Rapid Detection of Perfume Quality by GC-IMS

Rapid testing is an effective means to ensure product quality and safety. In order to ensure the accuracy and reliability of perfume quality testing results, it is essential to strengthen the introduction and innovation of related technologies.

The principle and technical characteristics of GC-IMS

Gas chromatographic (GC) analysis is a fast and efficient method for qualitative analysis by comparing with the retention time of standard materials. It has the advantages of high separation efficiency and wide application range. However, for substances with the same or close retention time, the accuracy of the qualitative analysis results is low, so GC technology is usually used in combination with other detection methods to maximize its advantages.

Ion Mobility Spectrometry (IMS), also known as plasma chromatography and gas phase electrophoresis, is an electrophoresis technique in a gas phase environment. It separates and analyzes substances based on the molecular mass, charge, and collision interface of the analyzed substance, and has the ability to separate mixtures similar to chromatography. In addition, it has high sensitivity, the lowest detection amount can reach 10~14g, and it can even distinguish asymmetric isomers. IMS has high selectivity,

according to different analysis objects and requirements, different ion sources, anion and cation modes, additives and so on can be selected to effectively reduce or even eliminate the influence of interfering substances. Compared with mass spectrometry, IMS does not need vacuum and special gas system, and has the advantages of simple analysis process, low cost, small equipment size and low energy consumption, so it is often used in conjunction with GC technology to detect gas.

Application of GC-IMS in perfume quality detection

A perfume usually contains a variety of flavors, which is usually composed of more than 30 different alcohols, aldehydes, esters, ketones, alkenes and other components, so the components that affect the smell of the perfume are extremely complex. The composition analysis of perfume is an important means to identify and evaluate the quality of true and false perfumes.

At present, there are two main methods for analyzing the quality of perfume: artificial olfactory identification method and instrumental analysis method. The artificial olfactory method is to smell the scent of perfume through the human sense of smell, and the sensory result of the person is used as the index of the detection result. The analysis results are greatly affected by personal factors, and it is difficult to draw specific and credible conclusions of component analysis, which will bring opportunities to some illegal businesses, and it is difficult to provide a strong basis for quality testing. Instrumental analysis mainly uses GC technology and (GC-MS) technology to analyze the components of perfume. GC and GC-MS can be used to analyze the components accurately, but all samples must be collected, stored, transported, purified and enriched in an appropriate way before analysis. Therefore, the above instrument analysis method has some problems, such as complex detection process, long cycle, inconvenient to use, real-time can not be guaranteed and so on.

GC-IMS technology is currently the latest international gas analysis technology. GC-IMS combined instrument has the advantages of small size, light weight, low energy consumption, wide analysis range, high sensitivity, easy to carry, *etc*. It can be widely used in various on-site rapid detection and analysis process of perfume products.

The role of GC-IMS in the quality supervision of perfume

- **Enhance the efficiency of perfume safety supervision**

  GC-IMS, with its fast and convenient detection, can complete the detection of perfume at the cosmetic safety supervision site, and analyze the specific causes of safety problems. Especially in the detection of problematic perfumes, it can quickly detect the source of its unsafe factors, help detect the illegally added ingredients, and contribute to the treatment of victims.

- **Improve the scope of perfume safety supervision**

  GC-IMS relies on the most advanced detection technology, with high efficiency and wide range of application, which can effectively improve the accuracy of detection, prevent the circulation of problematic perfume, protect the safety and vital interests of the people, and improve the supervision ability and scope of perfume safety supervision.

- **Technology to strengthen perfume safety supervision**

  With the development of technology, cosmetics are becoming more and more complex, the types and methods of toxic and harmful substances are gradually added, and the hidden means are more and more. Using GC-IMS to better solve the complexity of perfume safety issues, its technical means are reliable, the scientific principles are conclusive, the test report is complete, and it has a high degree of credibility.

- **Improve perfume safety supervision system and increase supervision efficiency**

  GC-IMS combined technology instruments are simple, and the cost of equipment is low, which greatly reduces the cost of perfume safety supervision.It can meet the requirements of instant detection, is convenient and economical, and improves the efficiency of perfume safety supervision. Strengthening the application of GC-IMS technology in perfume quality supervision can enrich the testing means of cosmetic safety supervision, effectively solve perfume safety problems, and promote the healthy development of cosmetics industry.