生命科学

FTIR在植物分类学中应用范围和方法的探究

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摘要　　运用OMNI 采样器–傅里叶变换红外光谱测定法获取了8科80种(包括种下单位)草本被子植物种子的红外光谱，统计了在3 100～900 ㎝-1波数范围内的峰值，以此为基础进行了聚类分析. 结果表明：（1）80种草本植物的种子可以分成两类，第1类由禾本科、莎草科、蓼科和苋科植物的种子组成；第2类由菊科、大戟科、十字花科和伞形科植物的种子组成；（2）聚类图上，只有十字花科植物的种子能较好地与其他科的相区别；（3）在11组同属不同种植物中，有8组植物与亲缘关系不同的其他属的植物混在一起；在7组同种不同亚种或品种植物中，仅有1组植物被聚合在一起. 由此得出如下结论，基于FTIR对植物进行分类或亲缘关系研究，应用上有局限性. 在具体应用时，应该同时测定亲缘关系较远的其它植物作为排序或者聚类的对照，考察该方法在应用上的有效性. 同时，在用于植物鉴别时要注意实验的重复性和数据间的统计学差异显著性分析.

关键词　　种子；傅里叶变换红外光谱法；分类关系；鉴别

分类号　Q949

Methodological study of FTIR on planttaxonomic relationships (Chinese)

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Abstract

In this paper, the Fourier transform infrared spectroscopy (FTIR) of the seeds of 80 herbaceous species, including subspecies and varieties of 8 families, were obtained using the method of FTIR with an OMNI collector. The peak values of FTIR between 3 100 cm-1 and 900 cm-1 were recorded and analyzed by the method of cluster analysis. The results were as follows: (1) Seeds of 80 species or subspecies could be classified into two groups. Group I included the seeds of Gramineae, Cyperaceae, Polygonaceae and Amaranthaceae, and Group II included the seeds of Compositae, Euphorbiaceae, Brassicaceae and Umbelliferae.(2) Only FTIRs of the seeds of Brassicaceae were clustered together in the dendrogram, while those of the other families all appeared farraginous.(3) Among FTIRs of the 11 groups of the congeneric species, 8 groups were clustered with other genus species, and 6 out of 7 groups of conspecific seeds appeared farraginous in the dendrogram. Therefore, the values of the application of FTIR to study the plant taxonomical relationships and to identify plant species are limited. It is suggested that the spectra of other taxa with distant taxonomical relationship should be included to evaluate the reliability of the method. Also, experimental replications should be highlighted, the significant differences between different materials should be confirmed by statistical tests in the application of FTIR to discriminate species or samples.

Key words　seed　Fourier transform infrared spectroscopy(FTIR)　taxonomical relationship　discrimination

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