

Peanut Blog

An ounce of information



Chromatography Targets Pesticides in Peanuts

A joint study conducted by researchers at China Agricultural University (Beijing, China) and Hebei Food Inspection and Research Institute (Shijiazhuang, China) developed a fast and reliable way to detect and measure 215 different pesticides in peanuts, which are particularly challenging to test due to their high fat content, using gas chromatography–quadrupole orbital trap high–resolution mass spectrometry (GC–Q–Orbitrap HRMS). A paper based on this research was published in *Analytica Chimica Acta*.¹

Why is Pesticide Testing in Peanuts Important?

Peanuts are one of the world's most important and widely grown crops, with around 47 million tons produced every year. They are packed with healthy fats, proteins, and other nutrients, and are used to make a wide range of everyday products like peanut oil, peanut butter, snacks, and sweets. Pesticides are widely used in peanut farming to protect crops from pests and diseases and to maintain good yields and quality. However, their heavy use can leave behind residues that raise concerns about food safety.

Research shows that plants can absorb pesticides from the soil, which means peanuts growing underground are at risk of taking up these chemicals.^{4,5} The high fat content of peanuts (up to 46%) makes this even more of a concern, as pesticides that dissolve easily in fat tend to build up more readily in fatty crops.^{6,7} These residues can then work their way up the food chain, potentially posing a risk to human health.⁸ Pesticides can also find their way into peanuts through other environmental routes, such as air, rain, and groundwater.

How Did the Researchers Develop and Validate their Pesticide Testing Method, and What Are its Potential Applications?

For this study, the researchers mixed peanut samples with a vinegar–based chemical solution to pull out any pesticide residues, then treated with a salt mixture and filtered through a special cleaning column to remove unwanted fats and other interfering substances. The method was fine–tuned and tested at three different concentration levels, successfully detecting 215 pesticides with reliable and consistent results. The study also looked at how the chemical makeup of each pesticide affected the way it moved through the testing system, helping to better understand how so many different compounds can be identified in a single run.

“The established method,” write the authors of the paper,¹ “is suitable for routine multi–residue monitoring of pesticides in peanuts, and the systematic optimization strategy also provides a reference for analyzing other complex matrices.” The researchers believe that this method could eventually be used for other nuts and seeds that are high in fat and protein, making it useful for testing a wider range of foods for multiple residues at once.

Source: <https://www.chromatographyonline.com/view/chromatography-pesticides-peanuts>