

UNIVERSITI TEKNOLOGI MARA

THE PHYSICOCHEMICAL  
PROPERTIES OF CHOLESTEROL-  
REDUCED EGG YOLK POWDER  
PRODUCED BY REMOVAL OF p-  
CYCLODEXTRIN INCLUSION  
COMPLEX AND ITS APPLICATION  
IN MAYONNAISE

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## ABSTRACT

Association of eggs to high cholesterol level in body is greatly known. Liquid egg yolk is also difficult to transport due to their bulkiness, fragility and highly perishable. Egg yolk powder with reduced cholesterol content would be beneficial and nutritious to consume. Therefore, the aim of this study is to reduce egg yolk cholesterol by using P-cyclodextrin at different concentrations and the quality of cholesterol reduced egg yolk powder was analysed for mayonnaise production, p-cyclodextrin concentration used were at a range of 0-15 mM. At 15 mM P-cyclodextrin, egg yolk powder was successfully produced with 98.12% of cholesterol reduction. However, no significant reduction ( $p>0.05$ ) was noticed in the lipid content range from  $55\pm13.23$  to  $48\pm0.10$  g/100gm. The process of cholesterol removal caused significant reduction ( $p<0.05$ ) in protein range from  $38.86\pm0.26$  to  $35.43\pm0.16$  g/100gm and in saturated fatty acids range from  $154.7\pm6.09$  to  $61.62\pm0.54$  mg/g, monounsaturated fatty acids range from  $240.23\pm6.75$  to  $90.09\pm0.53$  mg/g and polyunsaturated fatty acids range from  $28.97\pm0.28$  to  $20.74\pm0.002$  mg/g. Cholesterol-reduced egg yolk powder and its inclusion complex produced at 15 mM were characterised using Differential Scanning Calorimetry (DSC), Fourier Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM) and X-Ray Diffraction (XRD) followed with its application in mayonnaise. Results obtained indicate that cholesterol: P-cyclodextrin inclusion complex behave differently when compared with egg yolk cholesterol: P-cyclodextrin inclusion complex which showed that compounds other than cholesterol might be encapsulated in egg yolk cholesterol inclusion complex. Mayonnaise made using cholesterol-reduced egg yolk were further analysed. Emulsion capacity and emulsion stability were analysed, and the results showed no significant difference ( $p>0.05$ ) between egg yolk powder-without cholesterol removal (emulsion capacity:  $58.43\pm4.73\%$ , emulsion stability:  $58.52\pm1.78\%$ ) and cholesterol reduced egg yolk powder (emulsion capacity:  $59.82\pm3.41\%$ , emulsion stability:  $56.06\pm2.07\%$ ). However, viscosity of mayonnaise prepared from cholesterol-reduced egg yolk powder ( $8000\pm16.0$  cP) was differ significantly ( $p<0.05$ ) from egg yolk powder-without cholesterol removal ( $4768\pm16.0$  cP). Egg yolk powder-without cholesterol removal was differed significantly ( $p<0.05$ ) from cholesterol-reduced egg yolk powder in term of lightness ( $L^*$ ), redness ( $a^*$ ), yellowness ( $b^*$ ), chroma ( $C^*$ ) and hue angle ( $h^\circ$ ) values. The results obtained for sensory characteristics showed no significant difference ( $p>0.05$ ) in term of overall acceptability between mayonnaise made using egg yolk powder-without cholesterol removal and cholesterol-reduced egg yolk powder with  $6.30\pm1.09$  and  $6.23\pm1.14$ , respectively. Therefore, p-CD can be used to produce cholesterol-reduced egg yolk powder and healthier food products.

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