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**EFFECT OF FOAMING PROPERTIES OF DEFATTED RICE BRAN ON
RHEOLOGICAL AND BAKING PROPERTIES OF EGGLESS CAKE IN
COMPARISON WITH EGG WHITE**

by

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LIST OF ABBREVIATIONS

Abbreviation	Caption
τ	Shear stress
γ	Shear rate
η	Viscosity
Ω	The angular velocity of spindle
μm	Micrometre
μm^2	Square Micrometre
$^{\circ}\text{C}$	Degree Celsius
%	Percent
Δt	The time interval, Δt (30 min)
ΔV	The change in the volume of foam
50% DRB	50% of defatted rice bran
100% DRB	100% of defatted rice bran
AACC	American Association for Clinical Chemistry
ANOVA	Analysis of Variance
AOAC	Association of Official Analytical Chemists
cm	Centimetre
cm^2	Square Centimetre
cm^3	Cubic Centimetre
D_2	The density of the water
DPD	Dedak padi dinyahlemak
DPS	Dedak padi terstabil
DRB	Defatted rice bran
dyne-cm	Dynes Centimetre
dynes/cm^2	Dynes per cube centimetre

EW	Egg white
g	Gram
g/cm ³	Gram per Cubic Centimetre
GC	Gas Chromatography
h	Hour
H	The emulsion stability percent
H ₀	The initial height of batter transfer into the tube
H ₁	The height of stable emulsion remained after centrifugation
HCl	Hydrochloric Acid
HPLC	High Performance Liquid Chromatography
kg	Kilogram
kg/m ³	Kilogram per cubic metre
KPDP	Konsentrat protein dedak padi
L	The effective length of spindle
M	Molarity
M	The torque input by instrument
min	Minutes
ml	Millimetre
mm/s	Millimetre per second
NaOH	Sodium Hydroxide
nm	Nanometre
Pa	Pascal
PT	Putih telur
R _b	The radius of spindle
R _c	The radius of container
rad/sec	Radius per Second
RBPC	Rice bran protein concentrate

Rpm	Revolutions Per Minute
s	Second
sec ⁻¹	Per second
SEM	Scanning Electron Microscopy
SPSS	Statistical Package for the Social Sciences
SRB	Stabilised rice bran
TPA	Texture Profile Analysis
UV	Ultraviolet
V ₀	The volume of foam at 0 time
V ₁	The volume of the empty beaker
V ₂	The volume of refilled rapeseeds in the beaker
W ₀	The weight of cake
W ₁	The weight of the batter filled in 150 ml beaker
W ₂	The weight of the distilled water filled in the same beaker
WPC	Whey protein concentrate
X	The radius at which shear rate

**IMPAK SIFAT PEMBUSAAN OLEH DEDAK PADI YANG TELAH
DINYAHLEMAK ATAS REOLOGI DAN SIFAT PEMBAKARAN KEK
TANPA TELUR DIBANDINGKAN DENGAN PUTIH TELUR**

ABSTRAK

Dedak padi dinyahlemek (DPD) boleh dihasilkan dengan membuang kandungan lemak yang terkandung dalam dedak padi dimana proses tersebut dapat meningkatkan tempoh simpanan dan sifat fungsi dedak padi. Kajian ini bertujuan untuk menilai sifat pembusaan oleh DPD dan akan dibandingkan dengan putih telur (PT) dalam kek tanpa telur. Dalam kajian awal, dedak padi telah diproses menjadi dedak padi terstabil (DPS), DPD, dan konsentrat protein dedak padi (KPDP). Ketiga-tiga produk dari dedak padi ini dinilai dari segi sifat pembusaan dan kandungan protein sebelum dipilih untuk digunakankan dalam eksperimen seterusnya. DPD menunjukkan sifat pembusaan yang terbaik dari DPS dan KPDP walaupun kandungan proteinnnya sedikit rendah dari KPDP. Bater dan kek telah diformulasikan dengan DPD pada konsentrasi yang berlainan seperti 50% dan 100% dan dibandingkan dengan sampel kawalan (100% PT). Bater yang telah diformulasikan dengan 50% DPD menghasilkan bater dengan kepadatan rendah dan dapat dikaitkan dengan keupayaan sampel ini untuk membendung udara yang terperangkap. Kepekatan bater telah berkurang apabila jumlah DPD ditingkatkan dalam bater. Fotomikrograf dari 50% DPD bater telah menunjukkan peningkatan dari segi bilangan udara yang terperangkap dan saiz udara tersusun dengan lebih teratur apabila dibandingkan dengan sampel kawalan dan hal ini dapat dikaitkan dengan kepadatan bater yang rendah. Sementara itu, peningkatan DPD dalam formulasi merendahkan isipadu dan meningkatkan kepadatan serta warna kek lebih gelap dari sampel kawalan. Namun, kek yang diformulasikan dengan 50% DPD menghasilkan kek dengan saiz udara yang kecil dan lebih banyak dari sampel kawalan dan sampel 100% DPD dimana hal ini dapat

dikaitkan dengan tekstur kek yang lebih baik terutamanya dari segi keliatan, kejeleketan, dan kebingkasan. Oleh itu, kualiti bater dan kek yang diformulasikan dengan 50% DPD telah ditingkatkan dari sampel yang diformulasikan dengan 100% DPD dan setandiing dengan sampel kawalan.

EFFECT OF FOAMING PROPERTIES OF DEFATTED RICE BRAN ON RHEOLOGICAL AND BAKING PROPERTIES OF EGGLESS CAKE IN COMPARISON WITH EGG WHITE

ABSTRACT

Defatted rice bran (DRB) can be produced by extracting its fat fraction which then can increase the shelf life and functional properties of the rice bran. This work aimed to evaluate the foaming property of DRB in comparison with egg white (EW) in eggless cake system. In preliminary study, rice bran was processed into three products such as stabilised rice bran (SRB), DRB, and rice bran protein concentrate (RPBC). These three rice bran products were then evaluated for its foaming properties and protein content before being selected to be incorporated in subsequent experiments. DRB showed superior foaming properties than SRB and RBPC even though its protein content is lower than RBPC. The cake batter and baked cake was formulated with DRB at varying concentration of 50% and 100% and were compared with control (100% EW). Cake batter formulated with 50% DRB produced batter with low density which related to its capability of retaining trapped air than in 100% DRB sample. The viscosity of the cake batter decreased with the increase in the level of DRB. The photomicrographs of cake batter with 50% DRB showed an increase in the number of gas bubbles and more uniform size distribution which comparable with the control indicating low batter density. Meanwhile, the increasing incorporation of DRB in the formulation had produced cake with lower volume, higher density and lower lightness value compared to the control. However, cake formulated with 50% DRB produced cake with smaller bubble size and higher number of gas bubbles per section of the cake than control and 100% DRB sample. This result contributes to the high quality of cake texture especially in texture parameter such as chewiness, cohesiveness, and resilience. Therefore, the quality of cake batter and baked cake