STUDY OF PHYSICOCHEMICAL PROPERTIES AND SENSORY EVALUATION OF WHITE BREAD USING THREE BRANDS OF COMMERCIAL IMPROVER

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AUTHOR DECLARATION

In the Name of Allah, The Most Beneficent, The Most Merciful

I hereby declare that I am the author of this thesis titled "Study of Physicochemical Properties and Sensory Evaluation of White Bread Using Three Brands of Commercial Improver" and this is an original work of my own except for quotations, abbreviations, and summaries, which have been duly acknowledged.

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ABSTRAK

Dalam usaha untuk mengkaji pengaruh tiga jenama ibu roti komersial yang bertujuan untuk menilai perbezaan dalam fungsi mereka dan menilai kesannya terhadap kualiti produk dan penerimaan, penilaian terhadap kesan kualiti tepung dan teknik pembakaran kepada ciri-ciri fizikokimia dan sensorik roti putih telah dibuat. Kesan ibu roti komersial telah dipantau pada roti yang dihasilkan daripada tepung dengan kandungan gluten yang berbeza dan satu kajian perbandingan antara sampel – sampel roti telah dijalankan dengan menggunakan teknik "Autolyse" dan "Straight dough".

Sifat-sifat fizikokimia mendapati bahawa roti yang boleh diterima boleh dihasilkan dari kedua-dua tepung serba guna dan tepung yang bergluten tinggi menggunakan mana-mana tiga ibu roti komersial, dengan jenama ibu roti A menunjukkan prestasi terbaik dalam ciri-ciri sampel roti. Hasil kajian membuktikan bahawa penggunaan ibu roti bergantung kepada jenis tepung, dan impak positif semakin meningkat dengan penggunaan tepung yang lebih berkualiti, di mana tepung bergluten tinggi menghasilkan roti yang lebih baik.

Untuk teknik pembakaran, sampel roti yang menggunakan teknik Autolyse menunjukkan hasil yang lebih baik dari segi parameter fizikokimia dan lebih diterima dalam ujian pengguna, berbanding sampel roti yang menggunakan teknik Straight dough. Teknik pembakaran Autolyse telah menghasilkan sampel roti yang lebih ringan, dengan isipadu spesifik yang lebih tinggi, serta mampu mengekalkan kelembapan roti dengan lebih baik, dan ini lebih mendatangkan kepuasan baik kepada pengeluar mahupun pengguna.

Bagi sampel Autolyse, berat sampel adalah di antara 489.43 sehingga 499.80 g manakala berat sampel Straight dough adalah di antara 605.93 sehingga 609.57 g. Sementara isipadu spesifik setiap sampel adalah diantara (3.96 sehingga 4.03) bagi sampel Autolyse, dan di antara (2.85 sehingga 3.00) bagi sampel doh lurus. Ujian pengguna mendapati bahawa pengguna lebih gemar roti Autolyse, sebagaimana hasil indeks penerimaan menunjukkan skor di antara 67.91 sehingga 70.35% bagi sampel Autolyse, dan 63.57 sehingga 69.17% untuk sampel Straight dough.

Berdasarkan hasil kajian, terbukti bahawa penggunaaan ibu roti adalah penting dalam pembuatan roti, manakala ibu roti bergantung kepada jenis tepung dan menunjukkan kesan yang lebih positif dengan penggunaan tepung yang lebih berkualiti. Metode pemprosesan juga amat mempengaruhi kualiti roti yang dihasilkan kerana tepung bergluten tinggi menghasilkan roti yang lebih baik berbanding tepung serbaguna, dan teknik Autolyse mengahsilkan roti yang memenuhi citarasa pengguna.

ABSTRACT

In order to study the influence of three brands of commercial bread improver aimed at evaluating differences in their functionality and assess their impact on product quality and acceptance, the effect of flour quality and baking technique on the physicochemical and sensory characteristics of white bread were assessed. The effect of commercial improver were monitored on bread produced from flour with different gluten strength and a comparative study between bread samples prepared using Autolyse technique and Straight dough samples was conducted.

The physicochemical properties revealed that acceptable bread could be produced from both all-purpose and high gluten flour using any of the three commercial improvers with brand A improver exhibiting the best performance in the characteristics of the bread samples. It was evidenced from the result that improver usage was flour dependent and had higher positive effect on quality flour as high gluten flour produced better output.

For the baking technique, Autolyse samples showed better result in the physicochemical parameter tested and were more acceptable in the consumer test compared to Straight dough baked samples. Autolyse samples were lighter in weight, had greater specific volume and retained moisture better which implies better satisfaction to both producer and consumers of bread. The weight values were in the range of 489.43 to 499.80 g and 605.93 to 609.57 g, specific volume ranges between(3.96 to 4.03) and (2.85 to 3.00) for Autolyse and Straight dough baked loaves respectively. The consumer test indicated that consumers preferred the Autolyse bread as the outcome of the index of acceptability revealed score between 67.91 to 70.35% and 63.37 to 69.17% for Autolyse and Straight dough samples respectively.

It was evidenced from the results that the usage of commercial improver is significant in bread production, improvers were flour dependent and have higher positive effect on quality flour, and processing method greatly influenced bread quality as high gluten flour gave better output over all-purpose flour and Autolyse samples produced quality bread that gained consumer preference.

MULAKHKHAS AL-BATH

ملخّص البحث

هذا العمل يهدف لدراسة تأثير ثلاث أنواع تجارية من محسنات الخبز على جودة المنتج ودرجة قبوله. وكذلك تم تقييم تأثير جودة الدقيق وتقنية اعداد الخبز على الخصائص الفيزيائية والحسية للخبز الأبيض. من ناحية اخرى تم كذلك مراقبة تأثير المحسنات التجارية على صلابة الخبز وحفاظه على قوامه. وقد تم كذلك اجراء مقارنة تبين تأثير طريقتين مختلفتين لاعداد الخبز على المنتج النهائي.

دراسة الخصائص الفيزيائية والكيميائية للخبز أظهرت أن المنتج الجيد يمكن انتاجه بأحد الطريقتيين المستخدمتين وبدقيق ذو محتوى بروتين عالي بغض النظر عن نوع المحسن المستخدم. النتائج ايضا أظهرت أن استخدام المحسنات يظهر تأثيره الايجابي على المنتج باستخدام دقيق عالي الجودة كما هو الحال بالنسبة لاستخدام الدقيق ذو محتوى بروتيني عالي فكلاهما يؤدي لتحسين المواصفات النهائية للمنتج.

بالنسبة لطريقة الاعداد, العينات المعدة بالطريقة الغير تقليدية اظهرت نتائج افضل في اختبار المعاملات الفيزيائية والكيميائية وكذلك قبول اكثر من ناحية الطالب مقارنة بالطريقة التقليدية. تحليل العينات لكلا الطريقتين اعطى النتائج التالية, وزن العينات المعدة يتراوح بين 489.43 جم الي 499.80 جم و 605.93 جم الي 609.57 جم , بينما حجم العينات بين (3.96 الي 4.03) و (2.85 الي 3.00) بالنسبة للطريقة الغيرتقليدية و التقليدية, على التوالي. كما أشار اختبار المستهلك أن المستهلكين يفضلون الخبز المعد بالطريقة الغير تقليدية. ووفقا لنتائج احصائية لمؤشر القبول كشفت النتيجة أن بين 67.91 الي 70.35% يفضلون المنتج المعد بالطريقة الغير تقليدية, بينما 63.57 الي 69.17% للخبز التقليدي.

لقد أثبتت نتائج هذه الدراسة أن استخدام المحسن التجاري له تأثير فعال في إنتاج الخبز. تأثير المحسن له علاقة بجودة الدقيق المستخدم وله فعالية كبيرة على المنتج. طريقة الاعداد ايضا له تأثير كبير على جودة الخبز كماأن الدقيق ذو المحتوى البروتيني العالي يساعد على تحسين المنتج في كل الاحوال. اخيرا النتائج ايضا توضح ان الخبز المعد بالطريقة الغير تقليدية اسهم في تحسين المنتج وحيازة رضا المستهلك.

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LIST OF ABBREVIATIONS AND SYMBOLS

a*	Redness
AACC	Association of American Cereal Chemists
ANOVA	Analysis of Variance
AOAC	Association of Official Analytical Chemists
Aw	Water Activity
b*	Yellowness
°C	Degree Celsius
CBI	Commercial Bread Improver
cm	Centimeters
$C_6H_{12}O_6$	Glucose
C_2H_5OH	Alcohol
CO_2	Carbon dioxide
FAO	Food and Agriculture Organisation
g	Grammes
H_2O	Water
IA	Index of Acceptability
IARC	International Agency for Research
KB	Potassium Bromate
Kcal	Kilocalories
Kg	Kilograms
L*	Lightness
O_2	Oxygen
RTE	Ready-to-Eat
SV	Specific Volume
VOL	Volume
WHO	World Health Organisation