

New approach can predict pollution from cooking emissions

April 14 2022



Credit: CC0 Public Domain

Organic aerosols—such as those released in cooking—may stay in the atmosphere for several days, because of nanostructures formed by fatty acids as they are released into the air.

By identifying the processes which control how these aerosols are transformed in the atmosphere, scientists will be able to better understand and predict their impact on the environment and the climate.

Experts at the Universities of Birmingham and Bath have used instruments at the Diamond Light Source and the Central Laser Facility, both based at the Harwell Campus in Oxford, to probe the behavior of thin films of oleic acid—an unsaturated fatty acid commonly released when cooking.

In the study, published in *Atmospheric Chemistry and Physics*, they were able to analyze the particular molecular properties that control how rapidly aerosol emissions can be broken down in the atmosphere.

Then, using a theoretical model combined with [experimental data](#) the team was able to predict the amount of time aerosols generated from cooking may hang around in the environment.

These types of aerosols have long been associated with [poor air quality](#) in urban areas, but their impact on human-made climate change is hard to gauge. That's because of the diverse range of molecules found within aerosols, and their varying interactions with the environment.

By identifying the nanostructure of molecules emitted during cooking that slows down the break-up of [organic aerosols](#), it becomes possible to model how they are transported and dispersed into the atmosphere.

Lead author Dr. Christian Pfrang, of the University of Birmingham's School of Geography, Earth and Environmental Sciences, says that "Cooking aerosols account for up to 10 per cent of particulate matter (PM) emissions in the UK. Finding accurate ways to predict their behavior will give us much more precise ways to also assess their contribution to climate change."

Co-author Dr. Adam Squires, of the University of Bath, says that "we're increasingly finding out how molecules like these [fatty acids](#) from cooking can organize themselves into bilayers and other regular shapes and stacks within aerosol droplets that float in the air, and how this completely changes how fast they degrade, how long they persist in the atmosphere, and how they affect pollution and weather."

More information: Adam Milsom et al, The impact of molecular self-organisation on the atmospheric fate of a cooking aerosol proxy, *Atmospheric Chemistry and Physics* (2022). [DOI: 10.5194/acp-22-4895-2022](#)

Provided by University of Birmingham

Citation: New approach can predict pollution from cooking emissions (2022, April 14) retrieved 22 June 2024 from <https://phys.org/news/2022-04-approach-pollution-cooking-emissions.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.