Technical Information on Cleaning Products

The tables below include information on products and ingredients that have been tested for their effectiveness at removing or breaking down environmental methamphetamine or fentanyl. This information is not an endorsement by the Washington State Department of Health, and the products are not listed by effectiveness or recommendation. The information below may help you choose a cleaning product that is appropriate to your facility or situation.

This symbol indicates that the cleaner contains ingredients that are hazardous to the eyes. The cleaner may require an eyewash station and chemical splash goggles to use. Review the product Safety Data Sheet for more information and to see if an eyewash is required. Additional information on emergency eyewash requirements can be found at DOSH Directive (WRD) 13.00 Emergency Washing Facilities. L&I also has resources on Eyewash and Emergency Washing Facilities; you can contact them using eyeonsafety@lni.wa.gov.

Table 1. Effectiveness of Cleaning Products on Fentanyl and Methamphetamine

Category	Product Name	Cleaning Agent	Effectiveness Against Fentanyl	Effectiveness Against Methamphetamine	Reference
Water	Water	H_2O	62-95% removal, 33-80% fentanyl in runoff with 1-hour contact time (Oudejans, 2022).	About 69% removed after hosing down HDPE surface (nonporous) with water (comparing median concentrations post-cook and post-decontamination). It was noted that less meth was removed using water if organic solvent was also present on surface. The use of water in this case left a thin film of meth on the surface (Ciesielski et al. 2020).	Oudejans, 2022; Ciesielski et al., 2020
			"No degradation" (Oudejans, 2023).	Hot water is not more effective than cold water for cleaning (EPA, 2021).	Oudejans, 2023; EPA, 2021

				Scrubbing with water was more effective on removing fentanyl compared to scrubbing with no water (Froelich et al., 2018).	Froelich et al., 2018
General cleaners	Formula 409	0.3% of alkyl dimethyl benzyl ammonium chloride	No studies found.	Removal of 90% after 1 wash, 95% after 3 washes on latex-painted drywall (Serrano et al. 2012; Martyny, 2014).	Serrano et al., 2012 Martyny, 2014
	Crystal Simple Green	C9-11 Alcohols Ethoxylated, surfactant, Tetrasodium Glutamate Diacetate Simple Green Products SDS	No studies found.	No degradation seen (Singh, 2004).	Singh, 2004
	Simple Green All Purpose Cleaner by Sunshine Makers Inc	2-butoxyethanol, ethoxylated alcohol, tetrapotassium pyrophosphate, sodium citrate, fragrances, and colorants	No studies found.	100% removal after 1 wash on glass. 100% removal after 1 wash on sheet metal. 53% removed after 1 wash, 63% after 2 washes, 80% after 3 washes on painted plywood. 77% removed after 1 and 2 washes, 81% after 3 washes on latex-painted drywall, using wipe sample after wipe cleaning step (Serrano et al. 2012; Martyny, 2008).	Serrano et al., 2012 Martyny, 2008
	Pine Sol	Alkyl alcohol alkoxylate, Glycolic acid	No studies found.	No degradation seen (Singh, 2004).	Singh, 2004
	Liqui-Nox	Sodium Alkylbenzene Sulfonate	No studies found.	No degradation seen (Singh, 2004).	Singh, 2004
	TSP detergent	Trisodium phosphate	No studies found.	No degradation seen (Singh, 2004).	Singh, 2004
Hydrogen peroxide	Hydrogen peroxide	10% H_2O_2 (Lindén et al. 2024)	Low degradation: 48% of fentanyl remained after 19 hours in hydrogen peroxide. 23% of	No studies found.	Lindén et al., 2024

		H_2O_2 pH 5 (Qi et al. 2011)	carfentanil remained after 18 hours. Low results regardless of stirring or not. (Lindén et al. 2024). 10.4% degraded (after 5 minutes), 14.5% (10 minutes), 34.6% (30 minutes), 53% (60 minutes) stirring in a flask (Qi et al. 2011).		Qi et al., 2011
	Alkalized hydrogen peroxide	Added sodium carbonate to 15% hydrogen peroxide to reach pH 8.5	No studies found.	82%-93% degraded (wipe sample on drywall, vinyl floor tiles, galvanized metal, and glass; Owens, 2017).	Owens, 2017
	Meth Remover by Apple Environmental	Two-part solution: 1. quats, isopropanol, dimethyltallow alkyl amines 2. 4% hydrogen peroxide	37-73% removal, 14-32% fentanyl in runoff with 1-hour contact time (Oudejans, 2022). 23-58% degradation (Oudejans, 2021). "Minimal degradation" (Oudejans, 2023).	No studies found.	Oudejans, 2022 Oudejans, 2021 Oudejans, 2023
	ZEP Professional Stain Remover with Peroxide	Hydrogen peroxide, 4%	57-78% removal, 11-55% fentanyl in runoff with 1-hour contact time (Oudejans, 2022). 14-46% degradation	No studies found.	Oudejans, 2022 Oudejans, 2021

			(Oudejans, 2021). "Minimal degradation" (Oudejans, 2023).		Oudejans, 2023
	OxiClean	Percarbonate, hydrogen peroxide	50-78% removal, 32-66% fentanyl in runoff (1-hour contact time; Oudejans, 2022). "Poor degradation" (Oudejans, 2023) Fentanyl and acetylfentanyl removed after scrubbing with OxiClean applied for 0 minutes or 15 minutes. Fentanyl and acetylfentanyl were not removed after 30-minute OxiClean application because it dried on the surface, so scrubbing without liquid had no effect (Froelich et al., 2018).	No studies found	Oudejans, 2022 Oudejans, 2023 Froelich et al., 2018
	Bio-Oxygen Chem Decon	2-part activated peroxide solution: 1. Potassium carbonate, 2-propanol, N-alkyl (C12-18)-N,N-dimethyl-N-benzalkonium chlorides other quats;	No studies found.	Oxidatively degrades meth and precursor ephedrine effectively. 71 ± 3% meth degraded over 1 hour.	Mayer et al., 2023

		2. Hydrogen peroxide		95 ± 3% meth degraded over 4 hour (Mayer et al. 2023).	
Peracetic acid	Dahlgren Decon	3-part solution: 1. polyoxyethylated tridecyl alcohol <3%	86-99.5% removal, 0.0022-0.024% fentanyl in runoff with 1-hour contact time (Oudejans, 2022)	No studies found.	Oudejans, 2022
		2. sodium hydroxide ≥85%	Reapplication does not significantly improve degradation efficacy (Oudejans, 2021)		Oudejans, 2021
		3. Boron oxide <40%, acetic acid <30%, peroxyacetic acid <30%	89-98% degradation using diluted 1:4 with 5 minute application time (Oudejans, 2021)		
		Creates peracetic acid, 1.7%	"Best degradation" (Oudejans, 2023)		Oudejans, 2023
			High degradation: No fentanyl and carfentanil detected after 10 minutes		Lindén et al., 2024

			(Lindén et al., 2024)		
	EasyDecon DF200	3-part solution: 1. quaternary ammonium compounds <6.5%	93-99.3% removal, 0.083-9.1% fentanyl in runoff with 1-hour contact time (Oudejans, 2022)	100% degraded after 1 wash, 100% after 3 washes (wipe sample on drywall; Martyny, 2014)	Oudejans, 2022; Martyny, 2014
		2. hydrogen peroxide <8%	"Best degradation" (Oudejans, 2023)	100% degraded after 1 wash on latex-painted drywall (Wipe sample; Serrano et al. 2012)	Oudejans, 2023; Serrano et al., 2012
		3. diacetin <60%			
	Peracetic acid	CH_3CO_3H, pH 8	90.7% degraded (after 5 minutes), 92.1% (10 minutes), 93% (30 minutes), 95.1% (60 minutes)	No studies found.	Qi et al., 2011
Products marketed to law enforcement	**FAST-ACT**	Dry. Mixed aggregates of magnesium oxide (MgO) and titanium dioxide (TiO_2) nanoparticles	Medium/high degradation: "less than 5% of the compounds remained after 10 minutes," but this was assumed to be from adsorption of fentanyl and carfentanil onto FAST-ACT rather than degradation.	No studies found.	Lindén et al., 2024
	GDS2000	Alkaline solution	No degradation (for both fentanyl and carfentanil).	No studies found.	Lindén et al., 2024
		Alkaline solution;		No studies found.	

	Reactive Skin Decontamination Lotion (RSDL)	Potassium 2,3-butanedione mono-oxime (DAM) and diacetyl mono-oximate (Dekon-139) in polyethylene glycol monomethyl ether and water	No degradation (for both fentanyl and carfentanil).		Lindén et al., 2024
Non-chemical agents	**Ozone**	335 ppm O_3	No studies found.	97% degradation in 12 minutes, no wiping (Rindelaub & Miskelly, 2019).	Rindelaub & Miskelly, 2019
	UV light	Ultraviolet light	3% of original fentanyl concentration remained after 4 days of UV irradiation of 254 nm in the lab, which is equivalent to about exposure to sunlight for 10, 10-hour days.	No studies found.	Reitstetter, 2018
	Temperature	42 degrees Celsius	28% of original fentanyl concentration remained after 4 days of exposure to 42 degrees C in the lab.	No studies found.	Reitstetter, 2018

Sisco et al. 2019 was reviewed and determined to have inadequate study methods.

Do not mix bleach products with other cleaners, ammonia, or acids, because this can create toxic gases that cause life threatening injuries. Visit Dangers of Mixing Bleach with Cleaners | Washington State Department of Health for more information. The acidified bleach products in the table below are mixed by trained professionals; **the research is included for informational purposes only and product mixing should not be attempted**.

Table 2. Effectiveness of Bleach Products on Fentanyl and Methamphetamine

Category	Product Name	Cleaning Agent	Effectiveness Against Fentanyl	Effectiveness Against Methamphetamine	Reference
Bleach products	Full strength bleach (pH 12)	Ultra Clorox Germicidal Bleach, 6.15% sodium hypochlorite (Singh, 2004)	69% removal with "pH12 undiluted bleach," 1-hour contact time (Oudejans, 2022).	90% degradation (Singh, 2004).	Oudejans, 2022
		K-O-K bleach, 5.5% (Oudejans, 2022)	"Good degradation" as "full strength bleach" (Oudejans, 2023).		Oudejans, 2023
		Klorin (Colgate-Palmolive) <5% sodium hypochlorite (Lindén et al., 2024)	Medium degradation: "less than 50% of fentanyl and carfentanil detected after one hour and/or full degradation observed within 24 hours" (Lindén et al., 2024).		Singh, 2004; Lindén et al., 2024
	Clorox Clean-Up	1.84% sodium hypochlorite	No studies found.	57% removed after 1 wash, 64% after 3 washes on latex-painted drywall (Serrano et al. 2012; Martyny, 2014).	Serrano et al., 2012 Martyny, 2014
	Trichloroisocyanuric acid	$C_3O_3N_3Cl_3$, pH 5	96.5% degradation (after 2 minutes), 98.6% (5 minutes), 99% (10 minutes), 99.5% (30 minutes), >99.9% (60 minutes).	No studies found.	Qi et al., 2011
	Calcium hypochlorite	$Ca(ClO)_2$, pH 12 (Qi et al., 2011)	85.9% degraded (after 2 minutes), 59.2% (5 minutes), 41.7% (10 minutes), 38.9% (30 minutes),	No studies found.	Qi et al. 2011

		$Ca(ClO)_2$, 0.2 M (Lindén, et al., 2024)	36.9% (60 minutes) (Qi et al., 2011). Medium degradation: "less than 50% of fentanyl and carfentanil detected after one hour and/or full degradation observed within 24 hours" (Lindén et al., 2024).		Lindén et al., 2024
	Bleach plus additives	Bleach plus TWEEN 20, ethanol (50%), tetrahydrofuran	TWEEN 20, ethanol, and tetrahydrofuran added to bleach did not decrease fentanyl clumping, and ethanol further decreased degradation ability of bleach.	No studies found.	Lindén et al., 2024
	Domestos Spray Bleach	0.52% sodium hypochlorite	Fentanyl agglomerated, leading to poor recovery via wipe. Unable to assess degradation accurately.	No studies found.	Lindén et al., 2024
	Effekt Klor	0.95% sodium hypochlorite pH 9.5	Fentanyl agglomerated, leading to poor recovery via wipe. Unable to assess degradation accurately. Dried rapidly, reducing effectiveness. No difference in degradation effectiveness compared to water.	No studies found.	Lindén et al., 2024

	Alldecont MED	Hypochlorite	Medium degradation: "less than 50% of fentanyl and carfentanil detected after one hour and/or full degradation observed within 24 hours. 1% fentanyl remained in alldecont MED after 26 hours."	No studies found.	Lindén et al., 2024
	Acidified bleach (pH 7)	K-O-K bleach: hypochlorite 0.6%, hypochlorous acid, acidified to pH 7	59-91% removal, 1.7-25% fentanyl in runoff with 1-hour contact time (Oudejans et al., 2021; Oudejans, 2022) "Good degradation" (Oudejans, 2023).	No studies found.	Oudejans et al., 2021; Oudejans, 2022 Oudejans, 2023
	Acidified bleach (pH 5)	K-O-K bleach: hypochlorite 0.5%, hypochlorous acid, acidified to pH 5 (Oudejans et al., 2021) Unspecified bleach product and strength, acidified to pH 5 (Lindén et al., 2024)	94-98% removal, 1.5-4.7% fentanyl in runoff with 1-hour contact time (Oudejans et al., 2021; Oudejans, 2022). "Best degradation" (Oudejans, 2023). High degradation: no fentanyl and carfentanil detected after 10 minutes (Lindén et al., 2024).	No studies found.	Oudejans et al., 2021; Oudejans, 2022 Oudejans, 2023 Lindén et al., 2024
	Acidified Clorox® Pro Results Garage & Driveway Cleaner	Sodium hypochlorite <5%	94-99% removed, 0.8-2.2% fentanyl in runoff with 1-hour contact time (Oudejans et al., 2021;	No studies found.	Oudejans et al., 2021; Oudejans, 2022

		sodium hydroxide <1% myristamine oxide, acidified to pH 5, strength reduced to 0.5% sodium hypochlorite (Oudejans, 2021)	Oudejans, 2022). Reapplication does not significantly improve degradation efficacy (Oudejans, 2021). 55-66% degradation with 5-minute application time (Oudejans, 2021).		Oudejans, 2021
	MAXBlue (3" Tablets, Pool chemical)	Hypochlorite from trichloroisocyanurate	"Good degradation" (Oudejans, 2023).	No studies found.	Oudejans, 2023

Table 3. Effectiveness of Cleaning Products on Fentanyl and Methamphetamine in Textiles

Product Name	Cleaning Agent	Effectiveness against fentanyl	Effectiveness against methamphetamine	Reference
"Household detergent" plus washing machine	"Household detergent," no additional information provided	No studies found.	Tight weave denim: 99.4% removed after one wash, 99.7% after two washes, 99.8% after three washes. Loose weave cotton blanket: 99.8% removed after one wash, 99.9% after two washes, 99.8% after three washes.	Serrano et al., 2012

Table 4. Effectiveness of Ingredients (Not Available for Purchase) on Fentanyl and Methamphetamine

Category	Product Name	Cleaning Agent	Effectiveness Against Fentanyl	Effectiveness Against Methamphetamine	Reference
Separately tested chemicals (not tested as a cleaning product available for purchase)	**Hydrochloric acid**	HCl 6 M	No degradation (of both fentanyl and carfentanil).	No studies found.	Lindén et al., 2024
	Sodium hydroxide	NaOH 5%	Low degradation: more than 50% of fentanyl remaining after one hour and/or detectable amounts still remaining after 24 hours. None for carfentanil.	No studies found.	Lindén et al., 2024
	Cerium dioxide	CeO_2 (dry)	Low degradation: more than 50% of fentanyl and carfentanil remaining after one hour and/or detectable amounts still remaining after 24 hours.	No studies found.	Lindén et al., 2024
	Magnesium oxide	MgO (dry)	Low degradation: more than 50% of fentanyl and carfentanil remaining after one hour and/or detectable amounts still remaining after 24 hours.	No studies found.	Lindén et al., 2024
	TiO_2-ND	TiO_2-nanodiamond (dry)	Medium/high degradation: less than 20% of fentanyl and carfentanil remained after 10 minutes.	No studies found.	Lindén et al., 2024
	$KHSO_5$	$KHSO_5$, pH 5	24.3% degradation (after 5 minutes), 28% (10 minutes), 44.6% (30 minutes), 43.5% (60 minutes).	No studies found.	Qi et al. 2011

	Sodium percarbonate	Sodium percarbonate, pH 4	18.7% degradation (after 5 minutes), 36% (10 minutes), 24.4% (30 minutes), 45.3% (60 minutes).	No studies found.	Qi et al. 2011
	MMPP	Magnesium monoperoxyphthalate, pH 5	47% degradation (after 5 minutes), 52.1% (10 minutes), 63% (30 minutes), 76.5% (60 minutes).	No studies found.	Qi et al. 2011
	SPC+TAED	sodium percarbonate/N,N,N,N-tetraacetylethylene diamine, pH 8 or pH 10	81.6% degradation (after 2 minutes), 91.9% (5 minutes), 92.4% (10 minutes), 95.7% (30 minutes), 98.6% (60 minutes): pH 8. 76.3% degradation (2 minutes), 81.2% (5 minutes), 91% (10 minutes), 91.4% (30 minutes), 93% (60 minutes): pH 10	No studies found.	Qi et al. 2011
	$K_2S_2O_8$	$K_2S_2O_8$, pH 6	4% degradation (after 5 minutes), 6.4% (10 minutes), 33% (30 minutes), 45.6% (60 minutes).	No studies found.	Qi et al. 2011

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