MINISTRY OF HEALTH
HANOI UNIVERSITY OF PHARMACY

SOCIALIST REPUBLIC OF VIETNAM
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ABSTRACT OF THE DISSERTATION

1. Introduction

Name of candidate: Hoang Viet Dung

Topic of the dissertation:

"Study on botanical characters, chemical composition and the acetylcholinesterase inhibitory activity of *Piper thomsonii* (C. DC.) Hook. f. var. *thomsonii* and *Piper hymenophyllum* Miq., Piperaceae"

Specialization: Traditional Pharmacy **Code number:** 62.72.04.06

Names of academic advisors:

1. PhD. Do Quyen
2. Assoc. Prof. PhD. Nguyen Minh Chinh

Name of academic institute: Hanoi University of Pharmacy

2. Summary

2.1. Objectives

1. Describing morphological and micro characters, identifying scientific names of 2 studied species.

2. Isolating compounds from 2 studied species.

3. Deploying the method and applying to evaluate the acetylcholinesterase inhibitory activity *in vitro* of extracts and compounds which are extracted and isolated from 2 studied species.

2.2. Methods

2.2.1. Study on botanical characters

Identifying scientific names of the 2 studied species based on morphological characters and comparing with reference specimens.

Micro characters are described based on obserbvation under the microscope.

2.2.2. Study on chemical composition

Fractions extracted from 2 studied species with some different solvents are evaluated the acetylcholinesterase inhibitory activity *in vitro*. 4 extracts possessing the strongest activities are studied on chemical composition by using some chromatography methods including: column chromatography, medium performance liquid chromatography, preparative high performance liquid chromatography, preparative thin layer chromatography.

Identifying isolated compounds based on data including: rotation angle, typically chemical reaction, mass spectrum, nuclear magnetic resonance.

2.2.3. Study on acetylcholinesterase inhibitory activity in vitro

Deploying the method of evaluating acetylcholinesterase inhibitory activity *in vitro* based on the colorimetric method developed by Ellman with a slight modification. Some factors affacting the method are tested including: concentrations of substrate, reagent and enzyme solutions; reaction interval; effect of solvent on enzymatic activity.

Evaluating the acetylcholinesterase inhibitory activity of extracts and compounds extracted and isolated from 2 studied species by applying the deployed method.

2.3. Results and conclusion

2.3.1. Botanical identification

2 species of the genus *Piper* L. are identified as *Piper thomsonii* (C. DC.) Hook. f. var. *thomsonii* and *Piper hymenophyllum* Miq.

Their morphological and micro characters are also described.

2.3.2. Chemical composition

14 compounds were isolated from 2 studied species by using chromatography methods. 6 compounds isolated from *Piper thomsonii* (C. DC.) Hook. f. var. *thomsonii* consist of 4-(2'-(*Z*)-decenyl)-phenol; benzyl benzoat; 2-methoxy benzyl benzoat; cucumegastigman I; *trans*-phytol; dihydromyricetin. 8 compouds isolated from *Piper hymenophyllum* Miq. consist of 3,5-dimethoxy-4-hydroxycinnamoyl pyrrol; 3,4-dihydroxycinnamyl alcohol methyl ether; *O*-

methylmoscatolin; (*E*)-caffeoyl aldehyd; 1-allyl-3,4-dihydroxybenzen; neotaiwanensol A và B; spathulenol. Among them, 3 new compounds have neve been previously reported from nature, 4 other ones were isolated from the genus *Piper* L. for the first time. All of 14 compounds have never been previously isolated from 2 studied species.

2.3.3. Acetylcholinesterase inhibitory activity in vitro

Some suitable conditions for the *in vitro* experiment are determinated including: ATCI solution (substrate) 2.4 mM, DTNB solution (reagent) 2.4 mM, acetylcholinesterase solution 0.25 IU/ml, incubation interval 15 minutes.

Four fractions, including: two *n*-hexane and ethylacetate extracts from *Piper thomsonii* (C. DC.) Hook. f. var. *thomsonii*; two chloroform and ethylacetate extracts from *Piper hymenophyllum* Miq. show stronger activities than activities of the other fractions. Therefore, they are selected to study chemical composition.

From these 4 fractions, 14 compounds were isolated and their acetylcholinesterase inhibitory activities were evaluated. Among them, neotaiwanensol B displays the strongest activity with IC_{50}=14,46 μM.

Date: 16/07/2014

The scientific advisors **Doctoral candidate**

PhD. Do Quyen **Assoc. Prof. PhD. Nguyen Minh Chinh** **Hoang Viet Dung**