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## Microfluidic Analysis in Pharmaceutical and Medical Chemistry

Kel Uni Chan\*

Department of Pharmacology and Toxicology, Zhejiang University, Zhejiang, China

\*Corresponding author: Kel Uni Chan, Department of Pharmacology and Toxicology, Zhejiang University, Zhejiang, China; E-mail: [chanunk@gmail.org](mailto:chanunk@gmail.org)

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### DESCRIPTION

The discipline of medicinal and pharmaceutical chemistry is multidisciplinary that lies between the divisions of natural products and synthetic organic chemistry. It is also connected to the BIOMED module. This area primarily focuses on novel compounds, their development and synthesis, biological and chemical evaluation, correlations between structures and properties, and applications in pharmaceutical goods. This topical introduction covers an overview of the subject; it begins with a historical introduction and concludes with a look into the future. This article highlights, in the form of an overview, several elements linked to the processes created by green chemical analysis for the separation of bioactive chemicals from plants using aided methodologies and environmentally friendly solvents. Due to concerns with sustainability, profitability, and efficiency, procedures for the separation of bio compounds in the field of analytical chemistry are becoming more and more necessary. In order to achieve this goal, green procedures create chemical processes and synthetic techniques that are ecologically benign, eliminating or reducing the usage of hazardous and toxic chemicals at any production stage in industry or in the laboratory. The use of alternative solvents, reduced energy consumption, assurance of the safety and excellent quality of the extract are all characteristics of "green" extraction techniques. The analysis provides an overview of the environmentally friendly practices used and their successful use in the extraction of medicinal plants' bioactive chemicals, backed by cutting-edge, renewable, and unconventional energy sources. The medicinal herb *Glycyrrhiza uralensis* is well-liked all around the world. Gan-Cao is a traditional Chinese medicine made from its roots and rhizomes. The chemistry and medical use of the plant's other sections are less well understood. The biological processes and chemical elements of the roots, leaves, stems and seeds of *G. uralensis* were compared in this study. The four components displayed various, observable biological functions. The development of microfluidic technology in recent years has produced new instruments for pharmaceutical research, and the idea of a "pharm-lab-on-a-chip" is intriguing due to its enormous potential to combine pharmacological and pharmaceutical testing in a single chip device. Specifically, we focus on the separation and analysis of drug molecules on a chip, the construction of pharmacological models on a chip, as well as their demonstrative applications in quality management, drug screening, and precision medicine. We also highlight recent developments of chip-based principles, techniques, and gadgets for

pharmaceutical test and pharmacological/toxicological test. Microfluidic technology's trend and difficulty for pharmaceutical analysis are also covered. This evaluation will enhance knowledge and pharm-lab-on-a-chip development. In many nations across the world, herbal remedies are often utilised. While they have been established for millennia in nations like China and India, they are currently becoming more and more popular in Western nations. Some of these allegedly natural medications make claims that they can treat erectile dysfunction. However, a lot of these medications have PDE5 inhibitors like sildenafil or beta-blockers added to them. Due to harmful drug-drug interactions with nitrates, patients with high blood pressure may turn to natural remedies instead of sildenafil (often utilised as treatment for coronary diseases). Patients may suffer severe side effects from products that have been tampered with to include PDE5 inhibitors. In order to identify adulterants, this work presents the immediate screening of purported herbal items using an atmospheric pressure solids assessment probe and high-resolution mass spectrometry. Sildenafil was present in three out of the twelve items that were examined, ranging from 0.5% to 18%. Positive results from a multivariate analysis of atmospheric mass spectrometry readings for identifying samples with and without sildenafil adulteration were found. Therefore, a viable technique for quickly detecting sildenafil in herbal products with the potential for further semi quantitative analysis is the atmospheric pressure solid analysis probe.