UNIVERSITI PUTRA MALAYSIA

EFFECTS OF GLAZES ON THE KEEPING QUALITY OF BREAD

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By

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EFFECTS OF GLAZES ON THE KEEPING QUALITY OF BREAD

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May 2010

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Faculty : Engineering

This work describes a study on the effects of different glazes on the keeping quality of bread in term of its crumb and crust properties. Four types of glazes which are corn starch, egg white, skim milk and shortening with four concentrations, i.e., 20%, 30%, 50% and 70% were applied on sweet bun surfaces to determine their effect on staling during six days of storage.

The bread staling was measured in term of firmness, moisture content and water activity of crumb and crust. The corn starch, egg white and skim milk were found significantly reducing crumb firmness with no effect by the concentrations used. The egg white and skim milk is moderately retaining moisture content of the crumb while egg white showed the lowest crumb water activity compared to other glazed bread. The effect of varying concentrations of glaze materials shows that only shortening showed significant (p<0.05) different effects on crumb firmness. Bread glazed with corn starch (p<0.05)
affected crumb moisture content whereas all the glaze materials except corn starch significantly (p<0.05) affected crumb water activity.

For the crust, shortening gave poor effect to the crust firmness since they have lower firmness compared to other glazes and unglazed bread. As glazes, corn starch and egg white probably able to prevent the growth of mold because they have lower water activity value compared to control bread. All the glaze materials give significant (p<0.05) effect on crust firmness and water activity when used at different concentrations while for the moisture content the effect is contradictory. The firming rate of crust is generally lower than the crumb despite the record of highest crumb firming rate detected when using 30% concentration of glazes.

In the two-way ANOVA, concentrations of glazes was found to be not significant to both crumb and crust firmness although the types of glazes displayed significant (p<0.05) effects to crumb and crust firmness. While for moisture content and water activities it is contradictory. In conclusion, the results show that application of glaze materials was able to slow down bread staling as well as improve the bread quality. The corn starch, egg white and skim milk were significant as glaze materials due to their capability in reducing crumb firmness and increase crust hardness. The effect on the moisture content and water activity of crumb and crust was not as clear as those to firmness when evaluating the glazing effects by comparing with the unglazed breads. Effectiveness of glazes in reducing staling rate of bread is within 5 – 49% compared to control.
Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

KESAN BAHAN-BAHAN PENGILAT TERHADAP KUALITI PENYIMPANAN ROTI

Oleh

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Penyelidikan ini menggambarkan kajian terhadap kesan bahan-bahan pengilat yang berbeza terhadap sifat-sifat semasa penyimpanan dan kualiti roti dari segi sifat isi dan kerak. Empat jenis bahan pengilat iaitu tepung jagung, telur putih, susu tanpa lemak dan lemak sayuran dengan empat kepekatan iaitu 20%, 30%, 50% dan 70% disapu pada permukaan roti manis untuk menentukan kesan mereka ke atas kerosakan semasa enam hari tempoh penyimpanan.

Kerosakan roti diukur dari segi kepadatan, kelembapan dan aktiviti air isi dan kerak roti. Tepung jagung, telur putih and susu tanpa lemak adalah signifikan dalam mengurangkan kepadatan isi roti tanpa pengaruh kepekatan yang digunakan. Telur putih dan susu tanpa lemak adalah signifikan dalam mengekalkan kelembapan isi roti sementara telur putih memberi aktiviti air isi roti yang paling rendah dibandingkan dengan roti yang disapu pengilat lain. Kesan daripada mempelbagaikan kepekatan bahan pengilat menunjukkan
hanya lemak sayuran yang telah menunjukkan kesan perbezaan yang signifikan (p<0.05) ke atas kepadatan isi roti. Roti yang disapu dengan tepung jagung (p<0.05) memberi kesan ke atas kelembapan isi roti sedangkan semua bahan-bahan pengilat kecuali tepung jagung secara signifikan (p<0.05) mempengaruhi aktiviti air isi roti.

Bagi kerak roti, lemak sayuran kurang memberi kesan kepada kepadatan kerak kerana mempunyai kepadatan yang lebih rendah dibandingkan dengan kesan bahan-bahan pengilat yang lain dan roti yang tidak disapu pengilat. Sebagai pengilat, tepung jagung dan telur putih mungkin mampu menghalang pertumbuhan kulat kerana mereka memberi kesan aktiviti air yang lebih rendah dibandingkan dengan roti kawalan. Semua bahan pengilat memberi kesan yang signifikan (p<0.05) ke atas kepadatan kerak dan aktiviti air apabila digunakan pada kepekatan yang berbeza manakala kesannya terhadap kelembapan adalah berlawanan. Kadar kepadatan kerak umumnya lebih rendah daripada isi walaupun rekod kadar kepadatan isi yang paling tinggi dikesan apabila menggunakan 30% kepekatan pengilat.

Dalam analisis ANOVA dua hala, kesan kepekatan bahan-bahan pengilat didapati tidak signifikan terhadap kedua-dua kepadatan isi dan kerak walaupun jenis-jenis bahan pengilat menunjukkan kesan yang signifikan kepada kepadatan isi dan kerak roti (p<0.05). Sementara bagi kelembapan dan aktiviti air, kesannya adalah disebaliknya. Sebagai kesimpulannya, keputusan menunjukkan bahawa aplikasi bahan-bahan pengilat mampu memperlahankan kerosakan roti seterusnya meningkatkan kualiti dan jangka hayat roti. Tepung jagung, telur putih dan susu tanpa lemak adalah signifikan sebagai bahan pengilat berikut kebolehan mereka dalam mengurangkan kepadatan isi roti dan
meningkatkan kepadatan kerak roti. Kesan ke atas kelembapan dan aktiviti air isi dan kerak roti adalah tidak sejelas kepadatan apabila nilai kesan bahan pengilat apabila dibandingkan dengan roti yang tidak disapu pengilat, kelembapan kerak roti dan aktiviti air kerak dan isi roti sementara mengekalkan kepadatan kerak dan kelembapan isi roti. Keefektifan bahan-bahan pengilat dalam mengurangkan kadar kerosakan adalah dalam 5-29% dibandingkan dengan roti kawalan.
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I certified that a Thesis Examination Committee has met on 31 May 2010 to conduct the final examination of Rohaiza binti Abdullah on her thesis entitled “Effects of Glazes on the Keeping Quality of Bread” in accordance with the Universities and University College Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Master of Science.

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

______________________________
ROHAIZA ABDULLAH

Date: 31 May 2010
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