



PUBLIC HEALTH STATEMENT

4,4'- METHYLENEBIS (2-CHLOROANILINE)

CAS#: 101-14-4

Division of Toxicology

May 1994

This Public Health Statement is the summary chapter from the Toxicological Profile for 4,4'-Methylenbis (2-chloroaniline) (MBOCA). It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™, is also available. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present. For more information, call the ATSDR Information Center at 1-888-422-8737.

This Statement was prepared to give you information about 4,4'- methylenbis(2-chloroaniline) (MBOCA) and to emphasize the human health effects that may result from exposure to it. The Environmental Protection Agency (EPA) has identified 1,350 hazardous waste sites as the most serious in the nation. These sites comprise the "National Priorities List" (NPL): Those sites which are targeted for long-term federal cleanup activities. MBOCA has been found in at least 4 of the sites on the NPL. As EPA evaluates more sites, the number of sites at which MBOCA is found may increase. This information is important because exposure to MBOCA may cause harmful health effects and because these sites are potential or actual sources of human exposure to MBOCA.

When a substance is released from a large area, such as an industrial plant, or from a container, such

as a drum or bottle, it enters the environment. This release does not always lead to exposure. You can be exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking substances containing the substance or by skin contact with it.

If you are exposed to a substance such as MBOCA, many factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, gender, nutritional status, family traits, lifestyle, and state of health.

1.1 WHAT IS MBOCA?

MBOCA is a synthetic chemical used in industry primarily to produce castable polyurethane parts. It also has a coating application when used in chemical reactions to "set" glues, plastics, and adhesives. Since plastics have many uses, MBOCA is used very frequently. Other names for MBOCA include 4,4'-methylenebis(2- chloroaniline), bis amine, DACPM, MCA, methylene bis ortho chloroaniline, and MOCA. The name MBOCA comes from methylene bis ortho chloro aniline. Pure MBOCA is a colorless solid, but MBOCA is usually made and used as yellow, tan, or brown pellets. If MBOCA is heated above 205°C it may decompose by itself. MBOCA has no odor or taste.

DEPARTMENT of HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

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1.2 WHAT HAPPENS TO MBOCA WHEN IT ENTERS THE ENVIRONMENT?

MBOCA may enter the environment through disposal of solid waste from manufacturing plants that use MBOCA in castable polyurethane processing. MBOCA is not likely to evaporate from the soil or water into the air. However, it may enter the air as dust when it is used at production plants, or it may enter surface waters from the waste streams of these plants. Some of the MBOCA may be broken down by sunlight or by tiny organisms, too small to be seen without the aid of a microscope.

1.3 HOW MIGHT I BE EXPOSED TO MBOCA?

Most exposure to MBOCA occurs in the workplace. If you work with MBOCA, you may breathe small particles of it in the air or get it on your skin if you brush against a surface covered by MBOCA dust. There are several other ways to be exposed to MBOCA outside of the workplace. For example, you may be exposed to MBOCA if you live in an area where the soil is contaminated with MBOCA. You may also be exposed if you eat foods grown in soils that contain MBOCA. However, you are unlikely to drink water contaminated with MBOCA because it does not dissolve easily in water.

1.4 HOW CAN MBOCA ENTER AND LEAVE MY BODY?

MBOCA can enter your bloodstream if you breathe it in the air, eat it, or get it on your skin. Results of studies in humans and animals show that MBOCA

can enter your body very quickly through the skin or lungs. Once MBOCA is in your body, most of it leaves your body quickly. MBOCA and its breakdown products exit the body through the urine and feces. Results of studies in humans and animals show that most MBOCA exits the body within a few days of exposure. The small amount of MBOCA that may remain in your body after you are exposed is likely to break down or leave your body at a slow rate.

1.5 HOW CAN MBOCA AFFECT MY HEALTH?

Studies of human exposure suggest that the small amounts of MBOCA usually found in the air or on surfaces in or near factories do not cause toxic effects, other than cancer. However, it is possible that acute exposure to a large amount of MBOCA, such as in the case of an industrial accident, may produce effects that we do not know very much about. Information on how MBOCA can affect your health is very limited, and we do not know if there are any long-term human health effects of exposure to MBOCA. MBOCA is suspected of causing bladder cancer and is considered a probable human carcinogen. Information is being gathered to determine whether bladder cancer in humans may be a result of a short-, medium-, or long-term exposure to MBOCA. We do not know if MBOCA causes birth defects in humans.

Results of studies in animals show that MBOCA can be harmful to the liver of exposed dogs and rats. MBOCA also causes cancer of the lungs, liver, breast, and bladder in animals. The Department of Health and Human Services has determined that

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MBOCA may reasonably be anticipated to be a carcinogen. The International Agency for Research on Cancer has determined that MBOCA is probably carcinogenic to humans. The EPA has determined that MBOCA is a probable human carcinogen.

1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO MBOCA?

There is a test that can measure MBOCA in your urine within a few hours of exposure. This test, however, will not detect exposure to MBOCA after a few days. This test may not be commonly available in your doctor's office.

1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The government has developed regulations and guidelines for MBOCA. These are designed to protect the public from the possible harmful health effects of this chemical. EPA has classified MBOCA as a hazardous waste that must meet certain disposal requirements.

The Occupational Safety and Health Administration (OSHA) regulates levels of MBOCA in the workplace. The maximum allowable amount of MBOCA in workroom air, assuming an 8-hour workday and a 40-hour workweek, is 0.22 milligrams per cubic meter.

1.8 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop F-32
Atlanta, GA 30333

Information line and technical assistance:

Phone: 888-422-8737
FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

To order toxicological profiles, contact:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Phone: 800-553-6847 or 703-605-6000

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1994. Toxicological profile for MBOCA. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.