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Comprehensive two-dimensional GCxGC-MS for the quality control of traditional Chinese medicine

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The use of traditional Chinese medicine (TCM) has attracted a lot of attention not only in Asia but also in the western industrialized countries, especially in Europe and the USA. On the one hand patients decide to use TCM more and more often as an alternative to the western medicine [1]. On the other hand plants of the TCM could be a source for a lot of chemical components. Therefore scientists are interested in the pharmacological and thus therapeutic activities of these constituents which could be probably used for new medical applications. A lot of written notes of the medicinal experiences during the last 2000 years can support this research [2].

However there are problems with the TCM drugs when they are adulterated or confounded, at the worst this can induce poisoning because of toxic ingredients in a single drug. For these reasons it is very important to develop a quality control which guarantees the correct composition and the potency. The detection of chemical biomarkers and fingerprints can ensure this. Till now biomarkers for a lot of medicinal drugs are not determined [3]. Because plant samples present very complex compositions, it is necessary to analyse them with the use of high-duty analytical methods, e. g. GCxGC-MS.

Radix Angelicae sinensis, one of the most widely used traditional Chinese herbal remedies, has proven a variety of bioactivities. In TCM *Radix Angelicae sinensis* is sometimes substituted with other species of *Radix Angelicae* without any change of the declaration [4]. In this work we have analysed samples of the genus *Angelica* from various countries (China, Japan, Korea, Europe) and have demonstrated that GCxGC-MS is a very powerful method to identify differences in the constituents and to find biomarkers for each species.

Radix Angelicae sinensis is one of the components of the Xiao Yao pill, a Chinese medicine mostly prescribed for the treatment of irregular menstruation. Consisting of six plants and a fungus, the Xiao Yao pill is analysed with GCxGC-MS in order to control the correct composition. Firstly we want to detect biomarkers of the seven components and then compare them with the analysis of the Xiao Yao pills of different producers.

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