

Commercial cooking elevates hazardous pollutants in the environment

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Credit: AI-generated image ([disclaimer](#))

As you stroll down restaurant row and catch the wonderful aroma of food — steaks, burgers, and grilled veggies — keep this in mind: You may be in an air pollution zone. Scientists in Minnesota are reporting that commercial cooking is a surprisingly large source of a range of air pollutants that could pose risks to human health and the environment.

They discussed the topic here today at the 239th National Meeting of the American Chemical Society.

Deborah Gross, Ph.D., pointed out that commercial food cooking is a known source of [air pollutants](#), including gases and tiny solid particles — as is cooking in the home. "While that mouth-watering smell may whet our appetites, it comes from the emission of smoke from the cooking process into the air that we breathe," Gross said. Research conducted in the U.S. during the past decade has shown that cooking is by far the largest source of respirable particles generated in the home, as well. "Exposure to high concentrations of these particles is common."

Gross, who is with Carleton College in Northfield, Minn., has been working with colleagues Tom Kuehn, Bernard Olson, and Dabrina Dutcher of the University of Minnesota to define the specific contribution that commercial cooking makes to [air pollution](#). The project, also involving Carleton undergraduate student Lisa Wang, already has resulted in two air quality management districts in California implementing restrictions on commercial cooking emissions. They are the South Coast and Bay Area Air Quality Management Districts. Much of the Los Angeles Basin now requires the use of [catalytic converters](#) to minimize the release of aerosol particles from charbroiler grates.

Gross and Wang set out to get the [chemical signature](#) of the mouth-watering aroma from the cooking process. They used a novel combination of chemical and physical measurements of the [aerosol particles](#) — solid and liquid droplets — emitted from food being cooked. They did the study with typical commercial cooking appliances in a kitchen laboratory at the University of Minnesota during cooking of pizzas in an oven, steaks in a broiler, and hamburgers on a griddle, clamshell broiler, and charcoal fire.

Which foods create the most emissions in commercial kitchens? Fatty

foods cooked with high heat, especially with open flames, such as cooking hamburger patties on a conveyor broiler. Kuehn's previous research has found that for every 1,000 pounds of hamburger cooked on conveyor broilers, 25 pounds of emissions are created. The same weight of pepperoni pizza cooked in an oven created just three pounds of emissions. The use of certain oils also could increase emissions. For 1,000 pounds of chicken cooked in a wok with peanut oil, 45 pounds of emissions were produced.

"These experiments help us to assess what needs to be replicated in standardized laboratory tests, and to suggest better methods of emission control," Gross said. "In combination with other measurements, we can provide a relatively comprehensive chemical and physical signature of the emissions from various cooking operations. Not only do these emissions affect [air quality](#), but they contain chemicals that are known carcinogens."

Provided by American Chemical Society

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