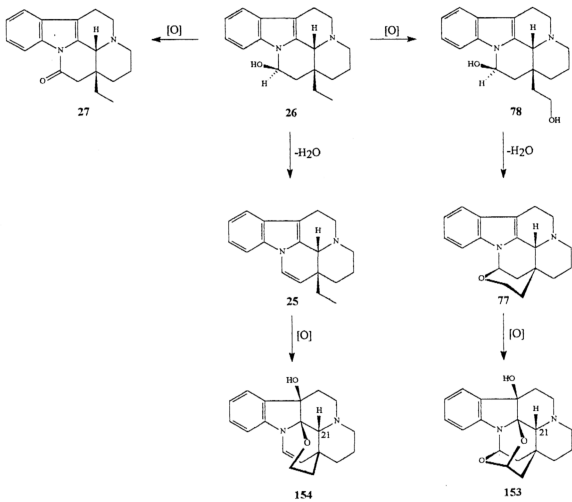


CHAPTER FOUR

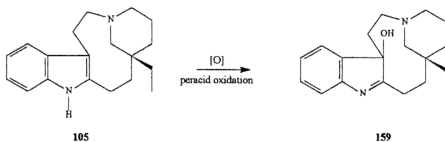
4.0 CONCLUSION

From the study, seven indole alkaloids were isolated from the bark, namely quebrachamine **105**, eburnamine **26**, isoeburnamine **61**, eburnaminol **78**, larutensine **77** and two new alkaloids, terengganensine A **153** and B **154**. Eight alkaloids were isolated from the leaves which were rhazhidigenine **159**, eburnamonine **27**, eburnamenine **25**, eburnamine **26**, eburnaminol **78**, larutensine **77**, terengganensine A **153** and B **153**. The majority of indole alkaloids afforded by *Kopsia terengganensis* are of the eburnane type skeleton (previously have been reported in *K. hainanensis*³⁴, *K. larutensis*^{39, 68}, *K. pauciflora*^{22, 41}, *K. officinalis*^{47, 48, 49} and *K. teoi*⁵⁸) together with two aspidospermane alkaloids, rhazhidigenine **159** and quebrachamine **105**. Of these two, quebrachamine **105** have only been encountered in *K. officinalis*⁴⁸ while rhazhidigenine **159** made an unprecedented appearance in the *Kopsia* species.

Two new alkaloids were isolated, named terengganensine A **153** and B **154** bearing a dihydroindole eburnane skeleton, which own an extra hydroxyl function at C-7 and an ether linkage between C2-O-C18. At the time of this study, no other *Kopsia* species that have been studied have such type of indole alkaloid, thus further demonstrate the diversity of indole skeletons in the *Kopsia* genus. The proposed biosynthesis relationship of these eburnane alkaloids are illustrated in Scheme 4.1. Meanwhile, by synthesis, peracid oxidation⁸⁰ of quebrachamine **105** produced rhazhidigenine **159** (Scheme 4.2).



Scheme 4.1 : Proposed biosynthesis relationship of the eburnane alkaloids isolated from *K. terengganensis*



Scheme 4.2 : Oxidation of quebrachamine 105

Since the known eburnane alkaloids, (-)-eburnamine, (+)-isoeburnamine, (-)-eburnaminol and (+)-larutensine, found in *K. terengganensis* all have the same absolute configuration at position 21, it is assumed that terengganensines A 153 and B 154 also have the same absolute configuration.

All the crude extracts do not exhibit any significant toxicity ($ED_{50} < 20\mu\text{g/ml}$). However, further studies on their biological activity can still be investigated such as tubulin tests, antihypertension and antioxidant tests.