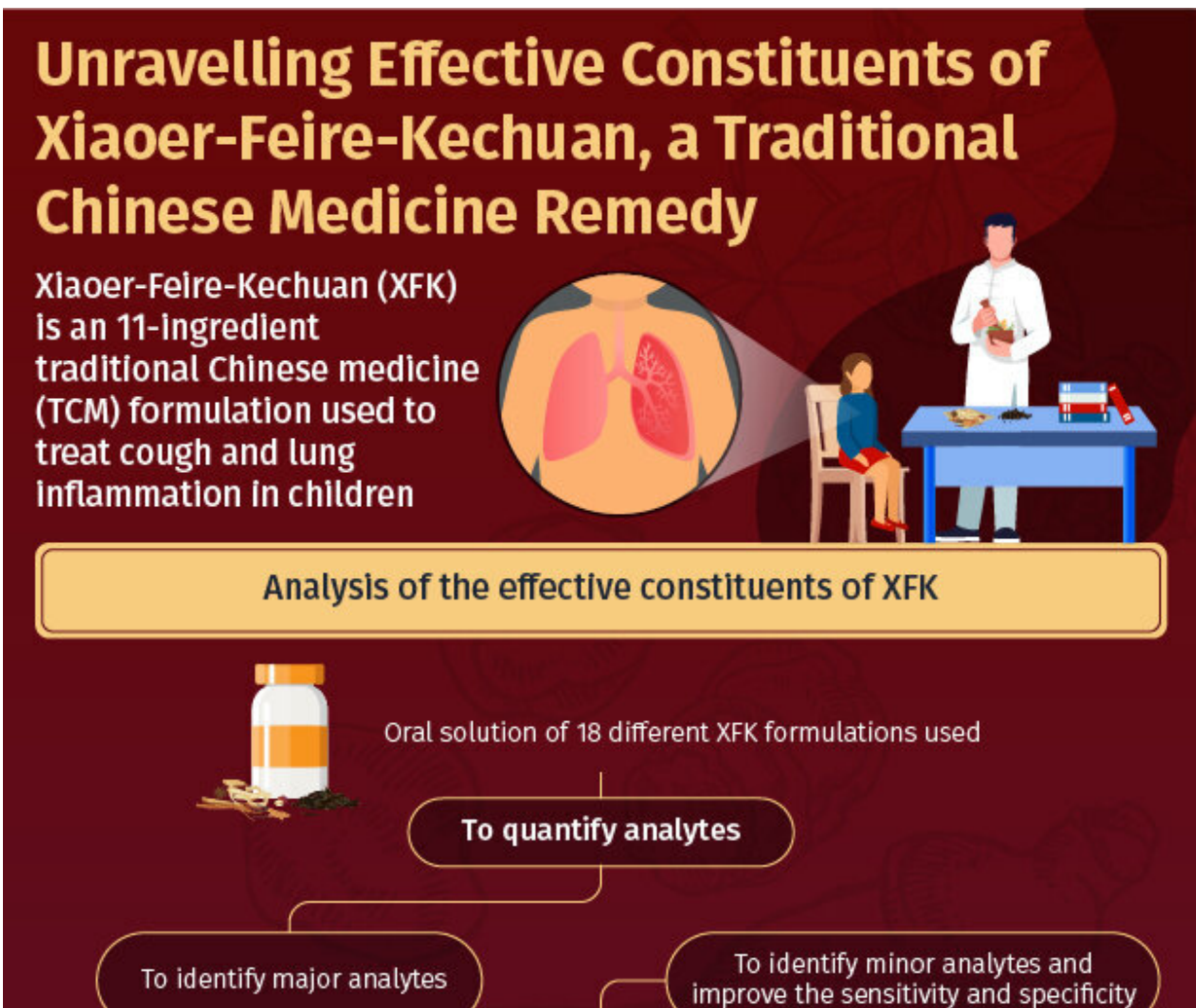


Study highlights novel method to 'actively' analyze herbal remedies

February 18 2022



Researchers have devised a method to analyze the effective ingredient in traditional Chinese medicine formulations, contributing to research in quality control and identification of analytes in complex herbal remedies. Credit: Professor Xue Qiao

Rooted in ancient knowledge and principles, traditional Chinese medicine (TCM) has been used to treat many diseases, sparking the interest of pharmaceutical researchers. TCM formulas are quite complex, requiring multiple herbs for their formulation. These herbs act synergistically, targeting different aspects of a disease's pathology.

Due to their complexity, analyzing the [active ingredients](#) (the components of a drug that are biologically "active") in TCM formulations is challenging. Hence, the identification of effective constituents and proper quality control of these formulations remains to be established, with much scope for improvement in these areas.

This [knowledge gap](#) caught the attention of scientists from China, who tried to analyze a specific TCM—Xiaoer-Feire-Kechuan (XFK), with an 11-ingredient formula used to treat cough and lung inflammation in children. In their article, made available online on 29th January 2021, and published in Volume 11, Issue 6 of the *Journal of Pharmaceutical Analysis* in December 2021, the team describes how they identified the active components in XFK.

The team, led by Dr. Xue Qiao from Peking University, China, used an integrated approach to reveal which constituents cause XFK to exert its anti-inflammatory action. We spoke to Dr. Qiao to understand the methodology better. "We applied the parallel reaction monitoring scan mode built in quadrupole (Q)-Orbitrap-MS, which has the combined benefit of mass isolation capability with high resolution, so it lessens the chances of false readings while assessing analytes in a sample," she tells us.

Using ultra performance liquid chromatography and ultra-[high performance liquid chromatography](#)/Q-Orbitrap-MS, two immensely

popular sample analysis methods, they screened 18 different formulations of XFK to reveal 35 analytes.

"We then leveraged our knowledge of cyclooxygenase-2 (COX-2), which we know plays a role in inflammation. These 35 analytes were put through an in vitro COX-2 inhibition assay to see which ones were potent anti-inflammatory agents," Dr. Qiao continues.

Their experiments revealed interesting results. They found that 4 analytes, baicalin and forsythosides H, I, and A, had significant anti-inflammatory activity. These inhibited COX-2 by more than 80%.

"These analytes are, most probably, what contribute most to XFK's method of action," Dr. Qiao explains. "And now, our method can be used to discover effective ingredients and analytes in other complex [herbal remedies](#) as well."

Decoding traditional therapies like TCM is an uphill task because it is difficult to identify which of their multiple ingredients is the most important one. "It took a while to figure out that caffeine was the active ingredient in coffee," Dr. Qiao smiles, "So you can imagine how difficult it is to analyze every herbal remedy." She makes a valid point. The 2015 edition of the Chinese Pharmacopoeia (a book containing the 'recipes' for each remedy) had 1,933 TCM formulas!

Therefore, this novel analytical method is a big step forward for the pharmaceutical industry: understanding which ingredient is the most effective can help improve quality control standards. This could result in better remedies, 'actively' contributing to this ancient school of medicine.

More information: Zhanpeng Shang et al, Simultaneous determination of 35 constituents and elucidation of effective constituents in a multi-

herb Chinese medicine formula Xiaoer-Feire-Kechuan, *Journal of Pharmaceutical Analysis* (2021). [DOI: 10.1016/j.jpha.2021.01.003](https://doi.org/10.1016/j.jpha.2021.01.003)

Provided by Cactus Communications

Citation: Study highlights novel method to 'actively' analyze herbal remedies (2022, February 18)
retrieved 7 May 2024 from
<https://medicalxpress.com/news/2022-02-highlights-method-herbal-remedies.html>

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