

Application of spectroscopy analytical techniques in medicine and food dual purpose products

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Abstract

Medicine and food dual purpose products are the important natural resource in China. There is an increasing need for new analytical methods that can be used for assuring safety and quality in medicine and food dual purpose products, including adulterants, pesticide residues and unknown functional components. In this work, recent applications of UPC2 for the analysis of different compounds in food and biological samples were reviewed. A simple, highly sensitive and fast analytical method based on UPC2 with photo-diode array detection (PDA) has been developed to quantify sulfonamides, monosaccharide and structural analogues of isoflavones isomer in medicine and food dual purpose products. The soft ionization fragmentation pathway based on mass spectrometry has been clarified for the determination of diosgenin in medicine and food dual purpose products. Furthermore, authentication technology based on fragment markers and high resolution mass spectrometry was developed for the quality assurance in medicine and food dual purpose products. The development of the pharmaceuticals brought a revolution in human health. These pharmaceuticals would serve their intent only if they are free from impurities and are administered in an appropriate amount. To make drugs serve their purpose various chemical and instrumental methods were developed at regular intervals which are involved in the estimation of drugs. These pharmaceuticals may develop impurities at various stages of their development, transportation and storage which makes the pharmaceutical risky to be administered thus they must be detected and quantitated. For this analytical instrumentation and methods play an important role. This review highlights the role of the analytical instrumentation and the analytical methods in assessing the quality of the drugs. The review highlights a variety of analytical techniques such as titrimetric, chromatographic, spectroscopic, electrophoretic, and electrochemical and their corresponding methods that have been applied in the analysis of pharmaceuticals.

All the analytical techniques used to collect physicochemical data obtained by absorbing, transmitting or reflecting the incident radiant energy in a sample are called spectrophotometry. Among these analytical techniques, there is the light absorption spectroscopy in the Ultraviolet and Visible region (UV-Vis) (200- 800nm) as one of the most used technique for the characterization and determination of several organic and inorganic substances. The UV-Vis analytical method has become very important and widespread in different scientific areas around the world due to its availability, simplicity, flexibility and wide applicability in several areas, including biochemistry and analytical chemistry. Currently, it is necessary to reduce sample and reagents quantity to develop an analytical measurement, especially for scarce samples or toxic solvents; therefore, a UV-Vis microvolume spectrometric instrumentation has been developed. Currently, spectroscopy techniques and chemometric methods are largely used in the food industry analyses to improve quality control of foods and beverages, such as: detection of falsification or adulteration, identification of origin, differentiation of caffeinated and decaffeinated coffee, origin and variety of wine or the origin of olive oils, and others. This study presents a bibliographic review in order to evaluate the effectiveness and the relevance of using the analytical technique of molecular spectrophotometry in the Ultraviolet and Visible region in the food industry. The spectroscopy in the visible ultraviolet region is a very useful technique for qualitative and/or quantitative studies related to characterization of organic and inorganic compounds in food matrices. Its application in quality laboratories of food industries has been very important, because it satisfies both the economic scope and the public health issues, since it allows the quality verification of various products widely commercialized and consumed around the world.

This work is partly presented at joint event 30th Annual Congress on Nanotechnology and Nanomaterials & 8th World Congress on Spectroscopy and Analytical Techniques, September 10 - 11, 2018, Stockholm, Sweden