3rd EDITION

E-EXTENDED

ABSTRACT

INTERNATIONAL AGROTECHNOLOGY INNOVATION SYMPOSIUM (i-AIS)

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ABOUT FACULTY OF PLANTATION AND AGROTECHNOLOGY

The Faculty of Plantation and Agrotechnology was established in 2010 at Universiti Teknologi MARA (UiTM). The mission of the faculty is to play the vital role of producing well-trained professionals in all areas of plantation and agriculture-related industries at national and international levels.

Bachelor of Science (Hons) Plantation Technology and Management is a three-year program that strongly emphasizes the various aspects of Production Technology, Management, and Information Technology highly sought after by the agricultural and plantation sectors. Students in this program will be fully trained to serve as professionals in the plantation sector and related industries. They will have ample opportunities to fulfill important positions in the plantation industry such as plantation executives. This program provides a strong balance of technology and management courses essential for the plantation industry such as management of plantation crops, soil fertility, plantation management operation, plantation crop mechanization, and agricultural precision. As an integral part of the program, students will be required to undergo industrial attachment to gain managerial skills in the plantation industry.

The faculty is highly committed to disseminating, imparting, and fostering intellectual development and research to meet the changing needs of the plantation and agriculture sectors. With this regard, numerous undergraduate and postgraduate programs have been offered by the government's intention to produce professionals and entrepreneurs who are knowledgeable and highly skilled in the plantation, agriculture, and agrotechnology sectors.

PREFACE

International Agrotechnology Innovation Symposium (i-AIS) is a platform to be formed for students/lecturers/ staff to share creativity in applying the knowledge that is related to the world of Agrotechnology in the form of posters. This virtual poster competition takes place on the 1st of December 2022 and ends on the 8th of January 2023. This competition is an assessment of students in determining the level of understanding, creativity, and group work for the subject related to agrotechnology and being able to apply it to the field of Agrotechnology. The i-AIS 2022 program takes place from December 1, 2022, to January 8, 2023. The program was officiated by the Dean of the Faculty of Plantation and Agrotechnology, namely Prof. Madya Ts. Dr. Azma Yusuf. The program involves students from faculties of the Faculty of Plantation and Agrotechnology (FPA)and HEP participating in i-AIS 2022, namely, the Faculty of Education and Pre-Higher Education. This program involves the UiTM student and some of the non-UiTM students which come from the international university and the local university. Two categories are contested, namely UiTM and non-UiTM. To date, students from these programs have shown remarkable achievements in academic performance and participation in national as well as international competitions.

This competition is an open door for the students and lecturers to exhibit creative minds stemming from curiosity. Several e-content projects have been evaluated by esteemed judges and that has led to the birth of this E-Poster Book. Ideas and novelties are celebrated, and participants are applauded for displaying ingenious minds in their ideas.

It is hoped that such an effort continues to breed so that there is always an outlet for these creative minds to grow.

Thank you.

Dean
On behalf of the Organizing Committee
Conference Chair
Universiti Teknologi MARA
Faculty of Plantation and Agrotechnology
http://fpa.uitm.edu.my

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INFLUENCE OF SOYBEAN RESIDUE FLOUR IN WHEAT BATTER FORMULATION ON PHYSICAL PROPERTIES OF FRENCH FRIES

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ABSTRACT - In this study, French fries were analyzed by using variant batter formulation with the addition of fiber. Fiber is one of food proximate sources which able to reduce the absorption of oil intake to food. Soybean grains is commonly used to make drinks or food products. Fiber could be obtained from soybean after it was crushed and its extraction were used to make foods and drinks. The output of soybean extraction was the soybean residue which able to become the food additives to reduce oil uptakes in fried food. After dehydrating and grinding process, a long-lasting soybean residue flour were obtained. The effect of soybean residue flour (SFR) addition into coating batter formulation in frying fries was studied on the color appearance and oil uptake of fries by varying the percentage of fibers at constant oil temperature. The amount of soybean residue flour in prepared batter formulation was varied (0% SFR, 10% SFR, 20% SFR). It was found that the highest fiber content (20% SRF) in batter formulation shows the lowest fat content (9g/100g) in fried fries. There is no significant difference (P>0.05) between the addition of SRF and solely using wheat batter formulation in the color appearance of French fries. All French fries' samples using formulated SRF batter have shown similarities to French fries available in the market. Hence, the addition of soybean residue flour in wheat batter formulation influence the properties of French fries in fat content and not on the color appearance.

Keywords: Soybean residue flour, fried food, fries, total fat, colour appearance

INTRODUCTION

French fries are commonly associated with fast food which is a simple but delicious at the same time. However, total fat in French fries has become a health concern as some fried product may contain fat up to 50% of the total weight [1]. Thus, both health and convenience should be addressed to meet consumer demand. Consequently, the invention of fried food that reduces oil uptake during frying is developed by using method of dipping into hot oil.

The use of soybeans in the manufacture of food products usually leaves a large amount of waste, especially in the manufacture of soy milk. The accumulation of soybean residues (a byproduct of soybean processing) accounts for approximately 25% of the total weight of soybeans used. Dried soybean residue is found to retain about 50% dietary fiber [2].

Fiber is known as a substance capable of reducing the rate of oil absorption in food. Soybean residue flour (SRF), which is also rich in fiber, has become increasingly popular as a functional food additive that capable of providing fiber nutrition [3]. Wheat flour are commonly used as main batter formulation for coating fried food. There is still no research on pre-mixed soybean residue flour with wheat flour as fried batter formulation. This study focuses on two main objectives, namely 1) identifying the fat content of French fries using SRF batter formulations with no SRF batter formulation and 2) determine the color changes of fried products using SRF batter formulations.

MATERIAL AND METHOD

Wheat flour (Cap Sauh, Malaysia), potatoes, and cooking oil were purchased at a local grocery store. Soybean residue flour (SRF) is obtained after drying and grinding the waste of soybean (Grade AA soybeans) that acquired after producing soybean milk.

Preparing Soybean Residue Flour Batter Formulation

Mixing a dry mixture containing wheat flour and soybean meal in different ratios (100 Wheat:0 SRF for 0% SRF, 90 Wheat:10 SRF for 10% SRF, 80 Wheat:20 SRF for 20% SRF). After mixing the dry ingredients, 100 ml of water is added to the dry mixture and stirred homogenously.

Oil Absorption Analysis

Raw potatoes were cut into cubes (6 cm x 1 cm x 1 cm) and weighed using a digital weighing scale (approximately 3 – 10 g). Fries were dipped in batter and fried using an electric stove (Tefal IH2108, France) at C3 rate (900 W or approximately 103°C) constantly for 5 minutes per sample, tossed and left to cool. Prepared French fries using three SFR batter formulations were used for analysis of oil (fat) content using the Soxhlet extraction method (In-House Method Kbio-TI-0012, referring to AOAC Official Method 2003.06.2005).

Color Evaluation

L*, a*, b* color values of the samples were measured using Photoshop 6 Software by open the colour picker tab and evaluates the RGB and *L, *a and *b index value of a colour chosen. C* for the metric chroma and were calculated by the transformation of a* and b* the following equations:

$$C* = \sqrt{(a^{*2} + b^{*2}}$$

RESULTS AND DISCUSSION

Tempting fries should low in fat and attractive in appearance. Therefore, fried French fries using different batter formulations have been analyzed (Figure 1). The use of 20% SRF batter on fries has the lowest amount of fat (9.1 g/100g) compared to 10% SRF (9.7g/100g) and 0% SRF (10.9g/100g) mixtures (Figure 2). Fiber from soy has good binding capacity in which prevent from excess oil uptake [4]. The microstructure characteristics in fiber also helps to reduce the moisture loss during frying and minimize oil absorption [5]. Thus, by substitution of SFR in wheat batter formulation, it is proven to lower the rate of oil permeation in fried potatoes.

Figure 1: Images of French fries using variant batter formulation a) 0% SRF; b) 10% SRF; and c) 20% SRF

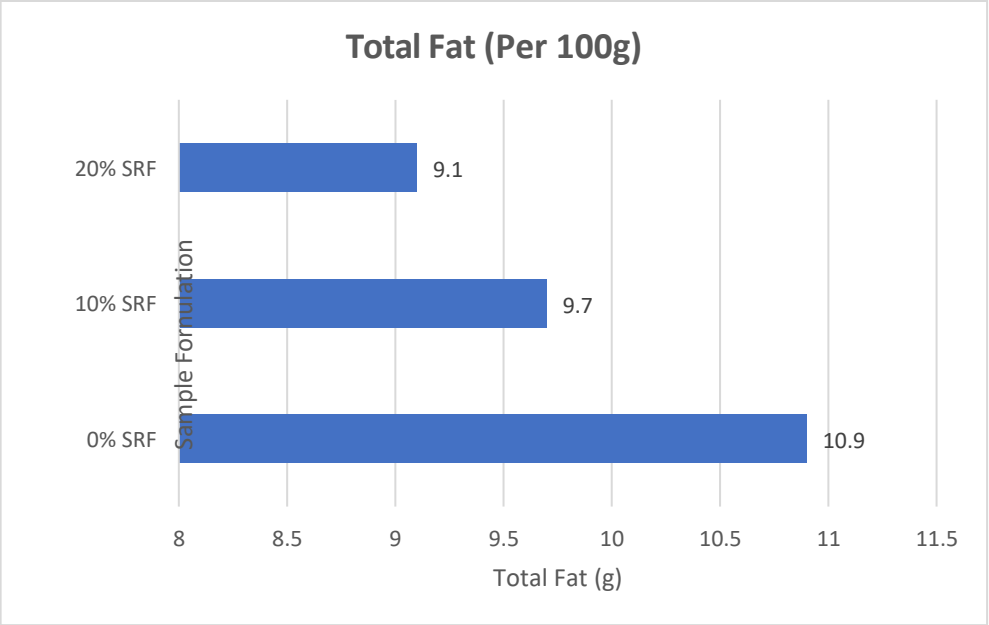

Figure 2: Percentage of fat (oil) content of French fries using variant batter formulation (0% SRF, 10% SRF, 20% SRF)

Color measurement is an important quality indicator since it reflects sensory attractiveness of food product. Color is represented by L*, a* and b* where L* measures the lightness of the sample (from black to white), a* measures the redness and greenness, b* measures the yellowness and blueness while chroma indicates the color intensity or saturation [6]. Table 1 shows the results of color measurement for variant batter formulation on fried fries. It was found that the lightness, redness and yellowness for all batter formulation had no significant effect ($P > 0.05$) on each other. French fries using 0% SRF batter formulation shows the highest lightness value, followed by 10 % SRF and 20 % SRF batter formulation. The a* value and b* value for all fries shows higher tendency towards reddish color (above 0) and yellowness color (near to 100) respectively which show slight difference in colour appearance. The highest chroma was that fries using 10% SRF batter formulation followed by 0% SRF and 20% SRF batter formulation. There is only slight difference in chroma value between the substitution of SRF and using whole wheat flour which do not affect the overall appearance.

Table 1: Colorimetric results of French fries using variant batter formulation (0% SRF, 10% SRF, 20% SRF)

Batter formulation	*L	*a	*b	Chroma, C*
0% SRF	44 ± 0.2	11 ± 0.1	45 ± 0.0	46.3
10% SRF	39 ± 0.1	17 ± 1.7	44 ± 0.3	47.1
20% SRF	36 ± 0.2	19 ± 0.4	39 ± 0.5	43.3

SRF, soybean residue flour

Means ± Standard deviation, *n*=3. Means within a column are significantly no different *(P > 0.05)*

CONCLUSION

The results of frying French fries using three different batter formulations (0% SRF, 10% SRF, 20% SRF) have shown that using 20% SRF batter formulation as a coating for frying purposes could minimize the fat content. The physical appearance of all the fried fries using different batter formulations do not show significant differences and shows acceptable colour for French fries as sold in the market. Soybean residue flour proven to show influence in reducing fat content using fries' batter formulation. Hence, pre-mixed soybean residue flour with wheat flour shows positive output in performing as healthier preference of fried batter formulation and can be used for further analysis.

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