

Information on Doctoral Thesis of Fellows Vu Ngoc Toan

Official thesis title: "***Study on synthesis and properties of 3-acetyl- và 4-formylcoumarin glycopyranosyl thiosemicarbazones***"

1. Full name: Vu Ngoc Toan

2. Sex: Male

3. Date of birth: 21/05/1978

4. Place of birth: Nam Dinh

5. Admission decision number: No. 3614/QĐ-SĐH date 22/10/2009

6. Changes in academic process: No

7. Official thesis title: "***Study on synthesis and properties of 3-acetyl- và 4-formylcoumarin glycopyranosyl thiosemicarbazones***".

8. Major: **Organic chemistry**

9. Code: **62 44 01 14**

10. Supervisors: **Prof. Dr. Nguyen Dinh Thanh**

11. Summary of the new findings of the thesis

- Two compounds *N*-(tetra-*O*- β -D-glucopyranosyl)- and (tetra-*O*- β -D-galactopyranosyl)thiosemicarbazide have been prepared by reaction of the corresponding isothiocyanates with hydrazine hydrate.

- Preparing 24 of carbonyl derivatives of coumarins, including 19 new substances.

- Synthesizing new 40 thiosemicarbazones compounds of *N*-(tetra-*O*- β -D-glucopyranosyl)-and *N*-(tetra-*O*- β -D-galactopyranosyl)thiosemicarbazides with different substituted 3-acetyl-coumarins and 6-alkoxy-, or 7-alkoxy-4-formylcoumarins by the synthetic method using microwave oven.

- Successfully carrying out the deacetylation of 7 peracetated glycosyl thiosemicarbazones with high yields.

- Successfully ring closing 8 thiosemicarbazones into 4,5-dihydro-1,3,4-thiadiazoles and other 7 thiosemicarbazones into 2,3-dihydro-1,3-thiazoles.

- Studying the structure of *N*-(tetra-*O*- β -D-glucopyranosyl)-and *N*-(tetra-*O*- β -D-galactopyranosyl)thiosemicarbazides, *N*-(tetra-*O*-acetyl- β -D-glycopyranosyl)thio-semicarbazones of substituted 3-acetylcoumarins and 6-alkoxy-, or 7-alkoxy-4-formylcoumarins, some products

metabolism by the method of IR, ¹H NMR and ¹³C NMR spectroscopy combined with 2D NMR techniques (HSQC, HMBC, COSY) and MS spectroscopy.

- Exploring the biological activities of new compounds, and finding the relationship between the electron structure and bioactivities by Hansch model.

12. Paratical applicability, if any:

The 81 new substanses has been prepared and determined the biological activities in thesis. The results in biological activities show that 4,5-dihydro- and 1,3,4-thiadiazol derivaties have good activity on yeast, mold, Gram (+) and Gram (-). These results are an important prerequisite for providing medicinal chemistry. Base on these, we can study and apply them into real drug manufacture in order to improving curable disease for people.

13. Further research directions, if any

- Studying the reduction reaction of obtained thiosemicarbazon with NaBH₃CN agent in methanol solvent.

- Studying the ability to make chelat of glycosyl thiosemicarbazon with ion transition metal (have orbitan *d* empty) such as: Ni(II), Co(II), Zn(II), Cu(II), .. And then determining biological activity of them.

- Studying the ability capture free radicals of modified compounds, after that determining ability antioxidant of them.

14. Thesis-related publications:

[1]. Nguyen Dinh Thanh, Vu Ngoc Toan (2009), "Contribution to synthesis of some 3'-acetylcoumarin (tetra-*O*-acetyl-β-D-glucopyranosyl)thiosemicabazons", *Vietnam Journal of Chemistry* Vol. 47(2A), pp. 480-484.

[2]. Nguyen Dinh Thanh, Vu Ngoc Toan, Nguyen Thi Cuc (2010), "Contribution to synthesis of 3"-acetylcoumarin (per-*O*-acetyl-β-D-galactopyranosyl)-thiosemicarbazon", *Vietnam Journal of Chemistry* Vol. 48(4B), pp. 115-120.

[3]. Nguyen Dinh Thanh, Vu Ngoc Toan, Luu Cam Tu (2012), "Contribution to synthesis of some 4-(tetra-*O*-acetyl-β-D-glucopyranosyl)thiosemicarbazon of substituted 4-formylcoumarins", *Vietnam Journal of Chemistry* Vol. 50(4A), pp. 123-126.

[4]. Nguyen Dinh Thanh, Vu Ngoc Toan, Nguyen Thi Mai, Vu Hong Khuyen (2013), "Study on synthesis of some 4-formylcoumarin 4-(tetra-*O*-acetyl-β-D-glucopyranosyl)thiosemicarbazon", *Vietnam Journal of Chemistry* Vol. 51(5A), pp. 38-43.

[5]. Nguyen Dinh Thanh, Vu Ngoc Toan, Nguyen Minh Tri, Vu Hong Khuyen (2013), "Study on synthesis of some 4-formylcoumarin 4-(tetra-*O*-acetyl-β-D-galactopyranosyl)thiosemicarbazon", *Vietnam Journal of Chemistry* Vol. 51(6ABC), pp. 201-205.

[6]. Nguyen Dinh Thanh, Vu Ngoc Toan (2013), "Synthesis of some peracetylated glucopyranosyl thiosemicarbazons of substituted 4-formylcoumarins", *Asian Journal of Chemistry* Vol. 25(12), pp. 6609-6611.

[7]. Nguyen Dinh Thanh, Vu Ngoc Toan (2014), "Study on NMR spectra of some 4-formylcoumarin 4-(tetra-O-acetyl- β -D-glucopyranosyl)thiosemicarbazons", *Vietnam Journal of Analytical Sciences* Vol. 19(1), pp. 68-73.

[8]. Vu Ngoc Toan, Nguyen Dinh Thanh (2010), "Contribution to bioactivity research of some 3-acetylcoumarin 2,3,4,6-tetra-O-acetyl- β -D-glucopyranosyl thiosemicarbazons", *Vietnam Journal of Military Science and Technology* No. 8, pp. 81-84.

[9]. Vu Ngoc Toan, Nguyen Dinh Thanh, Nguyen Thi Hue (2012), "Synthesis of some 4-(Tetra-O-Acetyl- β -D-Galactopyranosyl)thiosemicarbazons of substituted 4-formylcoumarins", *Vietnam Journal of Science and Technology* Vol. 50(3D), pp. 938-943.