



**THE CHALLENGES IN THE DEVELOPMENT OF
BREAD USING MODIFIED CASSAVA FLOUR
(MOCAF) WITH ADDITION OF ROSELLE CALYCES
POWDER**

by

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(Nur Amiera Kamilia binti Azahari)

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ABSTRAK

Tujuan kajian komprehensif ini adalah untuk mengkaji perkembangan penyelidikan terkini berkenaan roti berfungsi, penggunaan tepung ubi kayu terubah suai (MOCAF) sebagai pengganti gandum dalam produk bakeri serta untuk mengkaji sifat-sifat serbuk kelopak Roselle di dalam produk bakeri. Dengan kemajuan pada era ini, minat pengguna untuk makanan yang lebih sihat semakin meningkat. Selain itu, penggunaan roti juga telah meningkat oleh kerana kemudahannya untuk dinikmati, menjadikan import tepung gandum juga semakin meningkat. Untuk mengatasi masalah ini, perkembangan roti menggunakan MOCAF dengan penambahan serbuk kelopak Roselle boleh berfungsi sebagai bekalan keselamatan makanan negara serta memberikan manfaat kesihatan untuk penggunaan manusia. MOCAF, yang dihasilkan melalui proses fermentasi akar ubi kayu memiliki ciri yang serupa dengan tepung gandum dari segi rupa, aroma dan rasa. Selain itu, proses fermentasi akar ubi kayu juga dapat mengurangkan jumlah hidrogen sianida (HCN) dan asid fitik yang dipercayai dapat mengakibatkan keracunan pada manusia jika memakannya tanpa menjalani sebarang proses. Di samping itu, MOCAF sesuai untuk individu yang tidak bertoleransi gluten kerana ia tidak mempunyai gluten. Namun, terdapat beberapa kekurangan dalam menghasilkan roti dengan menggunakan MOCAF semata-mata oleh kerana sifatnya yang tidak dapat membentuk sifat roti yang baik serta rendah dengan sebatian bioaktif. Oleh hal yang demikian, penyelidikan adalah penting untuk menumpu kepada aspek fungsi serta menjadikan MOCAF sebagai bahan asas dalam pembuatan roti. Untuk menjadikan MOCAF mempunyai sifat berfungsi, bunga yang boleh dimakan boleh ditambah. Roselle adalah salah satu bunga yang boleh dimakan yang mengandungi sejumlah besar fitokimia terutamanya antosianin, yang diakui

dapat meningkatkan sifat berfungsi produk makanan. Antosianin yang terdapat dalam kelopak Roselle telah terbukti dapat berfungsi sebagai antikanser, anti-keradangan dan menunjukkan kemampuan untuk menurunkan jumlah tahap lipoprotein berkepadatan rendah seterusnya dapat mengurangkan risiko penyakit kardiovaskular. Sebagai kesimpulan, adalah mungkin untuk menghasilkan roti menggunakan MOCAF kerana ia berpotensi untuk menjamin keselamatan bekalan makanan negara. Penambahan serbuk kelopak Roselle ke dalam roti MOCAF sememangnya dapat memberi manfaat terhadap kesihatan manusia. Walau bagaimanapun, terdapat beberapa kekurangan yang mungkin berlaku seperti kurang pengembangan doh dan sifat fizikal roti oleh kerana ketiadaan gluten di dalam MOCAF serta sifat deria rasa yang kurang baik disebabkan rasa masam daripada kelopak Roselle. Di samping itu, kandungan antosianin di dalam kelopak Roselle juga akan berkurang disebabkan suhu yang tinggi semasa proses membakar roti.

ABSTRACT

The aims of this comprehensive study were to review the current research development on functional bread, the application of modified cassava flour (MOCAF) as a wheat substitution in bakery products and to review the properties of Roselle calyces powder in bakery products. With the advancement in this current era, the interests for a healthier food has increased. Other than that, the consumption of bread has also increased as it is a convenience, which made the imports for wheat flour also became increasing. In order to tackle this problem, the development of bread using MOCAF with addition of Roselle calyces powder may serve as national food security as well as providing health benefits for human consumptions. MOCAF, which is produced by fermentation process of cassava roots possessed similar characteristic to wheat flour in terms of its appearance, aroma and taste. Besides that, fermentation process of cassava roots can also reduce the amount of hydrogen cyanide (HCN) and phytic acid that believed can cause toxicity to human if consume it without undergo processes. In addition, MOCAF is suitable for gluten intolerance people since it does not have gluten. However, there will be some drawbacks on producing bread using solely MOCAF since it could not form a good bread properties as well as lacking with bioactive compounds. Therefore, further research is essential to focus on the functional aspect as well as incorporating MOCAF a base ingredient in bread making. To make MOCAF bread to have functional properties, edible flowers can be added. Roselle is one of the edible flowers that contains high amount of phytochemicals mainly anthocyanins, that were recognized as to increase the functional properties of food products. Anthocyanins found in Roselle calyces have shown could serve as anticancer, anti-inflammatory and it exhibited the ability to lower the amount of low-

density lipoproteins level thus can reduce the risk of cardiovascular disease. However, adding Roselle calyces powder into bread formulation made the bread taste sour therefore the concentration of Roselle added must be limited. As a conclusion, it is possible to develop bread with MOCAF as it has a potential to secure the national food security. Incorporation of Roselle calyces powder in MOCAF bread is indeed can be beneficial to human health.