DOCTORAL DISSERTATION

Topic of the dissertation: *Method development for analysis of synthetic drugs illegally adulterated in herbal products*

Specialization: Drug quality control and Toxicology

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Names of academic advisors:

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Name of academic institute: Hanoi University of Pharmacy

Summary of new findings of the dissertation:

1. Developing LC-MS/MS procedures to analyze 16 synthetic drugs adulterated in traditional/herbal products

- The project is the first study in Vietnam to develop 3 LC-MS/MS procedures for identification and quantitation of 9 analgesic and anti-inflammatory drugs (paracetamol, piroxicam, indomethacine, ketoprofen, betamethasone, dexamethasone acetate, hydrocortisone acetate , 4 hypoglycemic drugs (glibenclamide, gliclazide, glimepiride, glipizide) and 3 PDE-5 inhibitors (sildenafil, tadalafil and vardenafil), using 9 placebo matrixes containing herbs for treatment of osteoarthritis, diabetes and ecrectile dysfunctions in men.

- Develop a chromatographic method for simultaneous analysis of 16 drugs with C18 column with mobile phase including formic acid containing 0.1%, water containing formic acid 0.1% according to gradient mode.

2. HPTLC methods were developed for the detection of 16 synthetic drugs adulterated in herbal preparations, one method for each group for non-steroidal anti-inflammatory drugs, analgesic and anti-inflammatory steroids, hypoglycemic group, PDE-5 inhibitor group in traditional herbal products.

3. For the first time in Vietnam, the TLC-SERS method was developed to detect sildenafil adulterated in traditional oriental preparations. Several technical parameters in creating the enhancement and signal measurement were investigated and selected for the successful detection of synthetic sildenafil adulterated in herbal preparations. Especially the double coffee-ring effect (concerning the redistribution of analyte particles and nano silver particles on the TLC plate) was described the first time in literature.

4. Applying the developed methods for the detection of synthetic drugs adulterated in herbal preparations

- Applying HPTLC method for identification and LC-MS/MS method for confirmative identification and determination of 16 synthetic drugs in 184 traditional medicine samples. 7 of 16 drugs were detected as adulteration in 25 positive samples. Adulterated compounds include paracetamol, indomethacine, dexamethasone acetate, glibenclamide, sildenafil, tadalafil and vardenafil.

- Applying TLC-SERS method for detection of sildenafil in 24 real products sodl as supporting supplement for ecrectile dysfunction treatment. 5 samples were detected positive to sildenafil, similar to the results from HPTLC and LC-MS/MS applications.

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