Drug Enforcement Administration
Diversion Control Division
Drug & Chemical Evaluation Section

1,4-Butanediol

February 2024

(Street Names: BD, BDO, Liquid Fantasy, Cleaner, One Comma Four, One Four Bee, One Four BDO)

Introduction:

1,4-Butanediol (BD) is an industrial chemical, and is illicitly used as a substitute to gamma-hydroxybutyric acid (GHB). BD and gamma-butyrolactone (GBL) are structurally similar to gamma-hydroxybutyric acid (GHB) and there is evidence to confirm that GBL and BD are converted to GHB after oral administration.

GHB is a schedule I depressant. GHB abuse became popular among teens and young adults at dance clubs and "raves" in the 1990s, and gained notoriety as a date rape drug.

Licit Uses:

BD is a commonly used industrial chemical intermediate. Worldwide yearly production of BD is measured in the millions of metric tons.

Chemistry:

BD has the molecular formula $C_4H_{10}O_2$ and the molecular weight 90.12 g/mol. It is a colorless, viscous liquid.

Pharmacology:

BD has similar pharmacological effects to GHB in part because it is readily converted into GHB by the body's own natural process. GHB is present in the central nervous system in very small concentrations; it is a metabolite of the neurotransmitter gamma-aminobutyric acid (GABA). Scientific data suggest that GHB can function as a neurotransmitter or neuromodulator in the brain. It produces dose-dependent depressant effects similar to those of the barbiturates and methaqualone. Low doses of BD/GHB produce drowsiness, nausea, and visual distortion.

At high doses, BD/GHB overdose can result in unconsciousness, seizures, slowed heart rate, severe respiratory depression, decreased body temperature, vomiting, nausea, coma, or death. Sustained use of BD/GHB can lead to addiction. Chronic abuse of BD/GHB produces a withdrawal syndrome characterized by insomnia, anxiety, tremors, marked autonomic activation (i.e., increased heart rate and blood pressure) and occasional psychotic thoughts. Currently, there is no antidote available for GHB overdose. Co-ingestion of alcohol with BD can increase the toxicity.

Illicit Uses:

BD is abused for its euphoric and sedative effects. BD is mainly self-ingested, with an average recreational oral dose ranging from 1-3 mL. The onset of action after oral ingestion is 5-20 minutes and the effects last 2-3 hours.

User Population:

BD is abused as a substitute for GHB due to its intoxicating effects. BD/GHB is abused by teens and young adults as an alcohol substitute, at all-night parties and "raves," and for enhanced sexual experiences.

Illicit Distribution:

BD is an industrial chemical intermediate that is used to make other industrial chemicals. It has no household applications and is not available at retail to walk-in customers. It is typically diverted by being sold as a cleaner or paint-stripper.

BD is efficiently converted into GHB in the body. It is not typically used as a chemical precursor for clandestine manufacturing of GHB.

The DEA's National Forensic Laboratory Information System (NFLIS) Drug database, which collects scientifically verified data on drug items and cases submitted to and analyzed by participating federal, state and local forensic laboratories in the United States, indicates that there were 308 reports of BD in 2021, 262 in 2022, and 162 in 2023 (reports still pending). In total, there have been over 6,000 reports of BD to NFLIS-Drug since it was first reported in 1998.

Control Status:

BD is not a controlled substance or listed chemical under the Controlled Substances Act (CSA). However, BD is included as a laboratory supply on the *Special Surveillance List*. The CSA provides civil penalties for distribution of a laboratory supply to manufacture a controlled substance or listed chemical with reckless disregard for the illegal uses to which that laboratory supply will be put for purposes of 21 U.S.C. § 842(a)(11).

If intended for human consumption, BD may be treated as a schedule I controlled substance analogue for the purpose of Federal law pursuant to 21 U.S.C. § 813, if found to meet the criteria outlined in 21 U.S.C. § 802(32)..

Comments and additional information are welcomed by the Drug and Chemical Evaluation Section; Fax 571-362-4250, Telephone 571-362-3249, or Email DPE@dea.gov.