

Gamma-Butyrolactone

April 2023

(Street Names: GBL, Blue Nitro, Blue Nitro Vitality, Revivarant, RenewTrient, Fire Water, Gamma-G, GH Revitalizer, Remforce)

Introduction:

Gamma-butyrolactone (GBL) is an industrial chemical, and is illicitly used as a substitute and chemical precursor to gamma-hydroxybutyric acid (GHB). GBL and 1,4-butadiene (BD) are structurally similar to 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:

GBL is a commonly used industrial chemical intermediate and solvent, which is found in paint removers, cleaners, adhesives, and nail polish removers. Worldwide production of GBL is measured in the hundreds of thousands of metric tons.

Chemistry:

GBL has the molecular formula C₄H₆O₂ and the molecular weight 86.09 g/mol. It is a colorless, oily liquid with a bitter taste.

Pharmacology:

GBL is readily converted into GHB by the body's own natural process. Because of this, GBL has similar pharmacological effects to GHB. 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 GBL/GHB produce drowsiness, nausea, and visual distortion.

At high doses, GBL/GHB overdose can result in unconsciousness, seizures, slowed heart rate, severe respiratory depression, decreased body temperature, vomiting, nausea, coma, or death. Sustained use of GBL/GHB can lead to addiction. Chronic abuse of GBL/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.

Illicit Uses:

GBL is abused for its euphoric and sedative effects. GBL is mainly self-ingested, with an average recreational oral dose of 1 mL. GBL has a faster onset of effects and longer duration compared to GHB.

User Population:

GBL is abused as a substitute for GHB due to its intoxicating effects. GBL/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:

GBL is typically marketed for sale as a cleaning solvent or polish. GBL is used as a GHB substitute and as a 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 151 reports of GBL in 2020, 148 in 2021, and 85 in 2022.

Control Status:

GBL is regulated as a List I chemical under the Controlled Substances Act.

GHB is controlled in schedule I of the Controlled Substances Act (CSA). GBL and BD are structurally similar to GHB and there is evidence to confirm that GBL and BD are converted to GHB after oral administration. GBL and BD have been sold and substituted for GHB in an effort to circumvent state and federal laws. If intended for human consumption, both GBL and BD may be treated as a “controlled substance analogue” under the CSA pursuant to 21 U.S.C. §§802(32)(A) and 813.

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.