

CHAPTER 4
CONCLUSION

In summary, the chemical constituent of stem extracts from *Gelonium multiflorum* A Juss, four mixture and eight compounds were isolated from dichloromethane and Ethyl acetate crude extracts which there were good biological activities. The chemical structures were characterized by means of spectroscopic studies and biological activities have been examined, the isolated compounds are summarized as follow.

1. Mixture of saturated long chain aliphatic alcohols (Mixture A) 29 mg ;
yield 2.48×10^{-4} %
2. Mixture of long chain carboxylic acids (Mixture B) 52 mg; yield
 4.44×10^{-4} %
3. Mixture of three triterpenoids (Mixture C: α -Amyrin, Bauerenol and
Multiflorenol) 5200 mg ; yield 4.44×10^{-2} %
4. Mixture of long chain esters (Mixture D) 90.5 mg ; yield 7.74×10^{-4} %
5. Stigmasterol (Compound 1) 850 mg ; yield 7.26×10^{-3} %
6. Triterpenoid I (Compound 2) 12.4 mg ; yield 1.06×10^{-4} %
7. Helioscopinolide M (New Compound, Compound 3) 4.6 mg ;
yield 3.93×10^{-5} %
8. 3-Methoxy-4-propylbenzaldehyde (Compound 4) 4.0 mg ; yield
 3.41×10^{-5} %
9. Helioscopinolide E (Compound 5) 350.3 mg ; yield 2.99×10^{-3} %
10. Helioscopinolide A (Compound 6) 4.3 mg ; yield 3.67×10^{-5} %

11. 5-Hydroxymethyl furfuraldehyde (Compound 7) 12.1 mg ; yield

1.03×10^{-4} %

12. 7-Hydroxy-6-methoxycoumarin : scopoletin (Compound 8) 5.9 mg ; yield

5.04×10^{-5} %

The chemicals investigation of compounds obtained from the stems of *Gelonium multiflorum* A.Juss. as described in this study was firstly reported, especially three diterpenes : Helioscopinolide A, Helioscopinolid E and Helioscopinolide M . The last compound is proposed to be a new compound

In terms of biological activities, Compound 2, 7 and 8 showed moderate cytotoxicity on brine shrimp (LC_{50} 38.33, 39.28 and 13.31 $\mu\text{g/ml}$, respectively). Moreover, Compound 8 also showed the positive tests in both free radical scavenging and prevention of β -carotene bleaching antioxidants.

Proposal for the Future Work

Plants of the family Euphorbiaceae are known to produce a variety of diterpenoids. The naturally occurring diterpenoids always play an important role because of their biological activity as insect antifeedants, antifungal, antitumor and antimicrobial agents^{54,55}.

Additionally, helioscopinolide A, helioscopinolide E and helioscopinolide M (Compound 3) isolated from dichloromethane crude extract of the stems of *G. multiflorum* could be further investigated for biological activities (anticell lines, insecticide and antimalarial). The structural elucidation of Compound 2 (Triterpenoid I) might lead to discovery of new compounds which will be of an additional information to natural product research. Compound 8 exhibited a moderate cytotoxic lethality to brine shrimp (LC₅₀ 13.31 µg/ml) and also gave a positive results as an antioxidant which might be worthwhile to test further for anticancer activities or other specific bioassay.

Another aspect that would provide more fulfillment to this research is a chemotaxonomic study on chemical constituents from polar solvent extracts of stems and the other parts of *Gelonium multiflorum* A.Juss.