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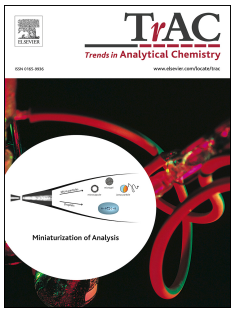

Combined extraction and microextraction techniques: recent trends and future perspectives

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Combined extraction and microextraction techniques: recent trends and future perspectives

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Abstract

The latest advancements in the analytical sample preparation indicate a trend of combining different extraction techniques with targeting an improvement in separation, cleanup, detection limits, enrichment factors, and dealing with complex matrices. This manuscript identifies mainly two groups of combined sample preparation techniques. The first group integrates conventional or enhanced extraction techniques with microextraction. The second group combines microextration with each other. The objectives and merits of each combination are critically appraised with respect to nature of the samples, analytical figure of merits, and certain application scenarios. Green aspects of combined extraction methods are described with some examples. At the end, a brief account is provided on accomplishments, limitations, and future directions.

Keywords

Combined extraction techniques; Sample preparation; Microextraction; Preconcentration; Chromatographic analysis; Enrichment factors; Green Analytical Chemistry

1. Introduction

Despite all the major advancements in analytical instrumentation, sample preparation is still of critically importance in the determination of target analytes in various matrices. The requirement of sample preparation arises from several facts including the demand of trace level analysis, the new regulatory obligations, and the complex nature of the sample matrices that are not compatible with analytical instrumentation for direct analysis. In this