



**EFFECTS OF GLUCONO-DELTA LACTONE (GDL) DIPPING AND
IN-PACK PASTEURIZATION TREATMENT ON RICE STARCH NOODLES
PROPERTIES UPON STORAGE**

by

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Tarikh

KESAN RAWATAN PENCELUPAN GLUCONO-DELTA LACTONE (GDL) DAN PASTEURISASI DALAM PEK TERHADAP SIFAT LAKSA SEMASA PENYIMPANAN

ABSTRAK

Laksa yang segar mempunyai jangka hayat yang pendek (2-3 hari) kerana rantai molekul didalam laksa yang pendek menyebabkan ia mudah putus. Glucono-delta lactone (GDL) adalah asid lemah yang mudah larut di dalam air. Penyelidikan sebelum ini mendapati bahawa kaeda mencelup laksa dengan GDL diikuti dengan rawatan pasteurisasi dalam pek dapat mengekalkan sifat mekanikal dan pengendaliannya. Dihipotesiskan bahawa permukaan molekul kanji berkemungkinan telah separa dihidrolisis yang menyebabkan pembentukan lapisan pada permukaan laksa. Hal ini dapat membantu mencegah kehilangan air semasa penyimpanan. Oleh itu, untuk kajian ini dilakukan untuk mengkaji kesan rawatan pencelupan GDL dan pasteurisasi dalam pek terhadap sifat laksa semasa penyimpanan untuk menyokong hipotesis tersebut. Laksa dicelupkan ke dalam larutan GDL yang disediakan dengan kepekatan yang berbeza (0%, 0.05%, 0.10%, 0.5%, 1.0% dan 1.5% w/v) selama 2 minit sebelum dibungkus dengan vakum (150g/pek) dan dipasteurisasi pada 85°C selama 10 minit. Sifat laksa yang dirawat semasa penyimpanan diperhatikan dengan menjalani Mikroskopi Elektron Pengimbas (SEM), difraksi sinar-x (XRD), Kalorimetri Pengimbasan Berbeza (DSC), analisis penyerapan kelembapan dan analisis eksudasi kanji. Hasil penyelidikan ini menunjukkan bahawa sifat morfologi laksa yang dirawat tetap utuh dan padat dengan keretakan yang minimum. Laksa yang dirawat menunjukkan kecenderungan retrogradasi yang lebih rendah semasa penyimpanan. Hal ini dilihat berdasarkan kurang kristaliniti dan endoterm yang kecil bersama julat T_0 hingga T_c yang luas. Kandungan kelembapan kesemua sampel menurun dengan ketara semasa penyimpanan, seiring peningkatan kepekatan GDL.

Seterusnya bagi analisis eksudasi kanji, jumlah kanji yang terkeluar semasa penyimpanan menurun apabila kepekatan GDL meningkat. Oleh yang demikian, kesemua analisis yang dilakukan telah membuktikan bahawa sifat laksa semasa penyimpanan dipengaruhi oleh rawatan pencelupan GDL dan pasteurisasi dalam pek.

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Fresh laksa noodles have a short shelf life (2-3 days) due to short chain molecules of rice starch that easily retrograde. Glucono-delta lactone (GDL) is a weak acid that dissolves readily in water. Previous research found that GDL dipping followed by in pack pasteurization treatment was able to retain its mechanical and handling properties. Hypothesized that, the surface starch molecules could have been partially hydrolyzed that facilitated the formation of the coating layer on the surface of the noodle strands, which helped to prevent moisture loss during storage of laksa noodles. Hence, this study has been conducted to study the effects of GDL dipping and in-pack pasteurization treatment on rice starch noodles properties upon storage to support the hypothesis. Commercial rice starch noodles were dipped into the prepared GDL solution of different concentrations (0%, 0.05%, 0.10%, 0.5%, 1.0% and 1.5% w/v) for 2 mins before vacuum packed (150g/pack) and pasteurized at 85°C for 10 mins using a water bath. The properties of treated rice starch noodles upon storage were observed by undergoing Scanning Electron Microscopy (SEM), X-Ray diffraction (XRD), Differential Scanning Calorimetry (DSC), moisture desorption analysis and starch exudation analysis. The results of this research showed that morphological properties of treated rice starch noodles remained intact and compact with minimal defects. Treated rice starch noodles showed less tendency of retrogradation upon storage by expressing less crystallinity and small endotherm with broad T_0 to T_c . The equilibrium moisture content of all samples was significantly decreased upon storage time, as the GDL concentration increased. For amylose

exudation analysis, starch molecules were leached out during storing and the amount of leached decreased with progressive increases in GDL concentration. Hence, all the analysis conducted proves that the properties of rice starch noodles upon storage time was affected by the GDL dipping and in-pack pasteurisation treatment.

DECLARATION BY AUTHOR

This dissertation is composed of my original work and contains no material previously published or written by another person except where due reference has been made in the text. The content of my dissertation is the result of work I have carried out 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.

Athirah

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