

Sources of Exposure

Toxicokinetics and Normal Human Levels

Biomarkers/Environmental Levels

General Populations

- The most likely source of exposure for the general population is contaminated drinking water and food that naturally contains 2-butanone.
- The general population may also be exposed via inhalation and/or dermal contact during the use of coating products (such as paints, varnishes, cleaners, etc.) containing 2-butanone.
- Individuals living near commercial settings where 2-butanone is used or manufactured may also be exposed to 2-butanone in the air.

Occupational Populations

- Individuals employed in facilities involved in spray painting or spray gluing may be exposed to 2-butanone in the air or via dermal contact.
- Workers in the following industries could also be exposed to 2-butanone including waste water treatment, waste solvent incineration, organic solvent recycling, and shale oil production.

Toxicokinetics

- 2-Butanone is rapidly absorbed following inhalation, oral, or dermal exposure.
- The limited available information on distribution suggests that it does not accumulate in any one tissue.
- 2-Butanone is metabolized via oxidative and reductive pathways.
- 2-Butanone and its metabolites (3-hydroxy-2-butanone and 2,3-butanediol) are excreted in the urine. 2-Butanone is also excreted unchanged in expired air.

Normal Human Levels

- There is no information on background levels of 2-butanone in humans.

Biomarkers

- 2-Butanone can be measured in blood, expired air, and urine.
- Occupational exposure studies have found correlations between urinary 2-butanone levels and workplace air concentrations.
- 2,3-Butanediol, a 2-butanone metabolite, can also be measured in urine.

Environmental Levels

Air

- Sporadic ambient air monitoring data suggest that the average background concentration of 2-butanone may be low.

Water

- 2-Butanone has been detected in <5% of U.S. groundwater samples.

Sediment and Soil

- Limited data are available on the detection of 2-butanone in soil samples.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2020. Toxicological Profile for 2-Butanone. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

ToxGuide™ for 2-Butanone



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U.S. Department of Health and
Human Services
Public Health Service
Agency for Toxic Substances
and Disease Registry
www.atsdr.cdc.gov



Chemical and Physical Information

Routes of Exposure

Relevance to Public Health (Health Effects)

2-Butanone is a Colorless Liquid

- Methyl ethyl ketone is a synonym for 2-butanone.
- 2-Butanone is a common industrial solvent used for various coating systems. Examples include nitrocellulose, lacquers, rubber cement, printing inks, paint removers, vinyl films, resins, rosins, polystyrene, chlorinated rubber, polyurethane, acrylic coatings, and cleaning solutions.
- It is used in the production of synthetic leathers, transparent paper, and aluminum foil.
- 2-Butanone is also used in metal degreasing, as an extraction solvent, in dewaxing applications, and as a solvent for the production of smokeless powders.

- Inhalation – Potential exposure route of concern for general population. Primary occupational exposure route.
- Oral – Primary route of exposure for the general population.
- Dermal – Potential exposure route for the general population and occupational populations.

2-Butanone in the Environment

- 2-Butanone exists as a vapor in the atmosphere. It is expected to undergo atmospheric destruction via photolysis and other unidentified mechanisms.
- 2-Butanone is expected to rapidly volatilize from surface water and moist or dry soils to the atmosphere.
- In soil, 2-butanone is expected to display high mobility, and has the potential to leach into groundwater.
- 2-Butanone is not expected to bioconcentrate in fish or aquatic organisms.

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- An acute-duration (≤ 14 days) inhalation MRL of 1 ppm was derived for 2-butanone.
- No intermediate- or chronic duration inhalation MRLs were derived for 2-butanone.

Oral

- No acute-, intermediate-, or chronic-duration oral MRLs were derived for 2-butanone.

Health Effects

- The primary health effects observed in humans following inhalation exposure to 2-butanone are neurological symptoms (headache, fatigue, feeling of intoxication) and eye, nose, and throat mucous membrane irritation.

Health Effects

- Respiratory tract irritation has also been reported in laboratory animals inhaling 2-butanone.
- Other health effects observed in laboratory animals following inhalation and/or oral exposure include renal tubular necrosis, neurological effects (narco-sis and inco-ordination), and developmental toxicity (reduced fetal weight, skeletal variations, and delayed brain development).
- 2-Butanone has been shown to enhance the neurotoxicity of ethanol, n-hexane, methyl-n-butyl ketone, ethyl-n-butyl ketone, and toluene; the hepatotoxicity of carbon tetrachloride, chloroform, and n-hexane; and the renal toxicity of methanol and chloroform.
- The carcinogenic potential of 2-butanone has not been adequately assessed in humans and no animal studies evaluated carcinogenicity. EPA concluded that the data are inadequate for an assessment of carcinogenic potential of 2-butanone.

Children's Health

- It is not known if children are more sensitive to 2-butanone exposure than adults; it is assumed that they would have similar effects.