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Sekian, terima kasih.

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Tarikh

EFFECT OF RICE BRAN WAX-RICE BRAN OIL OLEOGEL ON THE RHEOLOGY, TEXTURE AND THERMAL PROPERTIES OF BUTTER CAKE

By

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DECLARATION BY AUTHOR

This dissertation is composed of my original work and contains no material previously published or written by another author person except where due to the reference has been made in the text. The content of my dissertation is the result of work I have carried out since the commencement of my research project and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution.

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(SITI RAFEEQAH BINTI SH ROSLEE)

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TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

KESAN OLEOGEL DARI LILIN DEDAK BERAS-MINYAK DEDAK BERAS PADA SIFAT RHEOLOGI, TEKSTUR DAN TERMAL KEK MENTEGA

ABSTRAK

Objektif utama penyelidikan ini adalah untuk mengkaji kesan kepekatan berlainan lilin dedak beras-minyak dedak beras (LDB-MDB) sebagai pengganti lemak padat pada sifat reologi, termal dan tekstur kek mentega. Adunan kek yang mengandungi 100% marjerin dianggap sebagai sampel kawalan. Semua sampel oleogel disediakan dengan memasukkan lilin dedak beras (LDB) ke dalam minyak dedak beras (MDB) dengan komposisi 0.5 b/b%, 1 b/b%, 3 b/b% dan 5 b/b%. Campuran ini dipanaskan pada suhu 90 °C diikuti dengan proses penyejukan yang cepat hingga 20 °C dengan kacauan berterusan. Campuran ini kemudian dicampurkan dengan bahan lain untuk penghasilan kek mentega. Semua adunan menunjukkan sifat penipisan ricih ketika kelikatannya menurun dengan peningkatan kadar ricih. Pekali konsistensi adunan oleogel LDB-MDB jauh lebih rendah sebanyak 15.1 % daripada sampel kawalan. Walau bagaimanapun, indeks konsistensi adunan meningkat hingga 80.77 % dengan peningkatan kepekatan oleogel LDB-MDB berbanding sampel kawalan. Dalam semua sampel, nilai modulus penyimpanan G′ memberikan nilai sedikit lebih tinggi daripada nilai modulus kehilangan G, yang menunjukkan bater bersifat gel lembut. Penggantian lemak pepejal dengan adunan berasaskan oleogel LDB-MDB mengubah permulaan dan suhu puncak serta entalpi agar-agar. Permulaan suhu dan suhu puncak meningkat dengan ketara dengan peningkatan kepekatan oleogel. Kualiti kek diukur melalui isipadu, tekstur dan warna. Bateri yang mengandung 0.5 b/b% oleogel LDB-MDB adalah yang paling menjanjikan sebagai penggantian lemak padat kerana adunan ini memberikan nilai kekerasan terendah kerana nilai isipadu yang lebih tinggi.

EFFECT OF RICE BRAN OIL WAX-RICE BRAN OIL OLEOGEL ON THE RHEOLOGY, TEXTURE AND THERMAL PROPERTIES OF BUTTER CAKE

ABSTRACT

The main objective of this research is to investigate the effect of different concentration of rice bran wax-rice brain oil (RBX-RBO) oleogel as a solid fat replacer on the rheological, thermal and textural properties of butter cake. The cake batter contained 100% margarine was considered as the control sample. All the oleogel samples were prepared by incorporating the rice bran wax (RBX) into rice bran oil (RBO) with the composition of 0.5 w/w%, 1 w/w%, 3 w/w% and 5 w/w%. This mixture was heated at 90°C followed by a rapid cooling process until 20°C with continuous stirring. This mixture was then mixed with other ingredients for butter cake production. All the batter showed shear-thinning behaviour as the viscosity decreased with increasing shear rate. The consistency coefficient of the RBX-RBO oleogel batter was significantly lower by 15.1 % than control sample. However, the consistency index of the batter increased up to 80.77% with increasing concentration of RBX-RBO oleogel. In all samples, the storage modulus G′ values were slightly higher than the loss modulus G″ values, revealing the behavior of a soft gel. The solid fat replacement by RBX-RBO oleogel based batter changed the onset and peak temperature as well as enthalpy of gelatinization. The onset and peak temperature were significantly increased with increasing concentration of the oleogel. The qualities of the cake were measured through volume, texture and colour. Batter containing 0.5 w/w% of RBX-RBO oleogel is the most promising as solid fat replacement because its batter gave the lowest hardness value due to the higher specific volume value.