

INFORMATION ON DOCTORAL THESIS

1. Full name: Nguyen Thi Bich Huong
2. Sex: Female
3. Date of birth: 16/8/1982
4. Place of birth: Hai Duong
5. Admission decision number: 5429/SĐH Dated: October 30, 2008 of President of Vietnam National University.
6. Changes in academic process: No
7. Official thesis title: Synthesis, structural studies and investigation of biological activity of complexes Pd(II), Ni(II) with some derivative thiosemicarbazones
8. Major: Inorganic chemistry
9. Code: 62 44 25 01
10. Supervisors: Assoc. Prof. Dr. Trinh Ngoc Chau
11. Summary of the new findings of the thesis:
 - 12 thiosemicarbazones with different substitutes at the N(4)- thiosemicarbazide: N(4)-methyl, N(4)-allyl and N(4)-phenyl of pyruvic acid, benzaldehyde and acetophenone were successfully synthesized and their chemical formula and structural formula were investigated by means of IR, $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ methods. The results show that the free ligands exist in thion tautomer
 - 24 complexes of these thiosemicarbazones with palladium(II) and nickel(II) were synthesized and characterized by means of IR, NMR, MS methods. The obtained results allow giving conclusion about coordination style of thiosemicarbazones and structural formula of complexes.
 - The software "Chem Bio Draw Ultra 11.0" has been using effectively to support the characterization and spectral assignment for $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ spectroscopy of the thiosemicarbazones.
 - The software "isotope distribution calculator" also has been utilizing in the analysis of isotopic pattern of molecular-ion peaks for testing molecule formula of complexes. The fragmentary mechanism of $\text{Pd}(\text{thbz})_2$, $\text{Pd}(\text{pthbz})_2$, $\text{Ni}(\text{pthbz})_2$ and $\text{Ni}(\text{thacp})_2$ were also proposed with the utilization of software "Mass Frontier V.4.0 software".

- Biological activity of 12 ligands, 24 complexes and 2 free ion Ni^{2+} and Pd^{2+} were tested on 06 types of bacteria and one type of fungus. The results show that complexation leads to increase biological activity of these thiosemicarbazones. Six complexes have good antibacterial activity. Among them, the $\text{Ni}(\text{mthacp})_2$ inhibit 5/7 of testing types bacteria and fungus.

- Six complexes, that have highest activity against to bacteria were also tested inhibitive activity against development of cancer cell and normal cell of. The results reveals that all tested compounds have higher inhibitive activity against cancer cell than the normal cell. So that, there is a gap of concentration of complexes in which the cancer cells were inhibited but not with normal cells

12. Practical applicability:

- By using different substitutes at N(4) position of thiosemicarbazide frame, we have created a series of free ligands with systematic change in the character. They are allowed us to understand how affect of substitution on the ability to form complexes and their biological activity. These higher biological activities of several complexes were suggested that they are promising objects for further study on their pharmaceutical application.

- The results in this study should provide helpful some information for the field of study on design and syntheses of compounds with predetermined activities in the future.

13. Further research directions

- To continue the synthesis and study on thiosemicarbazones, that have different substitutes, different positions and their complexes for contribution to the field of synthesis of complexes and making clear the coordination style of thiosemicarbazones.

- To continue testing the biological activity of the compounds for looking for some compounds using in medicine, investigation deeper on the mechanism of biological activity of the thiosemicarbazone and contribution to the field of studding on " relation between structure and bioactivity of thiosemicarbazone"

14. Thesis-related publications:

1. Trinh Ngoc Chau, Nguyen Van Ha, Nguyen Thi Bich Huong (2008) "Synthesis and spectral studies of complexes between palladium and some thiosemicarbazone", Journal of Chemistry 46(2), pp. 251 - 257.

2. Trinh Ngoc Chau, Nguyen Van Ha, Nguyen Thi Bich Huong (2009) "Synthesis and spectral studies of palladium and nickel complexes with acetophenone thiosemicarbazone", Journal of Analysis Chemistry, Physics and Biology 14(1), pp. 79 - 93.

3. Trinh Ngoc Chau, Nguyen Van Ha, Nguyen Thi Bich Huong (2009) "Synthesis, structural study and biological investigation of palladium complex with p-N,N-dimethylamino benzaldehyde 4-phenyl thiosemicarbazone", *Journal of Chemistry* 47(2A), pp. 320 - 325.
4. Trinh Ngoc Chau, Nguyen Van Ha, Nguyen Thi Bich Huong (2010) "Synthesis and structure study on nickel(II) and palladium(II) complexes of pyruvic acid 4-phenyl thiosemicarbazone", *Journal of Chemistry* 48 (4B), pp.183 - 188.
5. Trinh Ngoc Chau, Nguyen Thi Bich Huong (2011) "The complexes of Ni(II) and Pd(II) with N⁴-allyl thiosemicarbazone benzaldehyde", *Journal of Chemistry* 49 (3A), pp. 57 - 60.
6. Trinh Ngoc Chau, Nguyen Thi Bich Huong (2011) "Nickel(II) and palladium(II) complexes of pyruvic acid N(4)-methyl thiosemicarbazone", *Journal of Chemistry* 49(2ABC), pp. 57 - 60.
7. Trinh Ngoc Chau, Nguyen Thi Bich Huong (2011) "Synthesis, structural and biological activities study on some complexes nickel(II) with benzaldehyde thiosemicarbazones and derivatives N(4)-methyl, N(4)-phenyl", *Journal of Chemistry* 49(2ABC), pp. 61 - 65.