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Eyedrops Can Mask THC on Point-of-Care Lateral Flow. Routine Validity Testing Will Not Catch It.

Clinical Scenario

A patient in a drug court program submits urine that returns negative for THC on a lateral-flow point-of-care cup; validity controls are normal. He uses prescription ophthalmic eyedrops daily. Laboratory LC-MS/MS confirmation returns positive for THC-COOH at 82 ng/mL.

The Pearl

Benzalkonium chloride (BAK) is a quaternary ammonium cationic surfactant used as a preservative in most ophthalmic preparations (timolol, latanoprost, dorzolamide, most generic drops) and in many antiseptic products. When added to urine, BAK forms detergent-like micelles that physically encapsulate THC-COOH and block its binding to the antibody-coated membranes of lateral-flow immunoassay (LFI) point-of-care cups, producing a false-negative result.[1] In a 2026 analytical validation study using a blinded panel of 45 specimens (15 true positive, 15 true negative, 15 BAK-adulterated true positives), **all 15 adulterated specimens returned false negative on LFI while a standard-addition confirmatory method classified all 45 correctly.**[1]

The critical blind spot is that standard specimen validity testing (creatinine, specific gravity, pH, nitrite, oxidants, glutaraldehyde) does not include any assay for cationic surfactants. SAMHSA Mandatory Guidelines for Federal Workplace Drug Testing Programs do not list BAK among required adulterant screening analytes.[2] A BAK-adulterated specimen passes all validity checks and produces a result the testing program treats as a legitimate negative.

Why It Matters

Drug courts, probation programs, and OTPs rely on lateral-flow cups for routine compliance monitoring. A BAK-containing antiseptic (available without a prescription) and ophthalmic eyedrops each produced reliable THC masking in controlled testing.[1] These products are inexpensive and draw no attention during a standard collection. A clinician reviewing a negative with normal validity controls has no signal from current testing infrastructure that masking has occurred; chromatographic confirmation (GC-MS or LC-MS/MS) is unaffected by BAK and is the only reliable endpoint when the clinical picture does not fit.

Bottom Line: A normal specimen validity panel does not rule out BAK adulteration. When a lateral-flow point-of-care THC negative is inconsistent with the clinical picture, send for laboratory confirmation by a chromatographic method (GC-MS or LC-MS/MS). Benzalkonium chloride from prescription eyedrops or OTC antiseptic products is invisible to standard validity testing and reliably produces false-negative LFI results.

References

1. Finn É, Huffman J, Skogerboe KJ. Behind the Mask: Detection and Characterization of Benzalkonium Chloride Adulteration in Immunoassay-Based Urine Drug Testing for Tetrahydrocannabinol (THC). *ACS Omega.* 2026;11(25):37997-38004. doi:10.1021/acsomega.6c03171 [Primary Data]

2. Substance Abuse and Mental Health Services Administration. Mandatory Guidelines for Federal Workplace Drug Testing Programs. Effective October 1, 2017. *Federal Register.* 82 FR 7920. [Regulatory]

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