

# CURRENT RESEARCH AND DEVELOPMENT IN BIOTECHNOLOGY ENGINEERING AT IIUM

VOLUME III

Editors:

Md. Zahangir Alam  
Ahmed Tariq Jameel  
Azura Amid



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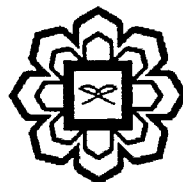
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**Department of Biotechnology Engineering  
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## CHAPTER 28

### OPTIMIZATION OF PHYTOCHEMICAL ANTIOXIDANTS IN RBD PALM OLEIN DURING FRYING PROCESS

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#### ABSTRACT

Antioxidants are important inhibitory compounds against the oxidative deterioration of food especially in frying oil. In Malaysia, food processing industry using deep fat frying process has become popular nowadays. The repeated use of oils could cause fried foods to have a rather limited shelf life due to the development of rancidity in the frying oil taken-up by the products. Antioxidants were proven to lower the rate of oxidation of oils during frying. This study investigated the effects of various phytochemical antioxidant systems which are oleoresin rosemary (OR), oleoresin sage (OS) and citric acid (CA) as synergist on the physico-chemical characteristics of refined, bleached and deodorized (RBD) palm olein during the frying of French fries. The effects of various mixtures of the antioxidants on the oil were also studied in repeated deep frying. RSM-based computer programs, Echip software has been used to provide the initial experimental designs, calculate the multi-regression equations and do the statistical analysis. Samples of the oil after frying are analyzed for different physical and chemical properties. Three different parameters which were peroxide value (PV), iodine value (IV) and absorbance at 232 nm (Abs 232) and absorbance at 268 nm (Abs 268) were used as indicator to determine the frying oil quality. PV, IV, Abs 232 and Abs 268 were all determined using MPOB test methods. Statistical analyses of the effects of each antioxidant and CA and their interactions on the physicochemical properties were provided by the Echip software. OR, OS and CA as synergist was expected to be effective phytochemical antioxidants protecting RBD palm olein against oxidative deterioration during frying.

**Keywords:** Photochemical, Antioxidant, Frying, RBD Palm Olein, Peroxidation

#### INTRODUCTION

In Malaysia, deep frying is widely used for industrial purposes. Deep frying is a cooking method in which food is submerged in hot oil. This is normally performed with a deep fryer, chip pan, pressure fryer or vacuum fryer. The deep-fat frying process is commonly used by the multimillion-dollar snack food industry. Many studies have reported that there are physical and chemical changes occurring in oils under frying conditions. Lipid oxidation is one of major deteriorative reactions in frying oils which result in loss of oils quality. Low cost synthetic antioxidants propyl gallate, butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA) and tertiary butylhydroquinone (TBHQ) are often used to retard fat