Renewable chemicals naturally designed and engineered to deliver the performance that adds value to everyday products

Renewa-Tone™ (Renewable Acetone)

What is Renewable Acetone?

Unlike petro-acetone, Renewa-Tone™ is produced from fermentation of C5 and C6 sugars utilising Green Biologics' proprietary *Clostridium* microbial biocatalysts. As our acetone is selectively produced by bacteria, and not by processing crude petroleum distillates, we are capable of providing higher quality material whose production is not coupled to phenol synthesis and global demand for this unrelated compound. It is important to note that Renewa-Tone™ is not a 'green alternative,' but rather the same molecule as acetone produced from petrochemical feedstocks, allowing for direct 'drop-in' to existing applications and formulations.

Acetone Basics

Acetone is a three-carbon symmetrical ketone that is one of the most widely used industrial and laboratory solvents. The compound is a clear, colourless, flammable, low-boiling, and volatile liquid recognized for its rapid evaporation and its faint aromatic, sweet odour. A hallmark of acetone's utility is its absolute miscibility with water and most organic solvents. Additionally, it is increasingly being used as a chemical intermediate for the production of functionalized compounds such as bisphenol A (BPA), methyl methacrylate (MMA), and methyl isobutyl ketone (MIBK).

Applications

While most commonly recognized as a solvent, acetone can be a valuable feedstock for the production of diverse functionalized materials (12 % use as a solvent, 75 % use as a chemical intermediate; 1995 data). Direct applications include surface coatings, films, adhesives, cleaning fluids, and laboratory research. Cosmetic products that utilize acetone range from the primary ingredient of some nail polish removers, nail treatments, skin lighteners, and hair spray to personal care products such as wound treatments and foot care.

Health and Toxicity

Acetone is ever-present in the human body as it is a natural metabolite resulting from the degradation of acetoacetic acid, which itself is a product of fat metabolism. As such, it has long been established that acetone has both low acute and chronic toxicity. Side-effects of exposure include those common with exposure to other generally benign chemicals (i.e. ethanol or sodium chloride) and are limited to irritation of the eyes, skin, and mucus membranes. Inhalation of 500 ppm acetone for 2 hours results in no symptoms of irritation to the mouth, lungs, and airways in humans. Furthermore, acetone has not been shown to be a carcinogen, genotoxin, neurotoxin, or developmental toxin highlighting the benign nature of the compound for human exposure. As it is recognized by the FDA as a generally recognized as safe (GRAS) compound, acetone is present in a variety of processed and unprocessed foods, including beverages, baked goods, desserts, and preservatives. Additionally, acetone is biodegradable with a 22-day half-life in air and 1 – 10 day half-life in water.

Environmental Impacts

A variety of organisms including plants, trees, volcanic gases, forest fires, and animals (through fat metabolism) release acetone naturally into the environment. In 1995, the EPA delisted acetone as a toxic chemical due to studies indicating that it exhibits low acute toxicity at levels common with environmental releases and the resulting exposures as well as low chronic toxicity. At the same time, the EPA exempted acetone from regulation as a volatile organic compound (VOC) as it could be used safely as a substitute for other more hazardous air pollutants. The robust volatility of acetone results in most of the material released into the environment being evaporated into the atmosphere where it is photo-degraded by UV light into methane and ethane. Furthermore, acetone released into the soil and water is rapidly consumed and metabolized by microorganisms, leading to its quick dissipation. There is evidence that the consumption of acetone by aquatic microorganisms can lead to oxygen depletion, however this is a secondary effect and is not the result of direct acetone toxicity.

Green Biologics Inc.
319 Business Lane Suite 1000
Ashland, VA 23005
+1 804 368 6136