SUMMARY OF DISSERTATION

1. INTRODUCTION

Name of Ph.D candidate: Tran Phi Hung

Dissertation title: Botanical properties, phytochemistry and biological activity studies on *Psychotria prainii* H. Lév.

Speciality: Medicinal Materials - Traditional Pharmacy **Code number**: 9720206

Scientific supervisors:

1. Assoc. Prof. Dr. Nguyen Trong Thong
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Academic institution: Vietnam National Institute of Medicinal Materials

2. SUMMARY

2.1. Objectives

- ***Botanical properties:***

  Identification of scientific name, morphological and microscopy characterization of *Psychotria prainii* H. Lév..

- ***Chemical constituents:***

  Extraction, isolation, identification of several compounds from *Psychotria prainii* H. Lév..

- ***Biological activities:***

  Evaluation of some biological activities of aqueous extract and some compounds isolated from *Psychotria prainii* H. Lév..

2.2. Methods

2.2.1. Botanical study

- *Scientific name identification:* Morphological characteristics were in comparison with published data and certificated voucher specimen of *Psychotria prainii* H. Lév.. The result was authenticated by expert.
- *Microscopic study:* Applying microscopic method for the study on anatomical and microscopy characteristics of stem, leaf, root of *Psychotria prainii* H. Lév..

2.2.2. Phytochemical study

- *Qualitative analysis:*

  Chemical components were detected applying phytochemical screening test and TLC method.

- *Extraction, isolation and structural elucidation of isolated compounds:*
  - Continuous percolation extraction was carried out using 96% ethanol as solvent.
  - Isolation was performed applying column chromatography (CC) (silica gel 70-230 mesh - Merck), YMC RP-18 (30-50 μm, Fuji Silysia Chemical Ltd., Japan), Sephadex LH20 (Amersham Biosciences), and dianion HP20. Fractions were tested using TLC method. Spots were detected under UV 254 nm, UV 366 nm and/or by spraying with 2% H_2SO_4 reagent, followed by heating.
  - Chemical structures were identified base on their physical properties (melting points, rotary polarization) and spectroscopy analysis: Infrared spectroscopy (IR), mass spectrometry (ESI-MS, HR-ESI-MS), one-dimensional nuclear magnetic resonance spectroscopy (^{1}H-NMR, ^{13}C-NMR, and DEPT), and two-dimensional nuclear magnetic resonance spectroscopy (HMBC, HSQC and NOESY).

2.2.3. Biological evaluation

- Test solutions: Aqueous extract and 4 compounds isolated from aerial parts of *Psychotria prainii* H. Lév. extracts.
- *Psychotria prainii* H. Lév. aqueous extract activity was evaluated applying mouse model of irritable bowel syndrome study.
- Anti-inflammatory *in vitro* activities of several compounds isolated from aerial parts of *Psychotria prainii* H. Lév. extracts were evaluated by inhibition of NO production in LPS-stimulated RAW264.7 macrophage cells.

2.3. Results and Conclusion

2.3.1. Botanical properties

- The sample, which was collected at Pung Ngo, Chieng Mai village, Mai Son district, Son La province, was identified as *Psychotria prainii* H. Lév., Rubiaceae.

- Morphological, anatomical analysis of stem, leaf, root of *Psychotria prainii* H. Lév. and microscopy characteristics of their powders were reported.

2.3.2. Chemical constituents

- Flavonoid, alkaloid, and tannin were shown as main active chemical constituents of aerial parts of *Psychotria prainii* H. Lév.. The presence of organic acid, amino acid, monosaccharide, polysaccharide, fat, sterol, and carotene were also detected.
- 10 compounds were isolated from *Psychotria prainii* H. Lév., their structure was identified, including 3 flavonoids (**2**-**4**), 3 monoterpene glucosides (**8**-**10**), 3 megastigmans (**1**, **6**-**7**), and 1 alkaloid (**5**). Among them, 6-ethyl ether deacetylasperulosidic acid was reported for the first time in nature, 7 compounds were isolated from genus *Psychotria* for the first time: sulfuretin (3′,4′,6-trihydroxyauron) (**2**), butein (2′,3,4,4′-tetrahydroxychalcon) (**4**), carbonylbis[imino(6-methyl-3,1-phenylene)]bis[carbamic acid] dimethyl ester (**5**), asperulosidic acid (**7**), degalloylmacarangioside B (**8**), 6-hydroxyjunipeionoloside (**9**), and roseoside II (**10**).

2.3.3. Biological activities

- *Psychotria prainii* H. Lév. aqueous extract at daily doses 0.32 g/kg and 0.80 g/kg had effective prevention and treatment on the model of irritable bowel syndrome mice induced by oil of mustard.
- Study on *Psychotria prainii* H. Lév. aqueous extract on gastrointestinal transit indicated the following results:
  + *Psychotria prainii* H. Lév aqueous extract at doses 0.32 g/kg and 0.8 g/kg reduced gastrointestinal transit in experimental animals.
  + *Psychotria prainii* H. Lév aqueous extract at doses 0.32 g/100 ml and 0.80 g/100 ml reduced the volume of fluid in the intestines in experimental animals.
- Anti-inflammatory *in vitro* activities of four compounds (**1**, **5**-**7**) isolated from aerial parts of *Psychotria prainii H. Lév*. extracts were evaluated by inhibition of NO production in LPS-stimulated RAW264.7 macrophage cells. Among them, compounds **7** (asperulosidic acid) and **5** (carbonylbis[imino(6-methyl-3,1-

phenylen)]bis[carbamic acid] dimethyl ester) exhibited strong effect with the IC_{50} values of 5.75 ± 0.85 and 6.92 ± 0.43 µM, respectively.

Hanoi, 29 Oct 2018

THE SCIENTIFIC SUPERVISORS **Ph.D CANDIDATE**

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