

Burning biomass pellets instead of wood or plants in China could lower mercury emissions

November 6 2013

For millions of homes, plants, wood and other types of "biomass" serve as an essential source of fuel, especially in developing countries, but their mercury content has raised flags among environmentalists and researchers. Scientists are now reporting that among dozens of sources of biomass, processed pellets burned under realistic conditions in China emit relatively low levels of the potentially harmful substance. The report was published in the ACS journal *Energy & Fuels*.

Xuejun Wang and colleagues explain that mercury is associated with health problems, particularly in children. But reducing exposure to mercury remains a huge challenge. In 2010 alone, coal-fired power plants, gold mining, the burning of biomass for fuel and other sources generated about 2,000 tons of mercury emissions around the world. In China, biomass such as plants and wood contributes to nearly a third of the energy used in the nation's rural areas. To take steps to reduce mercury emissions, however, researchers first need know how much of the substance comes from burning different types of biomass. The problem is that previous estimates were based on data measured in industrialized countries, which may not be accurate for other locations. To get a clearer picture of what's happening in China, Wang's team took measurements there with biomass sources and stoves that rural residents actually use to cook and keep themselves warm.

They found that the levels of mercury released from burning biomass in

widely available stoves varied greatly, depending on the source. Some of the highest levels of mercury came from burning certain wood species in raw form, such as Chinaberry and Chinese pine. In comparison, [biomass pellets](#) compressed from cornstalks and pine wood released lower levels of mercury. "Biomass pellets can reduce [mercury emissions](#) compared with the uncompressed raw materials," the scientists conclude.

More information: "Emission of Speciated Mercury from Residential Biomass Fuel Combustion in China" *Energy Fuels*, Article ASAP. [DOI: 10.1021/ef401564r](https://doi.org/10.1021/ef401564r)

Abstract

Among various sources, mercury emissions from biomass fuel combustion have received growing attention. Mercury emission from biomass fuels can be estimated on the basis of the combustion amount and the emission factors (EFs). Although mercury emissions from biomass fuel combustion occur mostly in developing countries, most EFs have been measured in developed countries, leading to bias in mercury emission inventories. In this study, mercury EFs for 25 species of fuelwood, eight species of crop residues, and two types of biomass pellets were determined according to the real-life practice of residential burning. Results showed that the EFs ranges were 0.65–28.44 ng g⁻¹ for fuelwood, 3.02–12.05 ng g⁻¹ for crop residues, and 5.22–8.10 ng g⁻¹ for biomass pellets. Hg⁰ is the dominant form of mercury emitted from biomass fuel combustion. The proportion of Hg⁰, Hg²⁺, and Hg^p was 76 ± 17, 6 ± 5, and 18 ± 14% for fuelwood; 73 ± 11, 4 ± 5, and 23 ± 13% for crop residues; and 97 ± 1, 1 ± 0.2, and 2 ± 0.7% for biomass pellets, respectively. Biomass pellets can reduce mercury emissions compared with the uncompressed raw materials. On the basis of the measured EFs, inventories of mercury emission from biomass fuel combustion in rural China from 2000–2007 were estimated. The annual mercury emission ranged from 1.94 to 5.07 Mg, of which crop residues and fuelwood accounted for 62 and 38%, respectively.

Provided by American Chemical Society

Citation: Burning biomass pellets instead of wood or plants in China could lower mercury emissions (2013, November 6) retrieved 24 April 2024 from <https://phys.org/news/2013-11-biomass-pellets-wood-china-mercury.html>

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