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Tarikh

DEVELOPMENT OF EXTRUDED FOOD SNACK USING MODIFIED CASSAVA FLOUR (MOCAF) WITH ADDITION OF LOCAL HERBS

by

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A dissertation submitted in the partial fulfilment of the requirements for degree of Bachelor of Technology (B.Tech) in the field of Food Technology

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DECLARATION BY AUTHOR

This dissertation is purely done from my own genuine studies and it contains no material that has been previously published or written by another person except where due reference has been made in text. The content of my dissertation is the outcome of the reviews that I have done 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 ABREVIATION

ATP	Adenosine Triphosphate
Cd	Cadmium
Cr	Chromium
Cu	Copper
DALYs	Disability-Adjusted Life Years
FAO	Food and Agriculture Organization
HCN	Hydrogen Cyanide
HTST	High Temperature Short Time
MARDI	Malaysian Agricultural Research and Development Institute
MOCAF	Modified Cassava Flour
RTE	Ready-to-eat
Se	Selenium
WKS	Wernicke-Korsakoff Syndrome
YLL	Years of Life Lost
Zn	Zinc

ABSTRAK

Tujuan kajian ini adalah untuk membuat tinjauan komprehensif mengenai perkembangan makanan ringan yang diekstrusi yang terdiri daripada tinjauan terhadap perkembangan terkini mengenai makanan ringan yang diekstrusi, penerapan tepung ubi kayu yang dimodifikasi dalam formulasi makanan dan penggunaan herba dan rempah terpilih dalam aplikasi makanan. Akar ubi kayu mempunyai ketahanan yang tinggi, namun mudah rosak dan mengandungi sianida yang tinggi. Cara untuk mengatasi masalah ini adalah dengan memproses akar ubi kayu menjadi tepung ubi kayu yang dimodifikasi (MOCAF) untuk mengurangkan kandungan air dan menghapuskan sianida. Langkah-langkah pemprosesan MOCAF melibatkan pengupasan kulit akar kayu ubi, fermentasi, pengeringan dan penggilingan. MOCAF mempunyai beberapa ciri yang serupa dengan tepung gandum, namun ia bebas gluten. Persamaan ini menimbulkan idea penggantian kepada MOCAF sebagai bahan asas dalam formulasi makanan ringan yang diekstrusi. Namun, penghasilan makanan ringan yang diekstrusi menggunakan MOCAF sahaja dianggap sebagai makanan yang tidak sihat berikutan kandungan mikronutrien yang rendah seperti vitamin dan mineral. Oleh itu, penghasilan makanan ringan yang diekstrusi menggunakan MOCAF dengan penggabungan herba mungkin berpotensi untuk meningkatkan kualiti makanan ringan yang diekstrusi. Herba tempatan seperti bunga kantan, daun kunyit dan daun kemangi merupakan antara herba yang sering digunakan dalam makanan tempatan. Herba-herba ini mempunyai pelbagai fitokimia (polifenol dan sebatian yang mengandungi nitrogen) yang memberikan pelbagai kesan terapeutik seperti sifat antioksidan, anti-radang, anti-barah, pelindung neuro, antikolinergik, antikonvulsan, antitumour, antivirus, antiparasit dan antimikroba.

Namun, beberapa masalah dijangka akan berlaku jika penggambungan herba ke dalam formulasi makanan ringan yang diekstrusi diteruskan kerana fitokimia ini sensitif terhadap panas dan bersifat tidak menentu. Berdasarkan carian, penambahan semula mampu menjadi penyelesaian untuk kembalikan fitokimia yang hilang semasa proses ekstrusi. Dengan itu, penghasilan makanan ringan yang diekstrusi menggunakan MOCAF dengan penggabungan herba dianggap boleh dilakukan dan berpotensi untuk menjadi makan ringan yang futuristik.

ABSTRACT

The aim of this study is to make a comprehensive review on the development of extruded snacks which involved the review on current research development on extruded snacks, the application of modified cassava flour (MOCAF) in food formulation and the utilisation of selected herbs and spices in food application. Cassava roots are known to have a high durability characteristics, albeit easily perishable and contain high cyanide content. The simplest way to tackle this problem is by processing the cassava roots into Modified Cassava Flour (MOCAF) as to reduce the moisture content and to remove the cyanide content. The MOCAF processing steps involved peeling of the root's skin, fermentation, drying and milling. MOCAF portrays some similar characteristics to wheat flour, except it is a gluten-free. This similarities rise up an idea of substitution to MOCAF as the base ingredients in extruded snack food formulation. However, development of MOCAF-based extruded snack alone may perceived as an unhealthy food as it is low in some important nutrients such as vitamins and minerals. Thus, the development of MOCAF-based extruded snack with incorporation of different type of herbs might be a potential solution to rise up the quality of the extruded snack. Local herbs such as torch ginger, turmeric leaf and holy basil are among frequently used herbal in our daily cuisine. These herbs possess variety of phytochemicals (polyphenols and nitrogen-containing compounds) which provide wide range of therapeutic effect such as antioxidant properties, anti-inflammatory, anti-cancer, neuro-protective, anticholinergic, anticonvulsant, antitumour, antiviral, antiparasitic and antimicrobial. In spite of portraying these good effects, several drawbacks are expected if the herbal are incorporated into the extruded snacks formulation as these phytochemicals are highly

heat-sensitive and volatile. Based on the findings, refortification method can be one of the option to recover the loss phytochemicals during extrusion process. All in all, the development of MOCAF-based extruded snack with incorporation of herbs is considered doable and potentially to be a futuristic snack food.