

# THESIS SUMMARY

**Full name of the PhD student:** Nguyen Viet Dung

**Thesis name:** “Research on plant characteristics, chemical compositions and some biological effects of *Hypericum sampsonii* Hance., (Hypericaceae) family”.

**Major:** Medicinal herbs - Traditional medicine

**Code:** 9720206

**Full name of the instructor** (Academic title, degree):

1. Assoc. Prof. PhD. Nguyen Duy Thuan
2. Assoc. Prof. PhD. Pham Thi Van Anh

**Training institution:** National Institute of Medicinal Materials

**Thesis summary:**

## 1. Objectives

- Research on plant characteristics, determine scientific names and determine microscopic characteristics, powder characteristics of stems, leaves, roots of *Hypericum sampsonii* Hance.
- To study on chemical constituents of the herbs of *Hypericum sampsonii* Hance.
- Evaluating the acute toxicity of the extract of the aboveground part of *Hypericum sampsonii* Hance; Studying some biological effects of the extract of the aboveground part of *Hypericum sampsonii* Hance and some isolated active substances.

## 2. Research methods

### 2.1. Botany research

- Appraisal of the scientific name of the research species on the basis of analysis of plant morphological characteristics, comparison with published documents of the species and plant taxonomy courses.
- Determination of microscopic characteristics of stems, leaves, roots and characteristics of medicinal powder by microscopy methods.

### 2.2. Chemistry research

- Qualitative method: Qualitative determination of groups of organic substances in medicinal herbs by characteristic chemical reactions.

- Methods for extraction, isolation and structural determination of compounds:

- + The research sample is dried and then ground into powder, which is extracted by soaking methods with MeOH solvent.

- + Isolation of compounds from fractions by column chromatography and prepared high performance liquid chromatography system. Fractions during isolation are monitored by thin layer chromatography.

- Methods to determine chemical structures of compounds: Determine structures of isolated compounds based on physical parameters and spectroscopic methods, ESI-MS, HR-EI-MS, 1-D and 2-D NMR dimension (HSQC, HMBC, COSY, NOESY) combined with published documents.

### ***2.3. Research on acute toxicity and biological activity***

#### ***a. In term of acute toxicity***

- Evaluation of the acute toxicity of the aboveground part from *Hypericum sampsonii* Hance.

#### ***b. In term of biological activity***

- Evaluation of antioxidant activity of 09 isolated substances and extract of *Hypericum sampsonii* Hance.

- Evaluation of the ability to inhibit NO production of 03 isolated substances and extract of *Hypericum sampsonii* Hance.

- Evaluation of acetylcholinesterase enzyme inhibitory activity of 09 isolated substances and extract of *Hypericum sampsonii* Hance.

- Evaluation of the effect of improving memory and anti-oxidation of the aboveground part of *Hypericum sampsonii* Hance extract in experimental studies.

### **3. Main results and conclusions**

#### **3.1. In term of botanical characteristics of *Hypericum sampsonii* Hance., (Hypericaceae) family**

- Assessed the scientific name of *Hypericum sampsonii* Hance., collected in Ha Vi commune, Bach Thong district, Bac Kan province as *Hypericum sampsonii* Hance., (Hypericaceae) family.

- Described the microscopic characteristics of leaves, stems, roots and characteristics of stems, leaves, and roots of *Hypericum sampsonii* Hance., contributing to standardization of medicinal herbs.

### 3.2. In term of chemical compositions of *Hypericum sampsonii* Hance., (Hypericaceae) family

- Identified groups of compounds present in *Hypericum sampsonii* Hance., (Hypericaceae) family, including: flavonoid, saponin, reducing sugars, tannins, polysaccharides, fats.

- From the aboveground part of *Hypericum sampsonii* Hance., (Hypericaceae) family, isolated and determined the chemical structures of 15 compounds including:

+ 5 compounds are isolated firstly from *Hypericum sampsonii* Hance: 3,5,6-trihydroxy-1-methoxyxanthone; Petiolin F; Quercetin-3'-*O*- $\beta$ -D-galactopyranosid; Quercetin-3-*O*- $\beta$ -D-galactopyranosid; Cratoxyarborenone F.

+ And the remaining 10 compounds, including (Mangiferin, Quercetin, 3,5-dihydroxy-2',4',6'-trimethoxybenzophenone-3-*O*- $\alpha$ -L-rhamnopyranosid, Neolancerin, Euxanthone, 2-hydroxyxanthone, acid betulinic, 3,5-dihydroxy-2',4',6'-trimethoxybenzophenone, I3-II8-biapigenin và Daucosterol).

### 3.3. In term of acute toxicity and biological activity of *Hypericum sampsonii* Hance., (Hypericaceae) family.

#### a. In term of acute toxicity

- Evaluated that the aboveground part of *Hypericum sampsonii* Hance is very less toxic in 24 hours at a dose of 225.0 grams of dried medicinal herbs/Kg of body weight.

#### b. In term of biological activity

- Evaluation of antioxidant activity

+ 09 isolated compounds (HSA1, HSA2, HSA4, HSA9, HSA13, HSA15, HSA16, HSA17, HSA20) are evaluated for antioxidant activity, 02 compounds Mangiferin (HSA1) and 3,5,6- trihydroxy-1-methoxyxanthone (HSA2) have the best antioxidant activity with value of  $IC_{50} = 35,48 \pm 1,23 \mu M$  and  $IC_{50} = 87,10 \pm 2,16 \mu M$ .

+ *Hypericum sampsonii* Hance has low antioxidant activity with value of  $IC_{50} = 93,33 \pm 1,78 \mu g/ml$ .

- Evaluation of NO production inhibitory activity

+ Compound Petiolin F (HSA4) has the best NO production inhibitory activity with value of  $IC_{50}$  as  $2,00 \pm 0,34 \mu M$  compared with positive control and 02 tested substances.

+ Compounds 3,5-dihydroxy-2',4',6'-trimethoxybenzophenone-3-*O*- $\alpha$ -L-rhamnopyranoside (HSA9) and 3,5-dihydroxy-2',4',6'-trimethoxybenzophenone

(HSA20) have a good NO inhibitory activity, value of  $IC_{50}$  as  $2,29 \pm 0,12 \mu\text{M}$  and  $2,40 \pm 0,69 \mu\text{M}$  respectively.

+ *Hypericum sampsonii* Hance extract has inhibitory activity on NO production.

- Evaluation of acetylcholinesterase enzyme inhibitory activity

+ In 09 isolated compounds (HSA1, HSA2, HSA4, HSA9, HSA13, HSA15, HSA16, HSA17, HSA20) and *Hypericum sampsonii* Hance extract; in which, *Hypericum sampsonii* Hance extract has a very good inhibitory activity of acetyl cholinesterase with value of  $IC_{50} = 19,95 \pm 1,09 \mu\text{g/ml}$  at two test concentrations of 100 g/ml and 500 g/ml compared to compound HSA15, in 9 samples of compounds, Cratoxyarborenone F (HSA15) is firstly mentioned with the ability to inhibit acetyl cholinesterase enzyme.

- Effect of improving memory and anti-oxidation of extract of *Hypericum sampsonii* Hance in experimental studies

+ Effect of improving memory: extract of *Hypericum sampsonii* Hance has a memory improvement effect comparable to Scopolamine control at a dose of 10.8 g (extract)/kg.

+ Effect of anti-oxidation: extract of *Hypericum sampsonii* Hance shows a hepatoprotective antioxidant effect equivalent to and slightly higher than that of Sylymarin at a dose of 140 mg/kg with two dosage levels (3.6 grams of DL/kg and 10.8 grams of DL/kg).

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