

# New chemical composition of 'poppers' linked to retinal damage

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The new chemical composition of the legal high 'poppers' is linked to retinal damage at the back of the eye, finds a small study published online in the *British Journal of Ophthalmology*.

The findings prompt the researchers to call for a reassessment of the harms associated with these recreational drugs.

Poppers are colourless liquids with strong odours that are inhaled for their psychoactive effects, feelings of euphoria, and sexual arousal.

The Psychoactive Substances Act 2016 aimed to ban the production and sale of all 'legal highs' in the UK from April 2016. But [poppers](#) were exempt as they don't directly affect the central nervous system.

However, the principal chemical ingredient of poppers, isopropyl [nitrite](#), replaced isobutyl nitrite after the latter was reclassified as a cancer causing agent in 2006. And eye problems have emerged as a less well known side effect since the [chemical composition](#) of poppers was changed.

The researchers analysed visual disturbances subsequently associated with the use of poppers in twelve 31-59 year old men treated at one specialist eye hospital in southern England between 2013 and 2016.

The men were assessed by a retinal specialist; photographs of their retinas were taken; and their eyes were scanned using [optical coherence tomography](#) (OCT), a technique that is similar to ultrasound, but which uses light rather than sound waves to achieve higher resolution pictures of the structural layers of the back of the eye (retina).

The most frequently reported symptom was impaired central vision, such as blurriness, or blind spots (scotoma), with symptoms starting within hours or days of inhaling poppers.

Eight of the products the men used were chemically analysed: Platinum, Hard-on, Rush, Berlin XXX Hardcore, Liquid Gold, Jungle Juice (yellow label), and two Jungle Juice Plus varieties.

Six of the brands linked to visual symptoms contained isopropyl nitrite, while Jungle Juice Plus varieties, used without visual side effects in one case, contained other forms of nitrites and related compounds.

Three patients had used poppers for 20 years or more, only noticing symptoms after switching to a new brand.

One of these men developed a progressive central scotoma after using Jungle Juice, containing isopropyl nitrite. Previous use of Jungle Juice Plus, without isopropyl nitrite, wasn't associated with any visual disturbances.

The second patient noticed symptoms after using Berlin XXX containing isopropyl nitrite, for the first time, having previously suffered no ill effects when using other brands.

The third patient had frequently used isobutyl nitrites in the 1980s with no visual side effects, but after heavy use for the first time in years, developed scotoma.

Individual susceptibility to [visual disturbances](#) associated with poppers is likely to vary, say the researchers, although several users gave a clear history of visual disturbance after changing brands.

Most patients fully or mostly recovered several months after stopping drug use, although symptoms didn't clear up in all of them.

Most of the tested products were not the exact samples used by patients, and composition of the poppers might be different to those inhaled, caution the researchers. Popper products should be subject

to further analysis as different versions may have differing strengths and contaminants, they add.

But on the basis of their findings, the researchers conclude that isopropyl nitrite is harmful to the fovea—the small depression in the retina at the back of the eye where visual acuity is greatest.

The high rate of popper use is "of increasing concern, both because of the mounting body of evidence suggesting that poppers can have serious effects on central vision, but also because users and healthcare professionals may be unaware of the risk," explain the researchers.

Poppers' exclusion from the legislation banning legal highs may have reinforced the impression that they are largely harmless, suggest the researchers.

"While [retinal damage](#) can often resolve on cessation of use, symptoms can be prolonged and the visual effects of chronic use of the newer brands of poppers are unknown. For these reasons, it seems appropriate that the level of harm associated with poppers should be reassessed," they conclude.

**More information:** Poppers: legal highs with questionable contents? A case series of poppers maculopathy, *British Journal of Ophthalmology* (2017). [DOI: 10.1136/bjophthalmol-2016-310023](https://doi.org/10.1136/bjophthalmol-2016-310023)

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