

DEVELOPMENT OF PASTEURIZED ROSELLE PICKLES

By

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ENDORSEMENT

This project report entitled **Development of pasteurized roselle pickles** by **Goh Yoke Hoon**, Matric No. **UK16209** has been reviewed and corrections have been made according to the recommendations by examiners. This report is submitted to the **Department of Food Science** in partial fulfillment of the requirement of the degree of **Bachelor of Food Science (Food Technology)**, Faculty of Agrotechnology and Food Science, Universiti Malaysia Terengganu.



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DECLARATION

I hereby declare that the work in this thesis is my own except for quotation and summaries which have been duly acknowledged.

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ABSTRACT

The limited utilization of roselle in food products had encouraged this study to be done. This study was conducted to develop the most acceptable pickling formulation for roselle pickles. Sensory evaluation was conducted on six pickling formulations which involved different concentration of sugar (30, 40 and 50 °Brix) and acidity (0.5 and 1.0%). Sensory attributes evaluated were colour, aroma, texture, sweetness and sourness, and overall acceptability. Formulation B, C and F gave no significant different ($p>0.05$) in the taste and overall acceptability attributes but the texture attribute of formulation C was slightly higher, which was also confirmed by quantitative measurement of texture analysis. Thus, formulation C (50 °Brix, 0.5% acidity) was selected and prepared in four different conditions; fresh pasteurized, fresh unpasteurized, stored pasteurized and stored unpasteurized pickles, and then proceed with physicochemical (pH, ascorbic acid, anthocyanin, energy, ash, fiber, protein, and texture) and microbiological analysis (total viable bacteria, yeast and mould, *Enterobacteriaceae*, *Staphylococcus aureus*, and coliforms). Fresh roselle calyces were also analyzed for comparison. From fresh calyces to pickles, there were significant increased ($p<0.05$) in the pH and ash content, significant reduced ($p<0.05$) in anthocyanin, crude fiber, ascorbic acid and texture, and no significant differences ($p>0.05$) in energy and protein content. Fresh and stored pickles, both pasteurized and unpasteurized showed significant increased ($p<0.05$) in pH of pickles and pH of pickling solution, significant reduced ($p<0.05$) in anthocyanin, ascorbic acid, protein and texture properties. Pasteurized pickles, fresh and stored showed no changes in energy and crude fiber content but decreased significantly ($p<0.05$) in ash content. Fresh and stored of unpasteurized pickles showed significant decreased ($p<0.05$) in energy and crude fiber content but showed no changes in ash content. Microbes found in pasteurized and unpasteurized pickles were under safe limit. Since there are not much differences in the physicochemical and microbiological properties of pasteurized and unpasteurized roselle pickles, both fresh and stored, therefore pasteurization process is not a necessary step in the production of roselle pickles.

ABSTRAK

Penggunaan rosol yang terhad dalam penghasilan produk makanan mengalakkan kajian ini dijalankan. Ia bertujuan untuk menghasilkan formulasi jeruk rosol yang paling boleh diterima. Penilaian deria telah dijalankan ke atas enam formulasi penjerukan yang melibatkan kepekatan gula (30, 40 dan 50 ° Brix) dan keasidan (0.5 dan 1.0%) yang berbeza. Atribut deria yang dinilai adalah warna, aroma, tekstur, masam manis, dan penerimaan keseluruhan. Formulasi B, C dan F menunjukkan tiada perbezaan yang nyata ($p > 0.05$) pada atribut masam manis dan penerimaan keseluruhan tetapi bagi tekstur, formulasi C adalah lebih tinggi, yang disahkan dalam analisis tekstur secara kuantitatif. Oleh itu, formula C (50 °Brix, 0.5% keasidan) telah dipilih dan disediakan dalam empat kondisi yang berbeza; jeruk segar berpasteur, jeruk segar tanpa pasteur, jeruk lama berpasteur dan jeruk lama tanpa pasteur. Selepas itu, ciri-ciri kimia dan fizikal (pH, asid askorbik, antosianin, tenaga, abu, serat, protein, dan tekstur) dan mikrobiologi (jumlah bakteria, yis dan acuan, Enterobacteriaceae, Staphylococcus aureus, dan koliform) ditentukan. Rosol segar juga dianalisis untuk tujuan perbandingan. Perubahan daripada rosol segar kepada jeruk, terdapat peningkatan yang signifikan ($p < 0.05$) pada pH dan kandungan abu, penurunan yang signifikan ($p < 0.05$) pada antosianin, serat, asid askorbik dan tekstur, serta tiada perbezaan yang signifikan ($p > 0.05$) pada tenaga dan kandungan protein. Jeruk baru dan lama yang berpasteur dan tanpa pasteur, menunjukkan peningkatan yang signifikan ($p < 0.05$) pada pH jeruk dan pH air jeruk, penurunan yang signifikan ($p < 0.05$) pada antosianin, asid askorbik, protein dan tekstur. Jeruk berpasteur yang segar dan lama tidak menunjukkan perbezaan pada tenaga dan kandungan serat tetapi ia menunjukkan penurunan yang signifikan ($p < 0.05$) pada kandungan abu. Jeruk tanpa berpasteur yang segar dan lama menunjukkan penurunan yang signifikan ($p < 0.05$) pada tenaga dan kandungan serat tetapi ia tidak menunjukkan perbezaan pada kandungan abu. Kandungan mikroorganisma dalam jeruk berpasteur dan tanpa pasteur berada pada tahap yang selamat. Memandangkan tiada banyak perbezaan antara jeruk berpasteur dan tidak berpasteur, termasuklah yang segar dan yang lama, dari segi fizikal, kimia dan mikrobiologi, kaedah berpasteur tidak perlu diamalkan.