacers, as this determines interactions between them and starch, which is the main component of dough. The evaluation of gluten-free breads supplemented with various amounts of guar gum, pectin and xanthan, proved that bread with addition of xanthan has higher volume in comparison with pectin-guar standard. Higher amount of xanthan resulted in a decrease of bread hardness on the day of baking and after 72 hours of storage. Bread baked with equal amounts of all hydrocolloids (recipe IV) displayed best quality parameters. The amount of free amylose in crumb extract depended on the extent of starch gelatinisation, influenced by proportions of pectin, guar gum and xanthan in the mixture of hydrocolloids.

A. Lazaridou et al., (2007) emphasized the effects of hydrocolloids on dough rheology and bread quality parameters in gluten-free formulations. The effect of hydrocolloids on dough rheology and bread quality parameters in gluten-free formulations based on rice flour, corn starch, and sodium caseinate (control) was studied; the hydrocolloids added at 1% and 2% w/w (rice flour basis) were pectin, carboxymethylcellulose (CMC), agarose, xanthan and oat β-glucan. The study on rheological behavior of the doughs containing hydrocolloids, performed by farinography and rheometry, showed that xanthan had the most pronounced effect on viscoelastic properties yielding strengthened doughs; addition of xanthan to the gluten-free formulation resulted in a farinograph curve typical of wheat flour doughs.

Mahmoud Abu-Ghoush et al., (2008) demonstrated the effect of preservatives addition on the shelf-life extensions and quality of flat bread as determined by near-infrared spectroscopy and texture analysis. The present study hypothesised that the addition of preservatives may be done in Arabic flat bread (AFB) to extend shelflife. Thus, objectives of this study were to evaluate selected preservatives to inhibit mould growth and to employ physical techniques, to monitor bread aging. Three preservatives, fumaric acid (0.2%, F), sodium propionate (0.3%, P), and sodium propionate-fumaric acid mixture (PF) were used. Tensile tests, and near infrared reflectance spectroscopy (NIRS) were used to monitor bread ageing. The addition of PF in the AFB formula significantly increased the time of tearing at 0 day. For all treatments, the NIRS results showed high R^2-values between the actual storage days and NIRS predictions. The NIRS and texture analysis are valuable tools to detect the effect of the preservatives on AFB shelf-life and quality.

Jelena Filipović et al., (2010) examined the effects of commercial fibres on frozen bread dough. The objective of this research was to analyze the influence of different commercial fibres (originating from sugar beet pulp fibrex, and Jerusalem artichoke inulin HPX and GR) in yeast dough at a level of 5 %, on the rheological properties of dough and the quality of bread during frozen storage. Frozen dough characteristics were determined using a Brabender maturograph and test baking was followed according the AACC procedure. The dough was frozen at –18 °C and stored over a period of 60 days. The results concerning the dough (proving time and stability) and bread quality (volume and crumb quality) were statistically analysed by multivariance Manova and discriminative analysis, which indicated that there was a significant difference between dough without fibres and dough with different fibres (fibrex, inulin HPX and GR). The discrimination coefficient points that the greatest influence of fibres on the final proof and proving stability is after 30 days (6.250) and after 0 days (6.158), respectively, but the greatest influence of fibres on bread volume and bread crumb quality (15.488 and 3.638, respectively) can be expected on no frozen dough, due to above mention their adverse the effect on gluten network.

Lorena S. Sciarini et al. (2010) assed the effect of hydrocolloids on gluten-free batter properties and bread quality. The objectives of this study were to assess the effect of the addition of different hydrocolloids on gluten-free batter properties and bread quality and to obtain information about the relationship between dough consistency and bread quality. Breads were made of rice, corn and soy flours and 158% water. Following hydrocolloids were added: carrageenan (C), alginate (Al), xanthan gum (XG), carboxymethylcellulose (CMC) and gelatine (Gel). Batter consistency, bread specific volume (SV), crumb analysis, crust colour, crumb hardness and staling rate were determined. Hydrocolloids increased batter consistencies: the highest value was obtained with XG, which doubled that of control batter, followed by CMC. Breads with hydrocolloid presented higher SV than control, especially with XG whose SV was 18.3% higher than that of control bread. A positive correlation was found between SV and batter consistency ($r = 0.94$; $P < 0.05$). Crumbs with Gel, XG and CMC presented higher cell average size. XG and CMC crumbs looked spongier. Breads containing hydrocolloid evidenced lighter crusts. Crumb firmness was decreased by XG and CMC addition, and staling rate was slower. Overall, XG was the hydrocolloid that most improved gluten-free bread quality. These results show that, in formulations with high water content, batter consistency is strongly associated with bread volume.

B.M. Smith et al., (2012) examined the effect of HPMC on the quality of wheat-free bread made from carob germ flour-starch mixtures. The purpose of this research was to optimize the production of wheat-free bread containing carob germ flour, corn starch, NaCl, sucrose, hydroxypropyl methylcellulose (HPMC), and H_2O. A key criterion was to formulate viscoelastic dough similar to wheat dough. To that end, response surface methodology (RSM) was used to determine optimal levels of carob germ flour, H_2O, and HPMC. Components varied as follows: 4.94%–15.05% for carob germ flour, 0.05%–3.75% HPMC, and 65.25%–83.75% H_2O (percents are on a flour basis, where carob germ flour in combination with maize starch equals 100%). Sucrose, NaCl, and yeast were held constant at 2%. Bread parameters evaluated were specific volume and crumb hardness, where the largest specific volume and the lowest value for crumb hardness were considered most desirable. The optimum formula as determined by RSM consisted of 7% carob germ flour, 93% maize starch, 2% HPMC, and 80% H_2O with predicted crumb hardness of ∼200 g of force and a specific volume of ∼3.5 cm^3/g. When proof time was optimized, a specific volume of ∼5.6 ml/g and crumb hardness value of ∼156 g of force was observed. Carob germ flour may be used as an alternative to wheat flour in formulating viscoelastic dough and high quality gluten-free bread.

Purpose of our research is to investigate the effect of different factors such as type of wheat, moisture, butter, sugar, yeast, fermentation time to bread quality.

2. Material & Method

2.1 Material

Raw material including wheat flour, sugar, salt, butter and yeast *Saccharomyces cerevisiae* are purchased in Tra Vinh province.

2.2 Research method

2.2.1 Experiment #1: Effect of wheat flour to bread quality

Experiment is randomly conducted with one factor and two replications. Factor B: kinds of wheat flour B1: Binh Dong, B2: Dai Phong, B3: Hong Ha.

Weigh exactly wheat flour, yeast, sugar, salt, additive and water, mix them together in 20 minutes. Then ferment dough in 6 hours, bake at 140^0C in 10 minutes. After baking, bread is covered in polyethylene bag.

Checking parameters: Sensory, swelling (rise), moisture, sponginess

2.2.2 Experiment #2: Effect of water supplementation to bread quality

Experiment is randomly conducted with one factor and two replications. Factor N: water with four levels from N1 = 500ml, N2= 550ml, N3=600ml, N4 =650ml. Preparations are performed as above with exception of water volume 500-650ml.

Checking parameters: Sensory, swelling (rise), moisture, sponginess

2.2.3 Experiment #3: Effect of butter supplementation to bread quality

Experiment is randomly conducted with one factor and two replications. Factor C: butter supplementation with four levels, C_1: 4%, C_2: 6%, C_3: 8%, C_4: 10%. Preparations are performed as above with exception of butter weight 4%-10%.

Checking parameters: Sensory, swelling (rise), moisture, sponginess

2.2.4 Experiment #4: Effect of sugar, yeast supplementation to bread quality

Experiment is randomly conducted with two factors and two replications. Factor D: sugar supplementation with three levels: Đ1: 10%, Đ2:15%, Đ3: 20%. Factor M: yeast supplementation with three levels: M1: 0.5%, M2: 1%, M3: 1.5%.

Checking parameters: Sensory, swelling (rise), moisture, sponginess

2.2.5 Experiment #5: Effect of fermentation time to bread quality

Experiment is randomly conducted with one factor and two replications. Factor T: fermentation time, T_1: 4h, T_2: 5h, T_3: 6h, T_4: 7h.

Checking parameters: Sensory, swelling (rise), moisture, sponginess

2.3 Testing method

Table 1: Chemical testing analysis

No	Criteria	Method
1	Moisture	Drying at 105 ^{0}C to basic weight
2	Total protein	Kjeldahl method
3	Lipid	Soxhlet (indirect) method
4	Total sugar	Lane-Eynon method
5	Sponginess	By measuring % fluid passed bread core
6	Swelling	Water rise up during fermentation

Table 2: Sensory evaluation

Criteria	Score	Requirements
Color	5	Yellow –brown, shimy, uniformed, specific
	4	Yellow –brown, quite uniformed
	3	Rather dark, slightly dark, not uniformed, not shimy
	2	Dark or white, white dotted or dark-brown
	1	Dark-brown, burned
Structure	5	Fine, soft, swell, sponginess
	4	Fine, rather soft, rather swell and rather sponginess
	3	Less fine, rather hard, less swell, less sponginess
	2	Not fine, hard, not swell, not sponginess
	1	Callous
Aroma	5	Fragant, butter smell and milk, specific
	4	butter smell and milk, specific
	3	Slight butter smell and milk, less specific
	2	Less fragant, slight bad smell of mold
	1	Less fragment, bad smell of mold, strange smell
Taste	5	Sweet, fatty, harmonius, after-taste
	4	Sweet, fatty, harmonius
	3	Sweet, less fatty, harmonius
	2	Too sweet or too insipid, not fatty
	1	Strange taste

2.2 Statistical analysis

Use Microsoft Excel 2003 at 95% confidence level and Statgraphics software.

3. Result & Discussion

3.1 Experiment #1: Composition in wheat flour

Table 3: Composition in wheat flour

Name	Moisture (%)	Protein (%)	Lipid (%)	Glucid (%)	Gluten (%)
Binh Dong	9.01	10.06	5.88	50.9	31.19
Dai Phong	9.02	11.81	6.96	53.40	44.25
Hong Ha	9.26	11.55	5.6	53.40	36.60

Table 4: Swelling and cost of wheat flour

Name	Swelling	Production cost (VND/kg)
Binh Dong	1.35^c	5.100
Dai Phong	1.17^a	5.300
Hong Ha	1.23^b	6.000

From table 3 & 4, we see Dai Phong wheat flour has high gluten content contributing to good structure, color, aroma and taste of bread at 5% significant difference. So we choose this flour for further experiments.

Table 5: Sensory evaluation for wheat flour

Sample	Name	Structure	Color	Aroma	Taste
B1	Binh Dong	3.10^{a}	3.00^{a}	3.10^{a}	3.95^{a}
B2	Dai Phong	3.95^{b}	3.65^{b}	3.75^{b}	3.85^{a}
B3	Hong Ha	2.95^{a}	3.20^{ab}	3.20^{a}	3.80^{a}

Table 6: Effect of moisture to swelling and sponginess of dough

Sample	Water (ml)	Moisture (%)	Swelling	Sponginess (%)
N1	500	39.35	0.96^{a}	63.33^{a}
N2	550	41.30	1.05^{b}	65.33^{b}
N3	600	43.14	1.35^{d}	70.33^{d}
N4	650	44.86	1.11^{c}	68.33^{c}

3.2 Experiment #2: Effect of moisture to swelling and sponginess of dough

Table 7: Sensory evaluation by moisture of dough

Sample	Water (ml)	Moisture (%)	Structure	Color	Aroma	Taste
N1	500	39.35	1.85^{a}	2.20^{a}	1.95^{a}	3.25^{a}
N2	550	41.30	2.25^{a}	2.25^{a}	2.85^{b}	3.35^{ab}
N3	600	43.14	3.95^{b}	4.10^{b}	3.95^{c}	3.75^{b}
N4	650	44.86	3.05^{c}	3.15^{c}	3.25^{b}	3.60^{ab}

Sample with moisture content 43.14% is suitable for further experiments.

3.3 Experiment #3: Effect of butter supplementation to bread quality

Table 8: Sensory characteristics of bread by butter supplementation

Sample	Butter (%)	Structure	Color	Aroma	Taste
C1	4	2.15^{a}	3.15^{b}	2.70^{a}	2.25^{a}
C2	6	3.30^{b}	3.65^{c}	3.30^{b}	3.35^{c}
C3	8	4.10^{c}	4.05^{c}	4.10^{c}	3.80^{d}
C4	10	3.90^{c}	2.70^{a}	3.90^{c}	2.70^{b}

Table 9: Effect of butter concentration to moisture, swelling, and sponginess of dough

Sample	Butter (%)	Moisture (%)	Swelling	Sponginess (%)
C1	4	30.13^{a}	1.64^{d}	80.33^{d}
C2	6	33.25^{b}	1.41^{c}	76.33^{c}
C3	8	38.41^{c}	1.23^{b}	70.33^{b}
C4	10	42.63^{d}	1.05^{a}	64.33^{a}

From table 9, the more butter supplementation is; the moisture, swelling and sponginess are lower. At butter concentration 8%, bread has the appropriate swelling and sponginess in soft and high sensory characteristics at 5% significant difference. So we choose this value for further researches.

3.4 Experiment #4: Effect of sugar and yeast supplementation to bread quality

Table 10: Sensory characteristics of bread by different sugar and yeast ratios

Sugar (%)	Yeast (%)	Structure	Color	Aroma	Taste
10	0.50	3.75^{d}	3.70^{d}	3.70^{e}	2.10^{b}
	1.00	3.55^{cd}	3.75^{d}	3.50^{cd}	1.95^{ab}
	1.50	2.70^{a}	2.60^{a}	3.25^{bcd}	1.75^{a}
15	0.50	3.35^{bcd}	3.50^{bcd}	3.10^{bc}	3.55^{cd}
	1.00	4.25^{e}	4.40^{e}	4.30^{f}	4.25^{e}
	1.50	3.00^{ab}	3.15^{b}	3.40^{cd}	3.65^{d}
20	0.50	2.95^{ab}	2.55^{a}	2.50^{a}	2.10^{ab}
	1.00	3.75^{d}	3.65^{cd}	3.50^{cd}	3.15^{c}
	1.50	3.15^{bc}	3.25^{bc}	2.90^{ab}	3.45^{cd}

Table 11: Effect of sugar and yeast supplementation to moisture, swelling, and sponginess of dough

0	Yeast (%)	Swelling	Sponginess (%)	Moisture (%)
10	0.50	1.23^{d}	68.50^{c}	35.41^{d}
	1.00	1.41^{f}	75.33^{c}	33.18^{b}
	1.50	1.64^{g}	81.16^{f}	30.16^{a}
15	0.50	1.05^{b}	64.66^{b}	38.50^{e}
	1.00	1.23^{d}	69.66^{d}	35.69^{d}
	1.50	1.35^{e}	75.33^{e}	33.56^{c}
20	0.50	0.94^{a}	63.33^{a}	40.12^{f}
	1.00	1.05^{b}	65.33^{b}	38.72^{e}
	1.50	1.17^{c}	68.33^{c}	33.33^{bc}

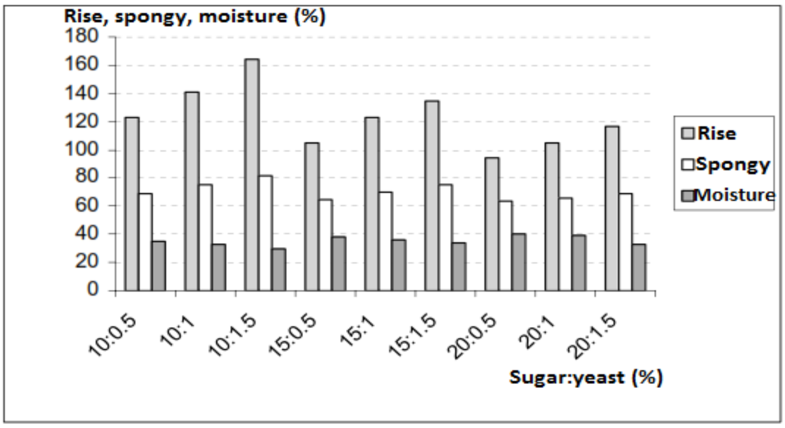

Fig 1: Swelling, sponginess and moisture by sugar and yeast supplementation

From table 11, the more sugar concentration we use; the less sponginess and the more moisture of dough we get. However if we use more yeast, the bread swelling will be higher also. At 15% sugar and 1% yeast, there is not significantly different with other samples. So we choose these values for further experiments.

3.5 Experiment #5: Effect of fermentation time to bread quality

Table 12: Effect of fermentation time to bread moisture, swelling.

Sample	Fermentation time	Swelling	Moisture (%)	Sponginess (%)
T1	4h	1.05[a]	38.72[d]	66.33[a]
T2	5h	1.35[c]	35.82[c]	74.33[c]
T3	6h	1.41[d]	35.42[b]	75.33[c]
T4	7h	1.16[b]	30.00[a]	69.33[b]

Table 13: Sensory characteristics of bread by fermentation time

Sample	Fermentation time	Structure	Color	Aroma	Taste
T1	4h	1.90[a]	2.95[a]	3.00[b]	3.20[a]
T2	5h	4.05[c]	4.25[c]	3.90[c]	3.05[a]
T3	6h	3.70[c]	4.10[c]	4.10[c]	2.95[a]
T4	7h	2.35[b]	2.30[b]	2.30[a]	2.90[a]

From table 12 & 13, fermentation time is defined at 5 hours which is appropriated to produce sweet bread.

Table 14: Compositions in sweet bread

No	Criteria	Average (%)
1	Moisture	35.12
2	Protein	7.96
3	Lipid	2.23
4	Glucid	42.66

4. Conclusion

This research finds out some basic technical parameters for bread bakery such as wheat material, moisture, butter, sugar, yeast and fermentation time to bread quality. We recommend further studies temperature and time of baking; preservation method to get the highest sweet bread product.

5. Reference

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