

Smoke from fireworks is harmful to health

November 16 2010



The metallic particles in the smoke emitted by fireworks pose a health risk, particularly to people who suffer from asthma. Credit: Jorge Alejo

The metallic particles in the smoke emitted by fireworks pose a health risk, particularly to people who suffer from asthma. This is the conclusion of a study led by researchers from the Institute of Environmental Assessment and Water Research (IDAEA-CSIC), published this week in the *Journal of Hazardous Materials*.

"The toxicological research has shown that many of the metallic particles in the smoke from [fireworks](#) are bio-reactive and can affect human health", Teresa Moreno, a researcher from the IDAEA (CSIC) and lead author of a study that has been published this week in the *Journal of Hazardous Materials*, tells SINC.

The different colours and effects produced in these displays are achieved

by adding metals to the gunpowder. When a pyrotechnic display takes place it releases a lot of smoke, liberating minute metallic particles (of a few microns in size, or even less), which are small enough to be inhaled deeply into the lungs.

"This poses a risk to health, and the effects are probably more acute in people with a background of asthma or [cardiovascular problems](#)", Moreno explains. "The effects in healthy people are still unknown, but common sense tells us it cannot be good to inhale the high levels of metallic particles in this smoke, even if this only happens a few times a year".

The study focused on the San Juan fiestas (the night of 23 June through to 24 June, 2008) in the Spanish city of Girona. The researchers analysed the levels of more than 30 [chemical elements](#) and compounds in May and June in order to confirm that the levels of lead, copper, strontium, [potassium](#) and [magnesium](#) skyrocketed after the fireworks were launched.

The team found the results were similar in other towns too. During the Mascletà (18 March), for example, in the Las Fallas fiestas in Valencia, levels of these elements rose once again, as well as others such as aluminium, titanium, barium and antimony, and also concentrations of nitric oxide (NO) and sulphur dioxide (SO₂).

Other studies have confirmed that the smoke from fireworks increases the presence of metallic particles in the skies over L'Alcora and Borriana (Castellón), Barcelona and even London (United Kingdom) during the Guy Fawkes' Night celebrations.

"People who live in cities already inhale significant amounts of contaminant particles stemming from traffic emissions, chimneys and cigarettes, and the dense smoke caused by fireworks only worsens this

situation", points out Moreno.

Possible solutions

The researcher compares the problem with that of tobacco. "The less you expose yourself to the smoke, the fewer negative effects it will have on your health, and so the best solution is to avoid inhaling it".

According to the scientists, in the absence of a ban on fireworks, spectators should stay well back in a place not affected by the smoke and pay attention to the wind direction. They also recommend that fireworks displays should be sited in a place that ensures the plume of smoke will blow away from densely populated areas.

An added problem is the chemical mixtures in the different kinds of fireworks, since some contain extremely toxic metals such as lead. "There should be strict controls on fireworks imports so that those with the potentially most dangerous chemical composition can be avoided", concludes Moreno.

More information: Teresa Moreno, Xavier Querol, Andrés Alastuey, Fulvio Amato, Jorge Pey, Marco Pandolfi, Nino Kuenzli, Laura Bouso, Marcela Rivera y Wes Gibbons. "Effect of fireworks events on urban background trace metal aerosol concentrations: Is the cocktail worth the show?" *Journal of Hazardous Materials* 183 (1-3): 945-949, 15 Nov 2010. [Doi:10.1016/j.jhazmat.2010.07.082](https://doi.org/10.1016/j.jhazmat.2010.07.082)

Provided by FECYT - Spanish Foundation for Science and Technology

Citation: Smoke from fireworks is harmful to health (2010, November 16) retrieved 30 April 2024 from <https://medicalxpress.com/news/2010-11-fireworks-health.html>

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