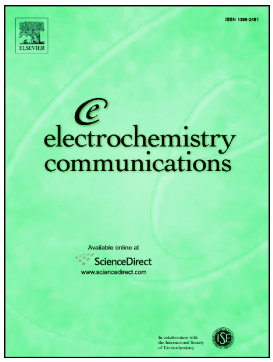

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Embedding leaf tissue in graphene ink to improve signals in electrochemistry-based chemotaxonomy

Li Fu[1*], Yuhong Zheng[2*], Pengchong Zhang[3], Jiangwei Zhu[4], Haoyang Zhang[1] Luxi Zhang[1] and Weitao Su[1]

[1] *College of Materials and Environmental Engineering, Hangzhou Dianzi University, Hangzhou, 310018, P.R. China*

[2] *Institute of Botany, Jiangsu Province and Chinese Academy of Sciences, Nanjing Botanical Garden, Mem. Sun Yat-Sen, Nanjing 210014, P.R. China.*

[3] *Hangzhou Botanical Garden, Hangzhou, Zhejiang, 310013, P.R. China*

[4] *Collaborative Innovation Center of Sustainable Forestry in Southern China of Jiangsu Province, Nanjing Forestry University, Nanjing 210037, China*

Corresponding authors: Li Fu, Yuhong Zheng Email: fuli@hdu.edu.cn; zhengyuhong@cnbg.net

Abstract: We propose a method for the electrochemical identification of plants by embedding leaf tissue into graphene deposited on a screen-printed electrode (SPE). The embedding process significantly enhanced the electrochemical signals, which made the SPE sufficiently sensitive to record information about electro-active compounds in plants. In this work, five *Lycoris* herbs have been used as examples to evaluate the feasibility of the proposed technique. Multidimensional pattern recognition was successfully established for plant identification. In addition, the recorded "electrochemical fingerprints" provided valuable taxonomic information, demonstrating the enormous potential of the technique for plant chemotaxonomy.

Keywords: Chemotaxonomy; Plant identification; Graphene ink; Screen printed electrode; Multivariate chemometric analysis

1. Introduction

Plant taxonomy is the oldest and most comprehensive branch of plant science. Classical taxonomy is based on morphological and anatomical studies of specimens, which is one of the most basic subjects in biology. Plant taxonomy relies heavily on evidence from many other disciplines, and new evidence is continually being added to improve previous research results [1, 2]. For example, chemotaxonomy is a method of studying plant groups and their relationships at the molecular level [3]. In recent years, the chemical division of plant groups has been widely studied due to the development of various separation and analytical methods which have provided many new lines of