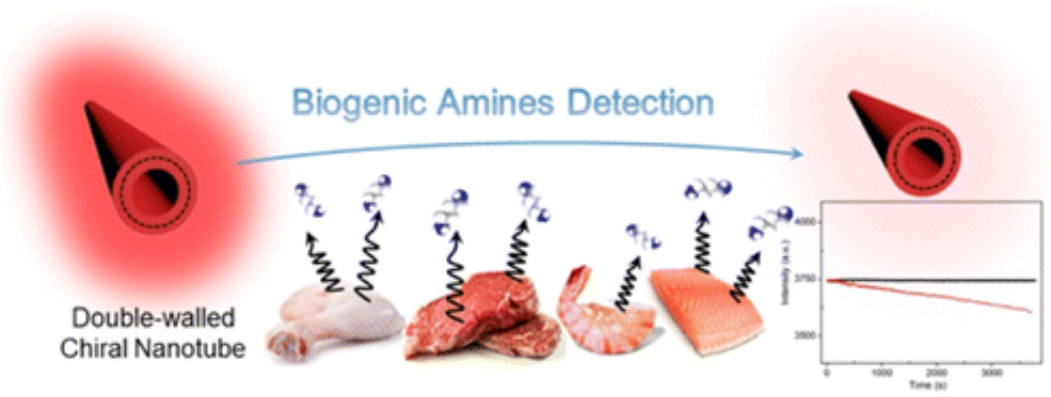
A simple, rapid test to help ensure safer meat

November 18 2015



Deciding whether to cook or toss a steak that's been in the fridge for a few days calls for a sniff test. This generally works well for home cooks. But food manufacturers that supply tons of meats to consumers require more reliable measures. In a new journal called *ACS Sensors*, scientists report a simple method that uses nanotubes to quickly detect spoilage. It could help make sure meats are safe when they hit store shelves.

Transporting meats and seafood from the farm or sea to the market while they're still fresh is a high priority. But telling whether a product has gone bad isn't a simple process. Current strategies for measuring freshness can be highly sensitive to spoilage but require bulky, slow equipment, which prevents real-time analysis. Some newer methods designed to speed up the testing process have fallen short in sensitivity.

Yanke Che and colleagues wanted to develop one simple test that could deliver both rapid and sensitive results.

The researchers turned to highly fluorescent, hollow nanotubes that grow dim when they react with compounds given off by meat as it decomposes. To test the nanotubes, the team sealed commercial samples—1 gram each—of pork, beef, chicken, fish and shrimp in containers for up to four days. When they exposed the portable system to a teaspoon of vapor emitted by the samples, it reacted in under an hour, fast enough to serve as a real-time measure of freshness. The researchers also found that if the tubes' glow dulled by more than 10 percent, this meant a sample was spoiled.

More information: Yanyong Hu et al. Detection of Amines with Fluorescent Nanotubes: Applications in the Assessment of Meat Spoilage, *ACS Sensors* (2015). DOI: 10.1021/acssensors.5b00040

Abstract
Highly fluorescent nanotubes assembled from designed asymmetric perylene diimide molecules (PDIs) exhibit high sensitivity (lowering the existing detection limit to ppb levels) and selectivity to amines in the vapor phase, which renders them capable of monitoring and assessing the deterioration of meat.

Provided by American Chemical Society