UNIVERSITI TEKNOLOGI MARA

SOLVENT EXTRACTION OF PEANUT OIL: OPTIMIZATION USING RESPONSE SURFACE METHODOLOGY

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ABSTRACT

In the production of peanut oil, plenty of extraction method could be used to extract the seed oil. This study focused on seed oil extraction by conventional method and optimized by response surface methodology. The study was performed by using different parameters as to find the optimum condition for the extraction process. The process parameters were further optimized by statistical approach using historical data design of response surface method (RSM) to find the optimum parameters for the highest oil yield.

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INTRODUCTION

1.1 Research background

Vegetable oils are edible oils that extracted from plants. Only in the past century, consumption of vegetable oil has increased as refined vegetable oils were not available until 20th century. The increased consumption of the vegetable oils has influenced the percentage of people that involved in overweight and obesity problems. Generous uses of oil for stir-frying are one of the main reasons of obesity [1]. Edible fats and oils are carrier of the important biological factor which relate to presence of fatty acids. Assuring adequate intake of two essential fatty acids, which are omega-6 and omega-3 known as linoleic acid and alpha-linolenic acid, human relies on food sources in diet as human bodies do not have the ability to produce the fatty acids. Vegetable oils are one of the sources of the essential fatty acids [2]. The composition of fatty acid in most fats and vegetable oils is palmitic, oleic, and linoleic acids. The developing of new varieties can change the fatty acid composition of oleaginous seeds. The fatty acid composition can be influenced by the environmental factors within certain restrictions. As the climate change and humidity increase, the proportion of unsaturated fatty acids in the glycerides of vegetable oils such as soybean, linseed and sunflower oils will be increases generally [3]. One of the vegetable oil, peanut oil is extracted from peanut seeds as by their high oil content. It consists almost up to 50% oil content. The other major compositions of the peanut are 26–28% protein, 20% carbohydrates and only 5% fiber [4].

Consider to buy vegetable oils in that were keep in dark, cool place and darker bottle are desired as the shading provided by the darker hue will reduce the impact of daylight and sunlight on fillings of the bottle. Canola oil, soybean oil, peanut oil, sunflower oil, coconut oil and olive oil are the common vegetable oil and it often used in cooking and baking [5]. The vegetable oils can be found or used in salad dressing, margarine, mayonnaise and cookies and it can also be raw materials for production of cosmetics and soap. Peanuts are also widely used for production of extenders in meat product formulation, snack product, peanut butter, confections, roasted peanuts, soups and desserts [6]. In many countries, vegetable oils have been consumed as a great