UNDERSTANDING THE β-CYCLODEXTRIN INCLUSION COMPLEX FORMATION AND ITS APPLICATION IN ANTIMICROBIAL ACTIVE PACKAGING SYSTEM

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By

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DECLARATION BY AUTHOR

This dissertation is composed 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.

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TABLES OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviations	Captions
C3	3rd carbon
C5	5th carbon
CBO	Cinnamon bark essential oil
CEO	*Cinnamomum zeylanicum* essential oil
CBE	Clove bud extract essential oil
CDs	Cyclodextrins
β-CD	β-Cyclodextrin
d	Day
^{o} C	Degree Celsius
EE	Entrapment efficiency
EVOH	Ethylene vinyl alcohol
EUG	Eugenol essential oil
FTIR	Fourier Transform Infrared
GA	Gallic acid
g/mol	Gram per mole
h	Hour
ITC	Isothermal titration calorimetry
LO	Lavender oil
LBO	Lemon balm oil

min	Minute
mmol/L	Millimoles Per Litre
OEO	Oregano essential oil
Pa	Pascal
PPO	Peppermint oil
PVC	Polyvinyl chloride
TO	Thyme oil
TH	Thymol
TCA	Trans-cinnamaldehyde essential oil
UV-Vis Spectroscopy	Ultraviolet-Visible Spectroscopy

LIST OF SYMBOLS

Symbols	**Captions**
α	alpha
$\sim$	approximate
β	beta
γ	gamma
%	percentage

ABSTRAK

β-Cyclodextrin (β-CD) merupakan kompaun makrosiklik yang menpunyai 7 subunit glukosa dan boleh memerangkap molekul. β-CD mempunyai banyak potensi dalam pelbagai bidang termasuk pembungkusan aktif. Salah satu kriteria untuk menghasilkan sistem pembungkusan aktif yang efisyen adalah dengan mempunyai ciri-ciri seperti pembebasan aditif makanan seperti agen antimikrobial secara terkawal dan berterusan untuk memastikan kualiti produk makanan dalam keadaan baik. Kebolehan β-CD untuk membentuk kompleks inklusi dengan molekul hidrofobik yang menpunyai sifat pengawetan makanan (e.g.antimickrobial) membuatkan β-CD sesuai untuk aplikasi seperti enkapsulasi. Secara keseluruhannya, β-CD telah membuktikan kegunaannya dalam aplikasi tersebut dan banyak kajian telah melaporkan keberkesanan β-CD dalam memanjangkan jangka hayat produk makanan berbungkus melalui mekanisma antimikrobial yang tidak ada pada pembungkusan biasa. Walaupun banyak kajian telah dilakukan untuk meneroka potensi β-CD dalam aplikasi pengawetan makanan, terdapat jurang pengetahuan dalam sains pembentukan kompleks inklusi oleh β-CD dan faktor-faktor yang boleh memberi kesan terhadap tahap efisyen enkapsulasi yang penting untuk tujuan mengkomersialkan pengunaan β-CD dalam industri pembungkusan aktif.Sejurus itu, pelbagai faktor seperti medium reaksi, cara pengeringan dan jenis molekul serta kesan kaedah-kaedah yang digunakan terhadap tahap efisien enkapsulasi kompleks inklusi β-CD akan diulas.