Information on Doctoral thesis of Fellows Nguyen Thi Anh Tuyet

1. Full name: Nguyen Thi Anh Tuyet

2. Gender: Female

3. Date of birth: 25/09/1978

4. Place of birth: Thai Nguyen, Vietnam

5. Admission decision number: 5429/QĐ-SĐH dated 30/10/2008 by President of Vietnam National University, Hanoi

6. Changes in the training process: None

7. Official thesis title: Study on assessment of betalactam antibiotic content in the pharmaceutical and biological objects by modern analytical methods.

8. Major: Analytical Chemistry

9. Code: 62 44 29 01

10. Supervisors: Principal supervisor: Assoc.Prof. Nguyen Van Ri

    Secondary supervisor: Prof. Pham Hung Viet

11. Summary of the new findings of the thesis:

Determination of 5 β-lactam antibiotics by RP-HPLC/UV.

The optimal condition for the determination of five β-lactam antibiotics had been studied and obtained as follows: column Supelcosil RP-C18, particle size 5 μm, mobile phase: 10 mM acetate buffer; pH 3.5; rate ACN/MeOH/buffer 20/10/70 (v/v), flow rate 0.8 ml/minutes. Calibration curves was established from standard antibiotics in the range of 0.1 – 2.0 μg/ml; The detection limits for the five β-lactam were less than 0.09 μg/ml and the recoveries of the methods in pharmaceutical and urine samples were over than 95% and 86%, respectively.

Simultaneous determination of three β-lactam antibiotics by RP-HPLC with fluorescence detector.

+ The optimal conditions for derivative reaction between β-lactam and NBD-F reagent are reaction temperature 70°C, derivatization time 12 minutes, reagent concentration 100 μg/ml.

+ The optimal conditions of chromatography system were: Supelcosil RP-C18 column, mobile phase 10 mM acetate buffer; pH 5.0; ACN/MeOH/buffer = 25/25/50 (v/v/v), flow rate 1.0 ml/min.

+ Calibration curves of three β-lactam antibiotics were established in the range of 0.05 – 2.0 μg/ml. The detection limit of the methods were less than 0.01 μg/ml. The selected method had been applied to analyze β-lactam in pharmaceutical samples and serum samples with the recoveries over 99% and over 93.6%, respectively. The β-lactam antibiotics in urine samples of patients who had used drug after 6 hours and 10 hours had been determined. The results completely agreed with the pharmacokinetic parameters of the drug. The studied results contribute to the determination of antibiotics concentration in the body of patients.

The simultaneous determination of seven β-lactam antibiotics using micellar electrokinetic chromatography-MEKC.

The optimal conditions for the analysis had been established and obtained as follows:

+ Bare silica capillary, total length 64.5 cm, diameter of 50 μm.

+ Eectrophoresis potential voltage 20 kV.

+ Time of hydrodynamic sample pump 10 seconds.

+ Capillary temperature 28 degree Celsius.

+ Buffer solution: 25 mM borate buffer with 100 mM SDS micelles at pH 7.75.

+ Calibration curves of seven β-lactam antibiotics were built in the range of 1.0 – 10.0 μg/ml. The method showed the good parameters such as high resolution, good repeatability and the detection limit less than 0.54 μg/ml. The studied method has been applied to determine β-lactam antibiotics in six pharmaceutical samples with high recovery of 97.3% and the deviation from the amount stated on the label in the allowed limit of less than 5%.

In addition, CE method with solid phase extraction (SPE) had been combined to determine β-lactam antibiotics in urine samples and obtained reliable results with recovery over 83%.

The systematically studied results about MEKC and RP-HPLC/fluorescence detector method firstly show the advanced application in determining β-lactam antibiotics in Vietnam.

These researched results were published in six papers published in the journals.

12. Practical applicability, if any:

The research can be applied to separate and simultaneously determine of β-lactam antibiotics in pharmaceuticals, biological fluids.

13. Further research directions, if any:

- To use the results to build analytical process and then get approval of a standard analytical method to determine the β-lactam antibiotics in pharmaceuticals and biological fluids.

- To continue to study conditions of fluorescent derivatives generation with β-lactam antibiotics containing level-2- amine groups to apply the method of HPLC - fluorescent detector.

14. Thesis-related publications:

[1]. Nguyen Duc Thanh, Nguyen Van Ri, Nguyen Thi Anh Tuyet (2008), "Simultaneous determination of enrofloxacilin and ciprofloxacilin in food by the high performance liquid chromatography", *Journal of Analysis in Chemistry, Physics and Biology* 13(3), pp. 26- 29.

[2]. Nguyen Thi Anh Tuyet, Tran Thi Thu Hang, Nguyen Van Ri (2010), "Study on separated conditions and determination of some β-lactam antibiotics by the Micellar electrophoresis capillary chromatography – (MECC)", *Journal of Analysis in Chemistry, Physics and Biology* 15(3), pp. 37-41.

[3]. Nguyen Thi Anh Tuyet, Nguyen Van Ri (2010), "Study on separated conditions and determination of some β-lactam antibiotics by Capillary Zone Electrophoresis (CZE)", *1st National scientific Conference on food control*, Ministry of Heath, pp. 369- 378.

[4]. Nguyen Thi Anh Tuyet, Lai Thi Thu Trang, Nguyen Van Ri (2011), "Study on separated conditions and determination of some β-lactam antibiotics by Reversed phase-high performance liquid chromatography (RP- HPLC)", *Journal of Chemistry* 49(2), pp. 908-912.

[5]. Nguyen Thi Anh Tuyet, Nguyen Van Ri (2012), "Examination of optimum conditions to build separated process and simultaneous determination of some β-lactam antibiotics by Electrophoresis method", *Journal of Science and Technology*, Thai Nguyen University 89 (01/2), pp. 295- 299.

[6]. Nguyen Thi Anh Tuyet, Tran Thi Dung, Hoang Thi Huong, Nguyen Van Ri, Duong Hong Anh (2012), "Research on analytic conditions of β-lactam antibiotics by high performance liquid chromatography with Fluorescence detector", *Journal of Analysis in Chemistry, Physics and Biology* 17(3), pp. 67- 72.