

**HUMAN HEALTH AND ENVIRONMENTAL
ANALYSIS OF DIMETHYL ETHER (DME)**

Prepared by
DuPont Company

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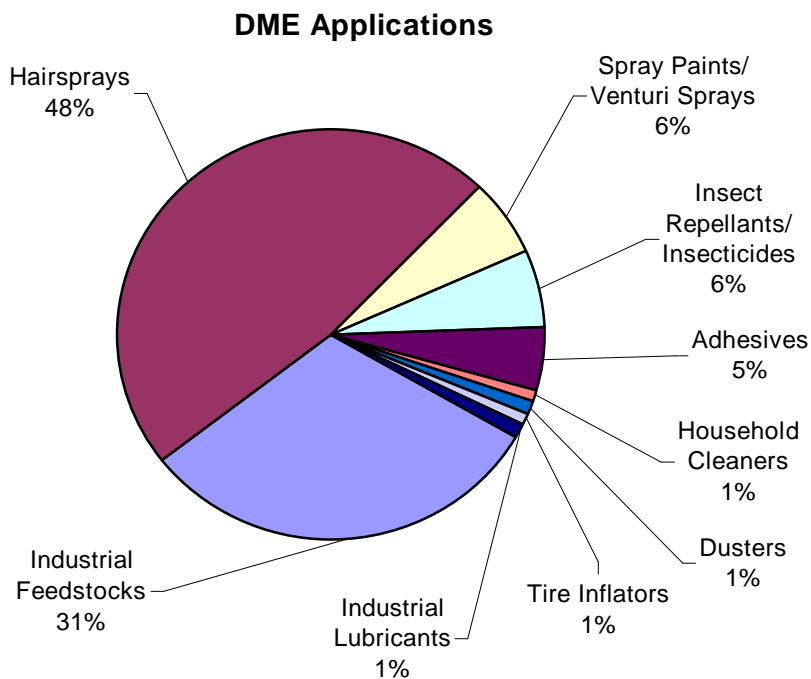
SPONSOR'S CONCLUSIONS

The potential risk associated with any chemical depends on the properties of the chemical and to what extent, if any, people are exposed to it.

To date, the available data indicate that, under normal use conditions, exposure to dimethyl ether (DME) for industrial employees and consumers is well below a level that would be unhealthy. This analysis also indicates that the potential for ecological risks is low. As such, the DuPont Company is recommending that DME be a low priority for further study at this time. This fact sheet is being provided to explain how this conclusion was reached.

EXPOSURE AND USE INFORMATION

DME is used as an ingredient to make other chemicals and is also used in aerosol products such as hairsprays and spray paints. DME is a popular component in aerosol products, replacing CFC-based propellants, which are associated with ozone depletion. Approximately 15 to 20 million kilograms of DME are produced annually¹. Uses of DME are shown in the accompanying pie chart.



¹ Source: DuPont business and market information

To estimate the extent to which a person might come into contact with DME, the manufacturing, processing, and major uses of DME were examined. Where data did not exist, exposures were estimated assuming a maximum level of exposure.

In industrial facilities where DME is manufactured and used, most exposure to DME is limited by the use of proper industrial hygiene methods. As a result, exposures during manufacture are typically several hundred times lower than that which would cause harm. Among those who work with DME, most exposure is through the inhalation of aerosol products (e.g., hairsprays, cleaning products).

In the case of consumer exposure, the most likely way that a person could come into contact with DME is inhaling it while using aerosol products (e.g., hairsprays, cleaning products). Several methods were used to estimate the amount of DME that a person might encounter while using aerosol products around the home, so that the various estimates could be checked against one another to help ensure the validity of the conclusions. Those exposure estimates showed that consumers typically are exposed to levels of DME that are several hundred times lower than that which would cause harm.

HAZARD INFORMATION

Health Effects

The health effects from DME exposure have been tested in a variety of approved test methods [i.e., Organization for Economic Cooperative Development (OECD) Screening Information Data Set (SIDS) battery of tests]. The results of these tests show that even long-term exposure to DME does not cause or contribute to cancer, nor does it result in any birth defects when exposures occurred during pregnancy. Tests showed that animals can breathe up to 10,000 parts per million (ppm) of DME (or 1% in air) for a lifetime without damage to their health. As a result, the level of exposure deemed safe is 10,000 ppm. For workers, a safe level of exposure has been established at 1,000 ppm for DME. These are the levels to which nearly all workers can be repeatedly exposed (for eight hours a day, seven days a week) without experiencing damage to their health.

It is extremely important to note that while long-term use under appropriate conditions is safe, intense, short-term exposure to extremely concentrated levels of DME can be life threatening. This situation results only from the abuse of DME-containing aerosol products from their intended use (i.e., deliberate, deep inhalation or “huffing”). The manufacturers of DME and the products containing it strongly advise against such inhalant abuse.

Physical Effects

DME is a flammable gas that is often sold in aerosol containers that are under high pressure. As such, DME presents a fire and explosion hazard if mishandled.

CHEMICAL PRIORITY INFORMATION (SPONSOR’S OPINION)

The DuPont Company is recommending that DME be a low priority for further study at this time.

Based on studies to date, DME does not pose a health threat when inhaled at low levels. It has not been shown to cause birth defects, gene mutations, or cancer. Risk of injury or damage to the health during the manufacture of DME or its processing into consumer products is low when this material is handled using proper industrial hygiene practices.

The levels of DME exposure predicted when using aerosol products in the manner in which they were intended are about 700 to 4,000 times *lower* than the level deemed safe for consumers and 250 times lower than the level deemed safe for industrial and commercial workers. This range accounts for conservative estimates of, for example, typical consumer use of hairspray and commercial use by beauticians. Further, even for those most vulnerable (e.g., children, pregnant women, the elderly), levels are still about 70- to 400-fold below the level deemed safe. This means that the estimated exposures are *well below* those that would be expected to pose any health threat.

Thus, based on DME testing conducted to date, the use of consumer products containing DME do not appear to present a human health risk. It should be recognized, however, that the intentional misuse via deliberate inhalation of concentrated vapors (i.e., “huffing”) can be life threatening.

Although ecological evaluations were not assessed in detail for DME, it is relatively nontoxic, breaks down quickly, and is not likely to be detected in the ecosystem at harmful concentrations.

ADDITIONAL INFORMATION

This summary is based upon a more detailed technical assessment. Additional information on the uses and potential risks associated with DME can be obtained by calling Ed Mongan, DuPont Environmental Manager, at 302-773-0910 or via electronic mail at edwin.l.mongan@usa.dupont.com.