

Information on Doctoral thesis of Fellows Tran Thi Thanh Nhan

1. Full name: Tran Thi Thanh Nhan
2. Sex: Female
3. Date of birth: 06-01-1982
4. Place of birth: Hai Phong
5. Admission decision number: 679/QĐ-SĐH, Director of the VNU University of Science, May 15, 2009
6. Changes in academic process: No
7. Official thesis title: "Study of isolation, structure determination, and biological activity evaluation of compounds from some plants belonging to the families Asteraceae and Zingiberaceae"
8. Major: Organic Chemistry
9. Code: 62 44 27 01
10. Supervisors:

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11. Summary of the new findings of the thesis

The PhD Thesis studied the chemical constituents of three valuable plant species of the genus *Artemisia* (Asteraceae) and *Curcuma* (Zingiberaceae), *Artemisia roxburghiana* Bess. (Asteraceae), *Artemisia dubia* Wall. ex Bess. var. *longeracemosa* Pamp. forma *tonkinensis* Pamp. (Asteraceae), and *Curcuma kwangsiensis* S. G. Lee et C. F. Ling (Zingiberaceae).

+ The chemical constituents of *Artemisia roxburghiana* Bess. (Asteraceae) of Vietnam were studied for the first time in the Thesis. The study isolated **nineteen compounds** from the leaves of this plant and determined their structures by modern physical methods (IR, MS, 1D and 2D NMR) to be 3-oxofriedelane (friedelin) (AR1), friedelan-3 β -ol (*epifriedelanol*) (AR2), roxburghianin A (AR3), tetracosanoic acid (AR4), β -sitosterol (AR5), docosyl *p*-coumarate (AR6), tetracosyl *p*-coumarate (AR7), achillin (AR8), eicosanoic acid (AR9), 1-*O*-palmitoylglycerol (AR10), 1-*O*-stearoylglycerol (AR11), palmitic acid (AR12), 23(*Z*)-cycloart-23-ene-3 β ,25-diol (AR13), 1 β ,10 β -epoxyachillin (AR14), roxburghianin B (AR15), 1-octacosanol (AR16), 11-*epi*-8 α -hydroxyarborescin (AR17), 24(*R*)-cycloart-25-ene-3 β ,24-diol (AR18), and 24(*S*)-cycloart-25-ene-3 β ,24-diol (AR19).

Of the compounds isolated, three are new compounds: roxburghianin A, roxburghianin B, and 11-*epi*-8 α -hydroxyarborescin.

+ The chemical constituents of *Artemisia dubia* Wall. ex Bess. var. *longeracemosa* Pamp. forma *tonkinensis* Pamp. (Asteraceae) of Vietnam were studied for the first time in the Thesis. The study isolated **thirteen compounds** from the leaves of this plant and determined their structures by modern physical methods (IR, MS, 1D and 2D NMR) to be calotropoleanyl ester (AD1), nonacosanoic acid (AD2), 13(18)-oleanen-3 β -ol (AD3), α -amyrin (AD4), docosanoic acid (AD5), tetracosanoic acid (AD6), β -sitosterol (AD7), stigmasterol (AD8), 1-O-palmitoylglycerol (AD9), 1-O-stearoylglycerol (AD10), palmitic acid (AD11), 6-methoxy-1*H*-indol-3-methylcarboxylate (AD12), and β -sitosterol 3-O- β -D-glucopyranoside (AD13).

Of the compounds isolated, 6-methoxy-1*H*-indol-3-methylcarboxylate is the indole alkaloid isolated for the first time from natural sources.

+ The chemical constituents of *Curcuma kwangsiensis* S.G. Lee et C.F. Ling (Zingiberaceae) of Vietnam were studied for the first time. The study isolated five **compounds** from the rhizomes of this plant and determined their structures by modern physical methods (UV, IR, CD, MS, 1D and 2D NMR) to be β -sitosterol (CK1), tricosanoic acid (CK2), gweicurculactone (CK3), (1*R*,4*R*,5*S*,8*S*)-4-hydroxy-1,8-epoxyguaia-7(11),9-dien-12,8-olide (CK4), and 2-oxo-guaia-1(10),3,5,7(11),8-pentaen-12,8-olide (CK5).

Of the compounds isolated, (1*R*,4*R*,5*S*,8*S*)-4-hydroxy-1,8-epoxyguaia-7(11),9-dien-12,8-olide is a new guaianolide with an oxygen bridge between C-1 and C-8. 2-Oxo-guaia-1(10),3,5,7(11),8-pentaen-12,8-olide was found for the first time in plants of the family Zingiberaceae. The absolute stereostructures of **CK3** and **CK4** were determined by Circular Dichroism (CD) spectrum.

12. Practical applicability:

Artemisia and *Curcuma* are large plant genera belonging to the families Asteraceae and Zingiberaceae having many practical applications in the pharmaceutical and food industries. The study results make contributions to form the scientific basis for the scientific and rational use of the medicinal plants studied. The study has developed a sample library of phytochemicals, especially the guaianolide-type sesquiterpene lactones with rare structures, for the following chemical and biomedical studies aiming at new lead structures for drug discovery programs.

13. Further research directions, if any:

Sample Library of phytochemicals, especially sesquiterpene lactones, should be further extended through studies of structural modification and biological tests with various molecular targets for the purpose of detecting new lead compounds for drug discovery studies.

14. Thesis-related publications:

1. Minh Giang Phan, Thi Thanh Nhan Tran, Tong Son Phan, Hideaki Otsuka, Katsuyoshi Matsunami (2012), "Two new sesquiterpene lactones and other chemical constituents of *Artemisia roxburghiana*", *Biochemical Systematics and Ecology*, 45, pp. 1115-1119.

2. Phan Minh Giang, Tran Thi Thanh Nhan, Phan Tong Son, Katsuyoshi Matsunami, Hideaki Otsuka (2013), "A new guaianolid from *Artemisia roxburghiana*", *Natural Product Research*, 27 (20), pp. 1856-1858.
3. Tran Thi Thanh Nhan, Phan Tong Son, Phan Minh Giang (2012), "Phytochemical constituents of *Artemisia dubia* Wall. ex Bess. var. *longeracemosa* Pamp. forma *tonkinensis* Pamp. (Asteraceae)", *Vietnam Journal of Chemistry*, 50 (3), pp. 385-388.
4. Tran Thi Thanh Nhan, Phan Minh Giang, Phan Tong Son (2013), "Study on chemical constituents of *Artemisia roxburghiana* Bess. (Asteraceae)", *Vietnam Journal of Chemistry*, 51 (6ABC), pp. 23-30.
5. Phan Minh Giang, Tran Thi Thanh Nhan, Katsuyoshi Matsunami, Phan Tong Son (2014), "Guaianolides from *Curcuma kwangsiensis*", *Phytochemistry Letters*, 9, pp. 137-140.
6. Phan Minh Giang, Tran Thi Thanh Nhan, Truong Thi To Chinh, Phan Tong Son, Katsuyoshi Matsunami (2013), "Phytochemical constituents of *Artemisia dubia* Wall. ex Bess. var. *longeracemosa* Pamp. forma *tonkinensis* Pamp.", *Chemistry of Natural Compounds*, accepted paper.