

## BTMPS: AN INDUSTRIAL CHEMICAL ADULTERANT IN THE ILLICIT DRUG SUPPLY

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In June 2024, community-based drug checking programs discovered the industrial chemical bis (2,2,6,6-tetramethyl-4-piperidyl) sebacate (BTMPS) in the illicit opioid supply in Portland, Oregon and Philadelphia, Pennsylvania. The substance appears as a white powder, and on industrial chemical websites, it is often referred to by its brand name, Tinuvin® 770. Used, among other things, as a protective coating on plastics to provide protection against ultraviolet rays, BTMPS belongs to a class of molecules called hindered amine light stabilizers. It is not approved for use in humans or animals, and it is not a scheduled or regulated substance in the U.S. Unlike other adulterants added to the illicit drug supply, such as [xylazine](#) and [medetomidine](#), BTMPS does not have any psychoactive effect. The substance has primarily been detected in products containing fentanyl, but it has also been found in samples containing other synthetic opioids, such as para-fluorofentanyl, and in stimulants, such as methamphetamine and cocaine. The presence of BTMPS in the illicit drug supply and its rapid proliferation across the country has left drug policy experts and harm reduction specialists puzzled as to why it is in the supply and how it will affect the individuals consuming it.

Between June and October of 2024, drug policy researchers conducted a study to characterize BTMPS's introduction to the illicit fentanyl supply by testing samples obtained from nine community-based drug checking programs. In Los Angeles, California and Philadelphia, Pennsylvania, the researchers tested small amounts of drug products that were marketed as fentanyl, "dope," or "tranq-dope," which were voluntarily submitted to them by individuals who use drugs.<sup>1</sup> Of the 284 drug products tested in Los Angeles and Philadelphia, 98 (35 percent) contained BTMPS.<sup>2</sup> In Los Angeles, the proportion of samples containing BTMPS increased from zero in June 2024 to 56 percent in September 2024.<sup>3</sup> In comparison, Philadelphia's proportion of samples containing BTMPS was 25 percent in June 2024 and increased to 32 percent in September 2024.<sup>4</sup> Of the 98 BTMPS positive samples, 62 samples (63 percent) contained more BTMPS than fentanyl by mass, with eight samples without any detectable fentanyl and 14 having more BTMPS than fentanyl by a factor of 10 or greater.<sup>5</sup> Additionally, the researchers tested trace residues from used drug paraphernalia obtained from sites in Delaware, Maryland, Nevada, Washington, Puerto Rico, and Alameda and San Luis Obispo counties in California.<sup>6</sup> Of the 486 trace residue samples collected from these locations, 13 percent contained BTMPS.<sup>7</sup> In these other locations, the proportion of samples containing BTMPS was three percent in June 2024 and increased to 32 percent in September 2024.<sup>8</sup>

Because of the high levels of BTMPS within the illicit drug supply, drug policy experts believe that the substance is being deliberately added, as opposed to it being the result of accidental contamination. It is unclear as to why BTMPS would be deliberately added to the illicit drug supply, but drug policy experts suspect the following: (1) it is due to a change in the synthesis or manufacturing process of fentanyl; (2) it is being added to dilute the amount of fentanyl or another psychoactive component in the illicit drug supply, possibly in an effort to reduce the risk of overdose; or (3) it is being added to stabilize drug products from light or heat exposure throughout the drug manufacturing, storage, or transportation process. Experts also believe that BTMPS is being added early in the

<sup>1</sup> Chelsea L. Shover, et al., "UV Stabilizer BTMPS in the Illicit Fentanyl Supply in 9 US Locations," *JAMA* (2025): <https://doi:10.1001/jama.2024.27550>.

<sup>2</sup> *Id.*

<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> *Id.*

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

illicit drug supply chain, possibly in large drug labs in Mexico, due to its widespread appearance in the illicit drug supply across the U.S. Typically, when an adulterant is added to the illicit drug supply later in the supply chain, the adulterant tends to be limited to one geographical location.

Research on the effects of BTMPS in humans is extremely limited, but a 2004 study of BTMPS in rats found that long-term use of the substance caused heart defects in the rodents.<sup>9</sup> The chemical safety data sheet<sup>10</sup> for BTMPS lists the substance as a health hazard that can cause serious eye damage, skin irritation, and harm to a fetus.<sup>11</sup> Anecdotal reports from individuals who have ingested drugs containing BTMPS report that the substances do not have the same desired effect when compared to substances not containing BTMPS. Individuals who have used substances containing BTMPS report blurred vision, burning eyes, ringing in the ears, nausea, and coughing after ingesting it. They also report a burning sensation when the substance is injected. Those who have used substances containing BTMPS further report a chemical-like smell, with some describing it as having a distinct smell similar to plastic or bug spray. Harm reductionists have also expressed concerns that individuals who regularly consume fentanyl containing high levels of BTMPS may inadvertently develop a lower tolerance for fentanyl, making them more susceptible to a future overdose if they ingest a form of fentanyl that is not adulterated.

Drug checking test strips, like those used to detect fentanyl and xylazine, do not exist for BTMPS. Moreover, neither healthcare providers nor medical examiners routinely test for BTMPS in drug screens. This means that without specifically testing for the substance, they would not have a way to know if an individual had ingested BTMPS. BTMPS, however, is detectable on portable spectrometers used by community-based drug testing programs, so harm reduction professionals should encourage substance users to have their substances tested regularly if such drug checking services exist in their area.

## CONCLUSION

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There is a lot still unknown about why BTMPS is showing up across the U.S. as an adulterant in the illicit drug supply, but its presence is concerning to drug policy experts and harm reductionists. Further research on the health effects of BTMPS ingestion in humans is urgently needed. Community-based drug checking programs will be a necessary tool in the identification of BTMPS due to the lack of BTMPS test strips.

## RESOURCES

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<sup>9</sup> Péter Sótónyi, et al., “Comparative Study on Cardiotoxic Effect of Tinuvin 770: A Light Stabilizer of Medical Plastics in Rat Model,” *Toxicological Sciences* 77, no. 2 (2004): 368-74, <https://doi.org/10.1093/toxsci/kfh025>.

<sup>10</sup> A chemical safety data sheet includes information about a chemical, including its properties; its physical, health, and environmental hazards; and its protective measures and safety precautions for handling, storing, and transporting the chemical. See “Hazard Communication Standard: Safety Data Sheets,” Occupational Safety and Health Administration, accessed Feb. 25, 2025, <https://www.osha.gov/publications/osh3514.html>.

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