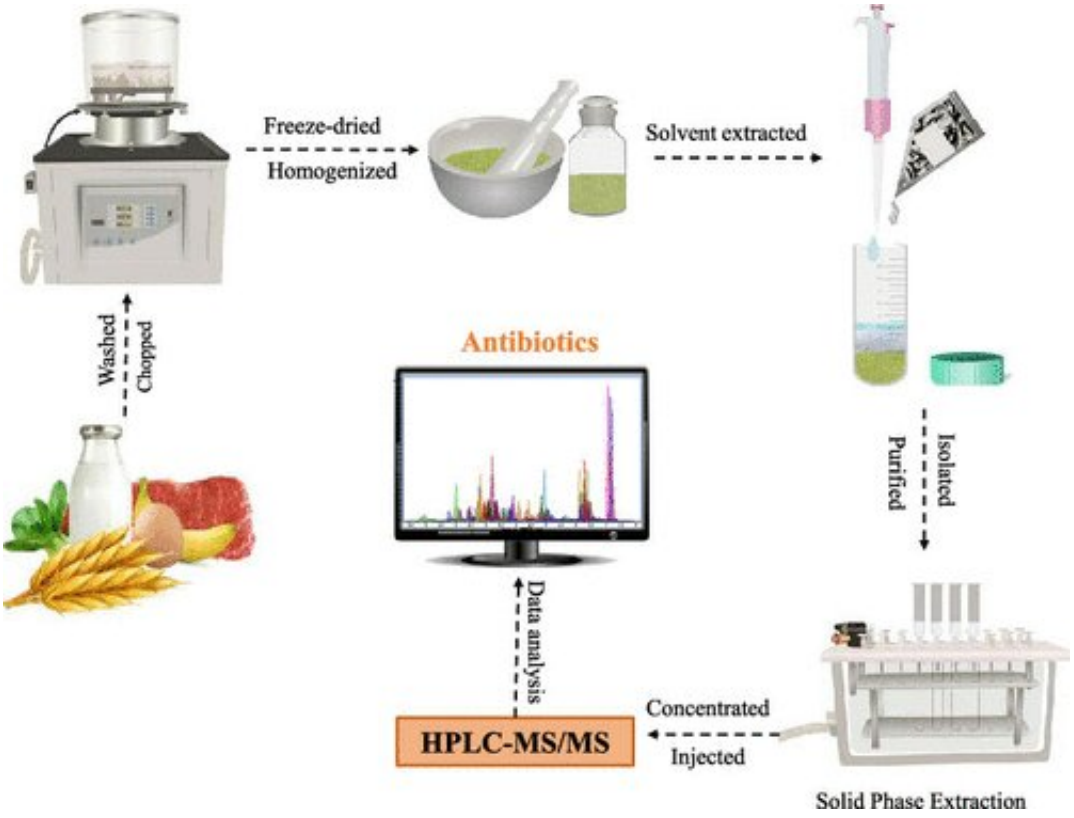
Detecting trace amounts of multiple classes of antibiotics in foods

January 27 2021



Credit: American Chemical Society

Widespread use of antibiotics in human healthcare and livestock husbandry has led to trace amounts of the drugs ending up in food products. Long-term consumption could cause health problems, but it's been difficult to analyze more than a few antibiotics at a time because they have different chemical properties. Now, researchers reporting in

ACS' *Journal of Agricultural and Food Chemistry* have developed a method to simultaneously measure 77 antibiotics in a variety of foods.

Antibiotics can be present at trace amounts in meat, eggs and milk if the animals aren't withdrawn from the drugs for a sufficient period of time before the products are collected. Also, antibiotics can accumulate in cereals, vegetables and fruits from manure fertilizer or treated wastewater applied to crops. Consuming these foods over a long period of time could lead to increased antibiotic resistance of bacterial pathogens or to an imbalance in the gut microbiome. However, most previous monitoring methods for antibiotics in foods have been limited to a few compounds at a time, usually within a single class of antibiotics with similar structures and chemical properties. Other methods have analyzed multiple antibiotics in only a single food type, such as eggs or milk. Yujie Ben and colleagues wanted to develop a time- and cost-effective method that could detect a wide range of antibiotics in different types of foods.

The researchers added trace amounts of 81 antibiotics from seven categories to vegetable samples and tested 20 different methods for extracting the drugs from the food. Only one extraction process, which involved treating freeze-dried, homogenized food samples with an acidified acetonitrile solution and a mixture of magnesium sulfate and sodium acetate, allowed the researchers to isolate 77 of the antibiotics. After establishing that their method was sensitive and accurate with spiked antibiotics in several foods, the team applied it to store-bought samples of wheat flour, mutton, eggs, milk, cabbage and bananas, detecting a total of 10 antibiotics. One of them, roxithromycin, was detected at trace amounts in all six food types. The new method should help with understanding, monitoring and regulating antibiotic levels in foods, the researchers say.

More information: Trace Analysis of Multiclass Antibiotics in Food

Products by Liquid Chromatography-Tandem Mass Spectrometry: Method Development, *Journal of Agricultural and Food Chemistry* (2021). pubs.acs.org/doi/abs/10.1021/acs.jafc.0c05778