



## ABSTRACT

*Calophyllum* is a pan-tropical genus belongs to the Guttiferae family and locally known in Malaysia as “*bintangor*”. There has been a continual interest to further investigate the phytochemistry of *Calophyllum spp* since this genus is a rich source of active secondary metabolites. In this study, antioxidant, cholinesterase and tyrosinase enzymatic inhibition activities of leaves and heartwood of *Calophyllum symingtonianum*, and the bark of *Calophyllum depressinervosum* were conducted. All extracts were tested for their total phenolic content and antioxidant activities by DPPH radical scavenging and  $\beta$ -carotene bleaching. Cholinesterase inhibition by Ellman’s method and tyrosinase inhibition using L-DOPA as a substrate were also tested. All methanol extracts were found to exhibit strong DPPH radical scavenging effects. The methanol extract of *C. depressinervosum* bark showed 95.08% inhibition of  $\beta$ -carotene bleaching and 78.46% inhibition against butyrylcholinesterase (BChE). All extracts showed moderate inhibition towards tyrosinase activity with an IC<sub>50</sub> of more than 100  $\mu$ g/mL.

## INTRODUCTION

*Calophyllum* from the family of Guttiferae are confined to tropical rain forest and known as ‘*bintangor*’ in Malaysia. The plants are commonly employed in folk medicine to treat bronchitis, gastric, inflammation, diabetes, hypertension, diarrhea, rheumatism varicose, hemorrhoids, chronic ulcer and to prevent wound infections [1]. *Calophyllum sp.* have sparked the interest of phytochemists around the world to investigate the phytochemical profiles owing to the discovery of compounds potentially inhibit HIV-RT1 from *Calophyllum lanigerum* [2]. Several studies on few *Calophyllum sp.* reported that this genus is a rich source of biologically active secondary metabolites such as pyranocoumarins, xanthenes and chromanone carboxylic acids. *Calophyllum symingtonianum* and *Calophyllum depressinervosum* species are endemic to Malay Peninsula. Herein, we report the antioxidant, cholinesterase and tyrosinase enzymatic inhibitory activities of leaves and heartwood of *Calophyllum symingtonianum*, and the bark of *Calophyllum depressinervosum*.



## METHODOLOGY

*Calophyllum symingtonianum*

*Calophyllum depressinervosum*

**Leaves**  
 - Dichloromethane Extract (CSLD)  
 - Methanol Extract (CSLM)

**Heartwood**  
 - Dichloromethane Extract (CSHD)  
 - Methanol Extract (CSHM)

**Bark**  
 - Dichloromethane Extract (CDBD)  
 - Methanol Extract (CDBM)

### Antioxidant assay

- Total Phenolic Content – Folin-Ciocalteu’s assay [3]
- DPPH radical scavenging assay [3]
- $\beta$ -carotene bleaching assay [3]

### Cholinesterase inhibition assay

- Ellman’s method [4] acetylcholinesterase (AChE) and butyrylcholinesterase (BChE)

### Tyrosinase inhibition assay

- L-DOPA as substrate [5]

## CONCLUSIONS

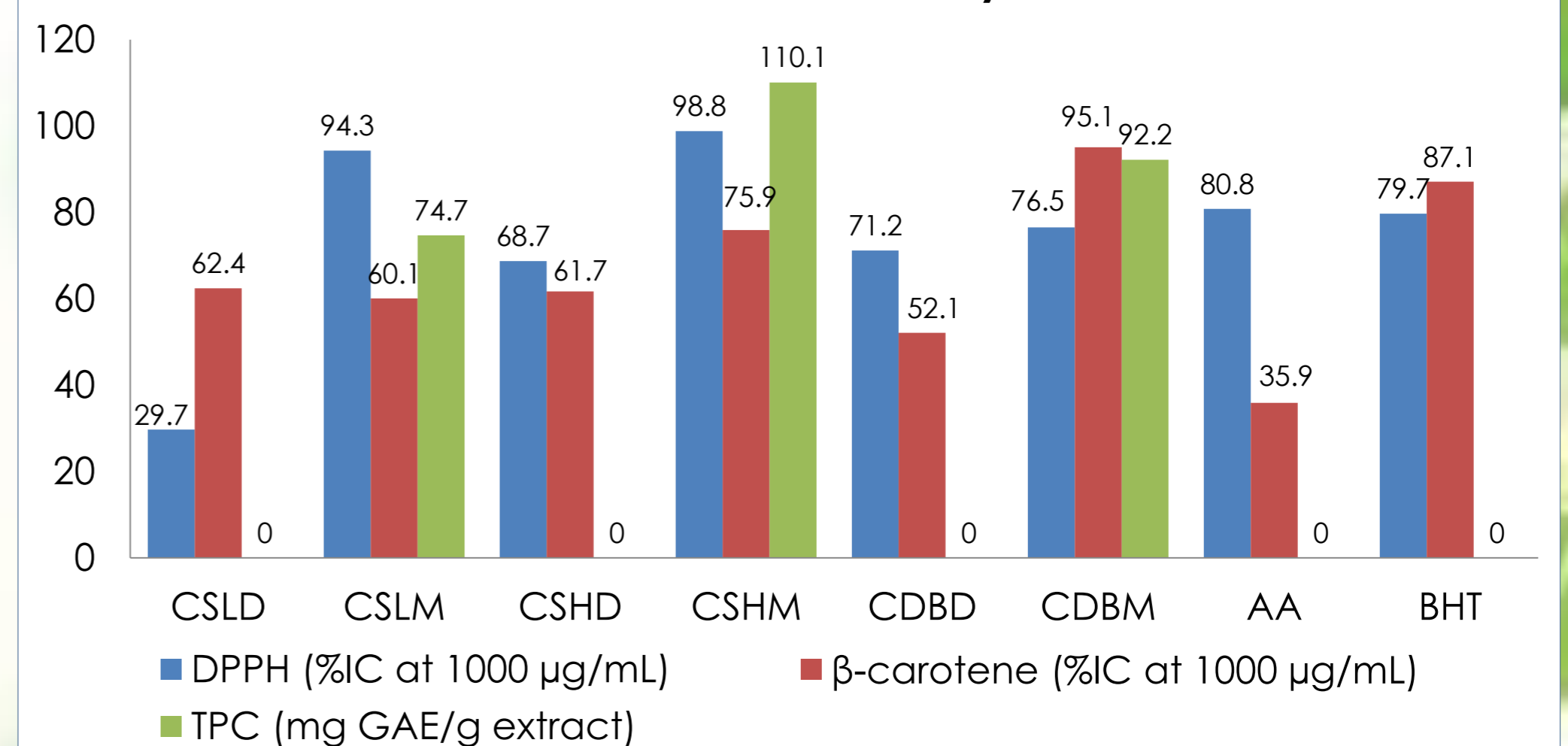
Both *Calophyllum* species showed strong antioxidant activity especially from methanol extracts, suggesting potent antioxidant agents may be isolated. Both *Calophyllum* species also may serve as possible sources for new cholinesterase inhibitors.

## ACKNOWLEDGEMENT

The authors would like to thanks the MOHE and UTM for GUP (03H93) grant and also to Department of Chemistry, Faculty of Sciences, UTM for laboratory facilities.

## RESULTS AND DISCUSSION

### Antioxidant Activity

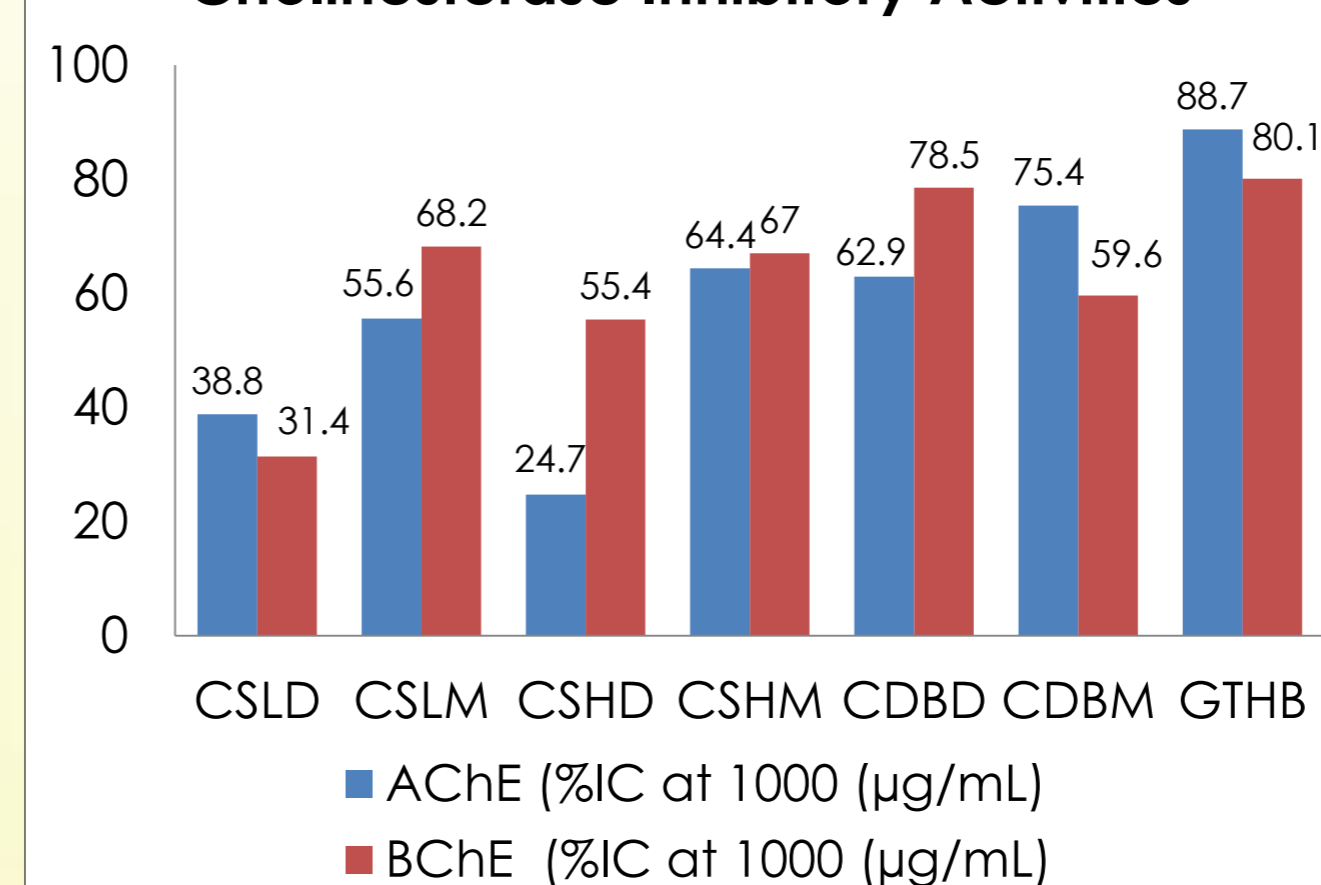


CRUDE EXTRACTS	DPPH IC <sub>50</sub> ( $\mu$ g/mL)
CSLD	>1000
CSLM	15.7 $\pm$ 1.43
CSHD	281.67 $\pm$ 3.12
CSHM	5.17 $\pm$ 0.04
CDBD	258.33 $\pm$ 3.21
CDBM	7.3 $\pm$ 0.14
Ascorbic Acid (AA)	4.3 $\pm$ 0.10
Butylated Hydroxytoluene (BHT)	48.3 $\pm$ 0.73

All methanol extracts showed low IC<sub>50</sub> in DPPH radical scavenging assay, possessed strong antioxidant activity which are correlated with their total phenolic content

All dichloromethane extracts also showed good  $\beta$ -carotene bleaching inhibition at 1000 ( $\mu$ g/mL) contradicting with DPPH radical scavenging activities demonstrated the “polar paradox” phenomenon.

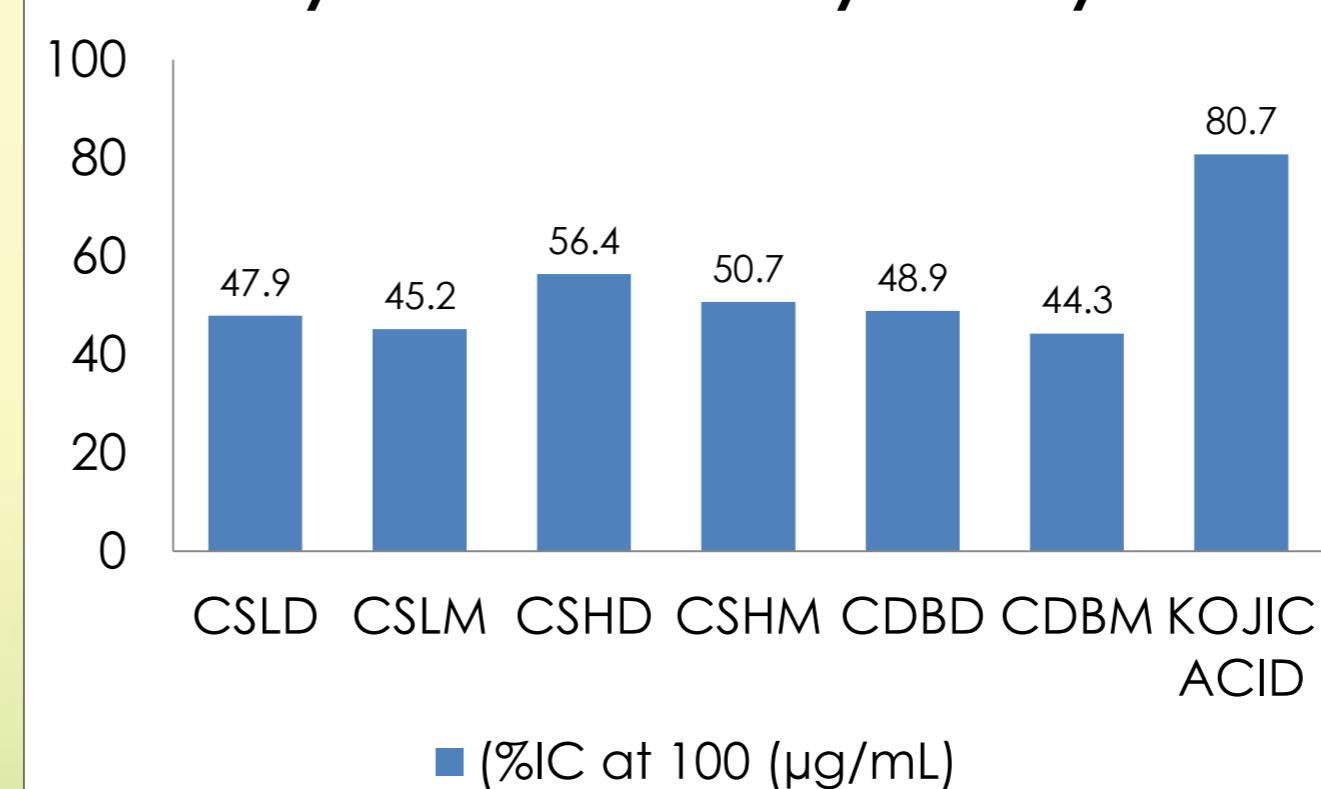
### Cholinesterase Inhibitory Activities



In general, all extracts are more selective towards inhibition of BChE enzyme compared to AChE enzyme except for CSLD and CDBM.

Methanol extracts exhibit stronger inhibition towards both cholinesterase enzyme.

### Tyrosinase Inhibitory Activity



All extracts showed moderate tyrosinase inhibitory activities with IC<sub>50</sub> of more than 100 ( $\mu$ g/mL).

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