



# **EFFECT OF WAX-BASED OLEOGEL AS NOVEL FRYING MEDIUM ON OXIDATIVE STABILITY AND ANTHOCYANIN RETENTION OF PURPLE SWEET POTATO CHIPS**

by

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This dissertation is composed of my original work and contains no material previously published or written by another person except where due 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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## LIST OF ABBREVIATION AND SYMBOLS

Abbreviation	Caption
ASLT	Accelerated shelf life testing
CA	Citric acid
DPPH	2,2-Diphenyl-1-picrylhydrazyl
FRAP	Ferric reducing antioxidant power
PSP	Purple sweet potato
PUFA	Polyunsaturated fatty acid
SS	Superheated steam
TAC	Total anthocyanin content
TBARS	Thiobarbituric acid reactive substances

**KESAN OLEOGEL BERASASKAN LILIN (WAX) SEBAGAI MEDIUM  
PENGGORENGAN KE ATAS KESTABILAN OKSIDASI  
DAN ANTOSIANIN KEREPEK UBI KELEDEK UNGU**

**ABSTRAK**

Ubi keledek ungu kaya dengan antosianin yang menyediakan warna ungu dan nutrisi untuk ubi tersebut. Walaubagaimanapun, antosianin akan berkurang ketika penggorengan apabila terdedah kepada suhu yang tinggi. Kajian ini dilakukan untuk mengkaji kesan oleogel berasaskan lilin (wax) sebagai medium penggorengan ke atas pengekalan antosianin, aktiviti antioksidan dan penyerapan minyak kerepek ubi keledek ungu. Pra-rawatan ke atas kerepek tersebut ialah rendaman asid sitrik (4%) dikaji pada masa rendaman yang berbeza (1, 3 dan 5 min) diikuti dengan stim panas pada suhu 160 °C selama 5 min. Kerepek ubi keledek ungu yang ditelah melalui pra-rawatan digoreng di dalam minyak kelapa sawit (sampel kawalan) dan juga di dalam lilin (wax) kandelila (minyak oleogel) dan antosianin, pengekalan antioksidan dan penyerapan minyak dikaji. Penyerapan lembapan isoterma sampel ditentukan dan kajian simpanan kerepek ubi keledek ungu yang disimpan di dalam bungkusan kerajang aluminium dilakukan selama dua minggu pada suhu 45 °C. Menggoreng ubi keledek ungu dengan oleogel meningkatkan kandungan antosianin sebanyak 82% dan mengurangkan penyerapan minyak sebanyak 48% berbanding sampel kawalan. Semasa penyimpanan, kandungan antosianin dan oksidasi lemak dikekalkan dalam sampel oleogel. Nilai DPPH dan FRAP berkurang sepanjang dua minggu itu sebanyak 16 dan 13%, setiap satu. Kesimpulannya, menggoreng dengan oleogel berasaskan lilin (wax) berkesan dalam meningkatkan pengekalan antosianin dan antioksidan begitu juga dalam mengawal oksidasi lemak dalam kerepek ubi keledek ungu yang dirawat dengan asid sitrik dan stim panas seterusnya menjanjikan penghasilan snek yang berkualiti tinggi dan sihat.

# **EFFECTS OF WAX-BASED OLEOGEL AS NOVEL FRYING MEDIUM ON OXIDATIVE STABILITY AND ANTHOCYANIN RETENTION OF PURPLE SWEET POTATO CHIPS**

## **ABSTRACT**

Purple sweet potato (PSP) is rich in anthocyanin content that provide attractive purple color and nutritional benefits. However, the anthocyanin degrades during frying when exposed to high temperature. This study sought to study the effects of wax-based oleogel as frying medium on the anthocyanin retention, antioxidant activity and oil uptake of PSP chips. The pretreatment of PSP slices with citric acid (4%) soaking was studied at different time (1, 3 and 5 min) followed by superheated steam (SS) at 160 °C for 5 min. Subsequently, the pretreated PSP chips were fried in palm oil without (control) and with candelilla wax (oleogel oil) and the anthocyanin and antioxidant retention as well as oil uptake were evaluated. The moisture sorption isotherms of the samples were determined and accelerated storage study of the packaged PSP chips in aluminium seal pouch was conducted for two weeks at 45 °C. Frying PSP chips with oleogel significantly increased anthocyanin content by 82% and reduced the oil uptake by 48% compared to the control sample. During storage, the anthocyanin content and lipid oxidation were maintained in the oleogel sample. The DPPH and FRAP values significantly decreased throughout two weeks of storage period by 16 and 13%, respectively. In conclusion, frying with wax-based oleogel was effective in improving anthocyanin and antioxidant retention as well as controlling lipid oxidation of the CA and SS pretreated PSP chips, thus promising in producing high quality and healthy snack.