UTILIZATION OF POTATO PEEL EXTRACT AS A NATURAL [illegible]

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Lihat sebelah

UTILIZATION OF POTATO PEELS EXTRACT AS A NATURAL ANTIOXIDANT IN PALM OLEIN

By

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JABATAN SAINS KIMIA
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PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: UTILIZATION OF POTATO PEELS EXTRACT AS A NATURAL ANTIOXIDANT IN PALM OLEIN oleh CHEK YIN SEZ, No. Matrik UK 6378 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Kimia sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah SARJANA MUDA SAINS – SAINS KIMIA, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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LIST OF ABBREVIATIONS

BHA	-	Butylated hydroxyanisole
BHT	-	Butylated hydroxytoluene
DPPH	-	1,1-diphenyl-2 picrylhydrazyl
DSC	-	Differential Scanning Calorimetric Analysis
E	-	Activation energy
$FeCl_2$-H_2O_2	-	Iron ion chelation system
FTIR	-	Fourier Transform Infrared Spectroscopy
I	-	Light transmitted
ICTA	-	International Confederation for Thermal Analysis
IV	-	Iodine value
I_o	-	Incident light
KI	-	Potassium iodide
KOH	-	Potassium hydroxide
LDL	-	Lipoprotein
$Na_2S_2O_3$	-	Sodium thiosulphate
PG	-	Propyl gallate
PUFAs	-	Polyunsaturated fatty acids
RBDPO	-	Palm olein
RBDSO	-	Superolein palm oil
TAG	-	Triacylglycerol
TAN	-	Total acid number

T	-	Transmittance
TBHQ	-	Tert-butyl hydroquinone
UV	-	Ultraviolet
v/v	-	volume to volume
v/v/v	-	ternary solvent system
w/w	-	weight to weight

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ABSTRACT

Atmospheric oxidation is the most important cause of deterioration in all lipids and which also can cause the reduction of the shelf life of many products. The purpose of the project is to study the effects of ethanolic extract subfractions on the oxidative stability of palm olein. In the study, the potato peels were extracted as a new source of natural antioxidant and added to palm olein in order to prevent the deterioration of palm olein as well as to extend the shelf life of the palm olein by inhibiting the auto-oxidation process. The potato peels were extracted using ethanol and then fractionated to yield four different subfractions which were dichloromethane, ethyl acetate, buthanol and water. By fourier transform infrared spectroscopic analysis (FTIR), the presence of phenolic compounds had been ensured. Results from thermogravimetric analysis method (TGA) suggested that the water subfraction (3 % w/w) was the best and therefore chosen for subsequent study. In order to study the prolonged exposure of antioxidant-added-palm olein to heat, 7.5 g water subfraction was added to 250 g palm olein then heated at 130 ^{0}C in an oil bath. Each sample was collected at 0, 25, 50, 100, 150 and 200 hours after exposed to a long period of heating. The extent of oil deterioration was evaluated using peroxide value test, acid value test and iodine value test and further confirmed using TGA and FTIR. Results from this study showed that the palm oil blended with 3 % water subfraction was more thermally stable towards oxidation compared to 100 % palm olein.

PENGGUNAAN EKSTRAK KULIT KENTANG SEBAGAI ANTIOKSIDA DALAM MINYAK SAWIT

ABSTRAK

Pengoksidaan atmosferik adalah salah satu punca yang serius dalam kerosakan lemak dan mengurangkan masa penggunaannya. Kajian ini bertujuan untuk mengkaji kesan ekstrak etanol kulit kentang ke atas kestabilan pengoksidaan di dalam minyak sawit. Dalam kajian ini, kulit kentang akan diekstrakkan dan ditambahkan ke dalam minyak sawit untuk menghalang proses pengoksidaan dalam minyak dan mengelakkan kerosakannya. Kulit kentang akan diekstrakkan dan dipekatkan dengan etanol kemudiannya dipisahkan untuk mendapat empat subfraksi yang berbeza, iaitu diklorometana, etil asetat, butanol dan air. Teknik spektroskopi inframerah fourier transformasi (FTIR) telah mengesahkan kehadiran fenolik sebatian. Keputusan termogravimetrik analisis (TGA) menunjukkan bahawa 3 % subfraksi air adalah paling baik dalam menghalang kerosakan minyak, maka ia dipilih untuk dijalankan kajian seterusnya. Untuk mengkaji pendedahan berantioksida minyak sawit terhadap pemanasan, 7.5 g subfraksi air ditambahkan ke dalam 250 g minyak kelapa sawit kemudian dipanaskan pada suhu 130 ^{0}C. Setiap sampel dikutip pada 0, 25, 50, 100, 150 dan 200 jam selepas pemanasan. Tahap kerosakan minyak dinilai dengan ujian nilai peroksida, ujian asid lemak bebas, ujian nilai iodin, TGA dan FTIR. Berdasarkan keputusan dari kajian ini, minyak sawit yang ditambahkan dengan 3 % subfraksi air adalah lebih stabil berbanding minyak sawit asal.