visualization for multisource database search of massive fine spatial data. Finally, massive fine multisource spatial data management prototype system can verify the analysis and discussion of several key technologies, reflecting the feasibility and practicability of the key technologies in this paper.

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DEVELOPMENT OF AN LC-MS METHOD FOR THE DETERMINATION OF YUANHUADINE AND YUANHUACINE IN RAT PLASMA: APPLICATION TO PHARMACOKINETIC STUDY

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Purpose of Study: Daphnane type diterpenoids, such as yuanhuadine and yuanhuacine, are promising anticancer drug which had shown to possess potent cytotoxic activity in vitro against various tumor cells which could be used as a potent antitumor drug. The definite antitumor activity and low cytotoxicity make yuanhuadine and yuanhuacine worthy of further development for the disease-oriented therapy. However, there have still been few reports on the pharmacokinetic study of yuanhuadine and yuanhuacine in rats. In this paper, a precise, selective and highly sensitive LC-MS method for determination of yuanhuadine and yuanhuacine in rat plasma we developed and validated to investigate the pharmacokinetic profiles of yuanhuadine and yuanhuacine.

Methods Used: The chromatographic separation was accomplished on CAPCELL PAK C18 column (150 mm × 4.6 mm, 5 μm) at a flow rate of 0.8 mL/min isostatically using methanol and 0.1% formic acid in water as mobile phase. Plasma samples were extracted by liquid-liquid extraction with methyl tert-butyl ether. Detection was performed on a single quadrupole mass spectrometer by selected ion monitoring (SIM) mode via electrospray ionization (ESI) source in positive mode.

Summary of Results: The pharmacokinetic parameters of yuanhuadine and yuanhuacine in rat plasma after intravenous administration at a dose of 50 μg/kg are as follows: the concentration of yuanhuadine and yuanhuacine reached a maximum (Cmax) of 428.8 ± 161.5 ng/mL and 256.2 ± 89.1 ng/mL, respectively. The plasma elimination half-life ($t_{1/2}$) was determined as 2.0 ± 0.7 h and 2.7 ± 1.6 h, respectively.

Conclusions: A selective and sensitive LC-ESI-MS method for the determination of yuanhuadine and yuanhuacine in rat plasma after intravenous administration has been developed and validated. Pharmacokinetic results indicated that yuanhuadine and yuanhuacine eliminated fast in vivo, and one should take care to ensure the pharmaceutical effect and avoid the side effects.

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MICROWARE PLASMA DESORPTION IONIZATION MASS SPECTROMETRY FOR RAPID SCREENING COUNTERFEIT MEDICINE

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Background: Mass spectrometry provides plentiful molecular information to probe the chemical nativity of samples, allowing confident detection of counterfeit medicals. Traditionally, targeted analytes must be separated from the matrices of real-world medical preparations, using a complex and time-consuming pretreatment procedure before mass spectrometry analysis. In recent years, analytical technology based on the ambient mass spectrometry is of increasing interest, because it requires no/minimal sample pretreatment. At present, advanced instrumentation required to achieve either high mass resolution or multiple stage mass spectrometry experiment impose high cost, large size and heavy weight on the mass spectrometers.

Method: In this work, a novel facial strategy is proposed to tune the mass spectral pattern of a given pharmaceutical preparation by combining thermal dissociation and ambient desorption ionization process in a miniaturized microwave plasma torch (MPT) source. As reported previously, MPT combines merits such as relatively high temperature, high electron density and high positive charge density. This makes MPT a suitable ionization source for desorption and ionization of volatile and/or non-volatile analytes. Consequently, MPT has been coupled to a simple mass spectrometer in this work for rapid qualitative analysis of real-world counterfeit drugs. In the process of experiment, pharmaceutical samples were placed on the sample holder without any pretreatment and the mass spectral data were collected by MPT-MS at optimized conditions.

Results: The peak of molecular ion of azithromycin at *m/z* 750 and mainly fragment ions at *m/z* 592, 574, 434, 416, 398 could be found in the full-scan mass spectra results from MPT-TOF MS. The results were consistent with the MS^n data of azithromycin from MPT-LTQ MS. It was shown that the information of molecular ion and the ionic fragments are found in the full-scan mass spectra by adjusting the distortion distance, time and temperature.

Conclusions: In summary, the results obtained in the work showed that installation of MPT ionization source to a cheap MS instrument is a cost-effective solution for rapid and confidential screening of pharmaceutical drugs.

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JUNIOR AND SENIOR UNDERGRADUATE NURSING STUDENTS' PERCEPTION OF HIGH-FIDELITY SIMULATION (HFS)

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Objectives: To study nursing students' perception of high-fidelity simulation in different stages and develop professional understanding and skills for nursing.

Methods: In this study, junior and senior nursing students' perception of HFS were investigated using the Educational Practices in Simulation Scale-Student Version (EPSS-S), the Simulation Design Scale-Student Version (SDS-S) and questionnaire with open-ended survey questions. The data were analyzed using Spearman's rho and the Mann-Whitney *U* test.

Results: The result indicated that junior and senior nursing students were satisfied with this new pedagogy, and the average score of satisfaction is 5.35 ± 2.25 (junior students) and 6.76 ± 1.97 (senior students), respectively. Significantly increased self-confidence after learning was observed in two groups ($P < 0.01$), compared to the before learning. Moreover, compared with the senior students, junior students showed higher anxiety (7.94±1.61) and lower self-confidence (3.12±0.70). There are statistically significant correlations between design characteristics with satisfaction and self-confidence for HFS in two groups of students (r=0.34-0.86).

Conclusions: The design of simulation training should be targeted and personalized to adapt to different categories of students' training.

Keywords: undergraduate nursing students; perception; high-fidelity simulation (HFS); student satisfaction and self-confidence

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