Journal of Diagnostic Techniques and Biomedical Analysis.

Editorial

A SCITECHNOL JOURNAL

Analytical Methods of Atomic Spectroscopy

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Received: March 03, 2021; **Accepted:** March 19, 2021; **Published:** March 31, 2021

Analytical methods of atomic spectroscopy are utilized in forestry and wood marketing research since their earliest development. Nowadays, most of the spectroscopic techniques available are employed within the analysis of metals and trace elements in diverse samples of commercial and environmental origin. The techniques that find most regular application include flame atomic absorption spectroscopy (F-AAS), graphite furnace atomic absorption spectroscopy (GF-AAS), inductively coupled plasma atomic emission spectroscopy (ICP-AES) and, occasionally, also direct current plasma atomic emission spectroscopy (DCP-AES).

Instrumental methods

Instrumental methods are capable of detecting and quantifying individual algal toxins supported their different physiochemical properties. To fulfill the wants of legal regulations, separation and quantification of the toxins within the sample are usually performed with LC or capillary electrophoresis (CE) coupled to UV (for ASP), fluorescence (for PSP), or electrochemical detection and are recently completed by using MS detection for identification of every individual analogue. In many countries, LC-MS-MS methods have been set up as the official methods instead of the MBAs for lipophilic toxins analysis, such as OA and derivatives, AZAs, YTXs, and PTXs. Other applications include the detection of synthetics and imitations, the detection of composite or assembled stones and therefore the investigation of inclusions to help within the identification of the origin of the gemstone. In order to hide surface cracks, improve colour or provide protection for soft stones, gemstones may undergo certain enhancement treatments.

HPLC is that the mostly commonly used instrumental methods for the identification and quantification of algal toxins. LC-UV was the primary method developed to detect the algal toxins. The AOAC approved HPLC methods with pre- or post-column oxidation fluorescence detection (HPLC-FLD) as official detection methods for PSTs. In this sense, fluorescence detectors can be as much as 100 times more sensitive than a UV detector, making them useful for trace analysis, particularly for limited sample. Thin-layer chromatography (TLC) is a simple and easy-to-operate separation technique and initially used for identification of algal toxins. One of the most drawbacks of TLC is that the low sensitivity within the detection of algal toxins, which may only be used for small-scale laboratory research.

Analytical Accuracy and Precision

All analytical measurements have, related to them, a measurement uncertainty. Unfortunately, information on the accuracy and precision of measurements is usually absent from reports of knowledge on dioxins. The analysis of those substances in foods is especially challenging due to the very low concentrations that are involved. Several studies have shown that good agreement are often achieved by highly expert laboratories, but the amount of laboratories engaged within the se analyses has increased dramatically in the past few years and there's an excellent variation within the quality of study available.

Gemmology

Analytical techniques commonly used in gemmology include X-ray and neutron diffraction, scanning electron microscopy and, more recently, FT-Raman micro-spectroscopy. Traditional identification is predicated on the gems' unique physical, chemical and optical properties. These include relative density, cleavage, hardness, toughness, fracture, refraction, transparency, lustre and sheen.

Micro-preparative OPLC Separations

Instrumental methods such as OPLC increase preparation time and costs but also significantly improve efficiency. As a rule of thumb, if the sample contains quite five substances, up to 10 mg of sample are often separated by micropreparative OPLC with linear development on an HPTLC plate. This can be increased five-fold by use of five HPTLC plates and a multi-layer technique; thus preparative amounts can be separated by means of a micropreparative technique.

Citation: *Poojitha M (2021) Biopsy. J Diagn Tech Biomed Anal 10:2.*