# CHEMICAL CONSTITUENTS OF *DEHAASIA* AND *PHOEBE* SPECIES (LAURACEAE)

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**Abstract**

Six Malaysian plants from the family of Lauraceae were investigated for their alkaloidal content. Three plants from the genus *Phoebe i.e. Phoebe grandis, Phoebe scortechinii* and *Phoebe lanceolata,* and the other three from the genus *Dehaasia i.e. Dehaasia longipedicellata, Dehaasia candolleana and Dehaasia incrassata* have been studied. A total of about 50 compounds were isolated in which sixteen are new alkaloids. The alkaloids isolated from bark and leaves of *Phoebe* and *Dehaasia* species are summarized below (Table and structures). Structural elucidation was performed with the aid of spectroscopic methods notably; UV, IR, MS, 1D and 2D NMR (COSY, HMQC, HMBC, NOESY).

Crude alkaloids of *Phoebe grandis, Phoebe scortechinii* and *Dehaasia longipedicellata* have the $IC_{50}$ values below 8 μg/ml (upper unit for the parasite lactate dehydrogenase test, pLDH). These alkaloid extracts demonstrate good properties as *anti-plasmodial* activities against sensitive and resistant strain of *P. falciferum in vitro.*

In addition, eleven selected alkaloids isolated from the genus of *Phoebe* and *Dehaasia* have been tested for CNS activity using radioligand receptor binding assays. Norhexahydromecambrine A **187** showed significant activity (64 % inhibition) to inhibit binding upon $^{3}$H-scopolamine, which labels muscarinic receptor. Phoebegrandine B **29,** sinoacutine **81**, norboldine **98**, phoebescortechiniine A **175**, tetrahydropronuciferine **177**, grandine B **180,** grandine C **183,** pallidinine **188,** pallidine **189** and m[illegible]onine **190** showed weak activity (< 50% inhibition).

**Abstrak**

Enam tumbuhan Malaysia dari keluarga Lauraceae telah dikaji kandungan alkaloidnya. Tiga tumbuhan adalah daripada genus *Phoebe* iaitu *Phoebe grandis, Phoebe scortechinii* dan *Phoebe lanceolata*, dan tiga tumbuhan lain daripada genus *Dehaasia*, iaitu *Dehaasia longipedicellata, Dehaasia candolleana* dan *Dehaasia incrassata*. Sebanyak 50 sebatian telah dipisahkan di mana 16 daripadanya adalah baru. Alkaloid yang telah ditulinkan daripada kulit batang dan daun spesis-spesis *Phoebe* dan *Dehaasia* ditunjukkan di bawah (Jadual dan struktur). Penentuan struktur-struktur alkaloid dijalankan menggunakan kaedah spektroskopik UV, IR, MS, 1D dan 2D NMR (COSY, HMQC, HMBC dan NOESY).

Ekstrak alkaloid daun *Phoebe grandis*, *Phoebe scortechinii* dan *Dehaasia longipedicellata* didapati mempunyai nilai $IC_{50}$ di bawah 8 μg/ml (tahap tertinggi untuk ujian parasit lactate dehydrogenase). Ekstrak-ekstrak ini telah menunjukkan aktiviti-aktiviti yang baik sebagai *anti-plasmodial* dalam melemahkan sensitiviti *P. falciferum in vitro*.

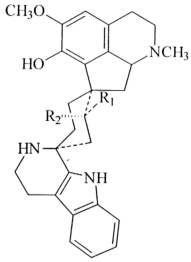
Seterusnya, sebelas alkaloid utama daripada spesis *Phoebe* dan *Dehaasia* telah diuji untuk activity CNS menggunakan assai '*radioligand receptor binding*'. Norhexahydromecambrina A **187** menunjukkan aktiviti yang bermakna (64% halangan) untuk menghalang pengikatan $^3$H-scopolamine yang melabel penerima muscarinic. Phoebegrandina B **29,** sinoacutina **81**, norboldina **98**, phoebescortechiniina A **175**, tetrahydropronuciferina **177,** grandina B **180,** grandina C

**183,** pallidinina **188,** pallidina **189** dan milonina **190** cuma menunjukkan aktiviti yang lemah (< 50 % halangan).

Table: The alkaloids isolated from the genus *Phoebe* and *Dehaasia*

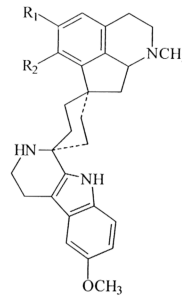
| Species | Plant Part | Remarks | Type of skeleton |
|---|---|---|---|
| *Phoebe grandis* KL 4224 | Leaves | Phoebegrandine E **176** | Indoloquinolizidine |
| | | Tetrahydroglaziovine **178** | Proaporphine |
| | | Phoebegrandine C **173** | Proaporphine-tryptamine |
| | | Phoebegrandine A **28** | Proaporphine-tryptamine |
| | | Phoebegrandine B **29** | Proaporphine-tryptamine |
| | | Phoebegrandine D **174** | Proaporphine-tryptamine |
| | Bark | Boldine **97** | Aporphine |
| | | Grandine A **179** | Proaporphine |
| | | Grandine B **180** | Proaporphine |
| | | Norboldine **98** | Aporphine |
| | | Lauformine **160** | Proaporphine |
| *Phoebe grandis* KL 4994 | Leaves | Tetrahydropronuciferine **177** | Proaporphine |
| | | Tetrahydroglaziovine **178** | Proaporphine |
| | | Phoebescortechiniine A **175** | Proaporphine-tryptamine |
| | | Phoebegrandine A **28** | Proaporphine-tryptamine |
| | Bark | Grandine C **183** | Proaporphine |
| | | Grandine D **184** | Proaporphine |
| | | Norhexahydromecambrine A **187** | Proaporphine |
| | | Lauformine **116** | Proaporphine |
| *Phoebe scortechinii* KL 4886 | Leaves | Tetrahydropronuciferine **177** | Proaporphine |
| | | Phoebescortechiniine A **175** | Proaporphine-tryptamine |
| | | Phoebegrandine A **28** | Proaporphine-tryptamine |
| | | Phoebegrandine B **29** | Proaporphine-tryptamine |
| | Bark | Hexahydromecambrine A **186** | Proaporphine |
| | | Grandine B **180** | Proaporphine |
| | | Grandine C **183** | Proaporphine |
| | | Norboldine **98** | Aporphine |
| | | Norhexahydromecambrine A **187** | Proaporphine |

| Species | Plant Part | Remarks | Type of skeleton |
|---|---|---|---|
| *Phoebe lanceolata* KL 4763 | Leaves | Liriodenine **135** | Oxoaporphine |
| | | Roemerine **47** | Aporphine |
| | | Norboldine **98** | Aporphine |
| | | Laurotetanine **99** | Aporphine |
| | Bark | Liriodenine **135** | Oxoaporphine |
| | | Roemerine **47** | Aporphine |
| | | Sebiferine **71** | Morphinandienone |
| | | Norboldine **98** | Aporphine |
| | | Asimilobine **57** | Aporphine |
| | | Boldine **97** | Aporphine |
| *Dehaasia longipedicellata* KL 4719 | Leaves | (+)-Milonine **190** | Morphinandienone |
| | | (+)-Pallidinine **188** | Morphinandienone |
| | | (-)-Pallidine **189** | Morphinandienone |
| | | (-)-Sinoacutine **81** | Morphinandienone |
| | | (-)-8,14-Dihydrosalutaridine **191** | Morphinandienone |
| *Dehaasia candolleana* KL 4683 | Leaves | Perakensol **193** | Phenantrene |
| | | (-)-Sebiferine **71** | Morphinandienone |
| | | (+)-Sebiferine **192** | Morphinandienone |
| | | Pallidine **189** | Morphinandienone |
| *Dehaasia incrassata* KL 4640 | Bark | (-)-3', 4'-Dihydrostephasubine **198** | Bisbenzylisoquinoline |
| | | (-)-Norstephasubine **201** | Bisbenzylisoquinoline |
| | | (-)-Gyrolidine**194** | Bisbenzylisoquinoline |
| | | Stephasubine **202** | Bisbenzylisoquinoline |



**173**: $R_1 = H$, $R_2 = OH$

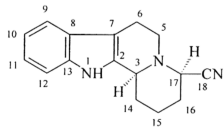
**174**: $R_1 = OH$, $R_2 = H$



**175**: $R_1 = OCH_3$, $R_2 = OCH_3$

**28** : $R1 = OCH_3$, $R_2 = OH$

**29**: $R1 = OH$, $R_2 = OCH_3$



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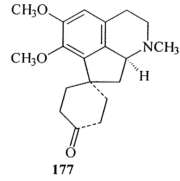

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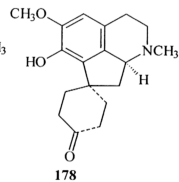

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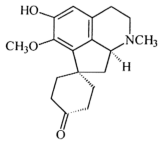

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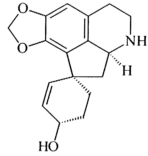

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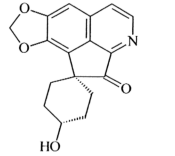

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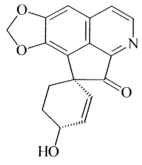

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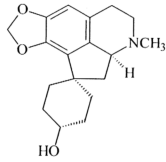

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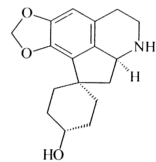
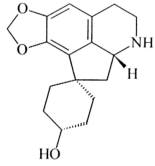


**187**



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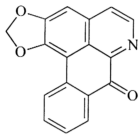

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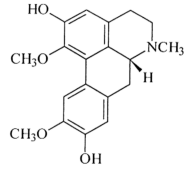

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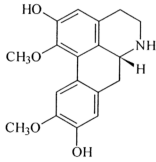

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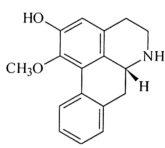

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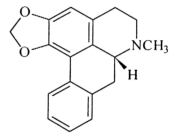

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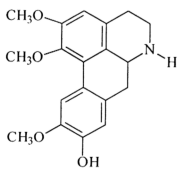

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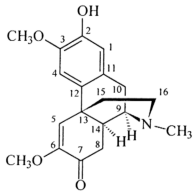

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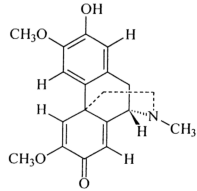

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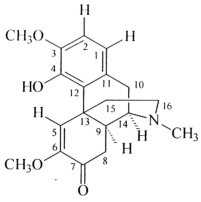

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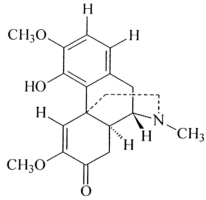

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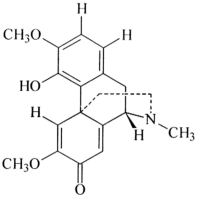

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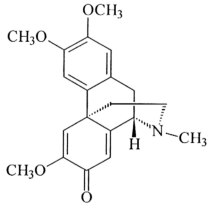

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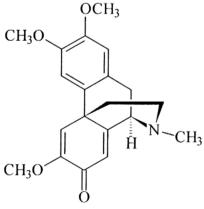

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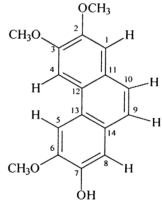

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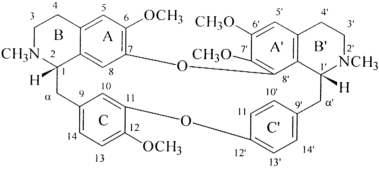

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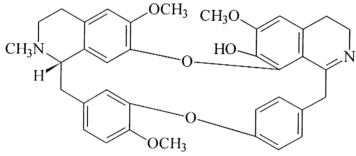

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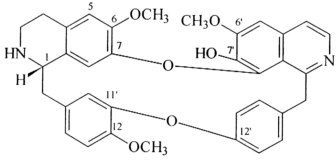

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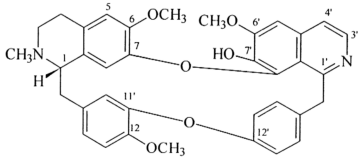

**202**