

MIND, DISRUPTED

How toxic chemicals change how we think and who we are



Triclosan

What Is Triclosan?

Triclosan is an antibacterial chemical used in a wide range of consumer products, including soaps, deodorants, cosmetics, cleansing lotions, toothpaste, plastics, and fabrics.^{1,2} Triclosan is used in many consumer products that are disposed of in drains and is known as a ubiquitous water contaminant. Wastewater treatment plants have been found to incompletely remove triclosan from water before it is released, and consequently contaminates receiving rivers.³ Between 1999 and 2000, the United States Geological Survey tested water samples for 95 different chemicals. Among these, triclosan was one of the most frequently detected chemicals and found at some of the highest concentrations.⁴ In the first study of triclosan in marine mammals, researchers reported detectable levels of triclosan in the plasma of wild Atlantic bottlenose dolphins, providing evidence it bioaccumulates.⁵

The Environmental Protection Agency (EPA) has listed triclosan as “could be” and “suspected to be” contaminated with dioxins.⁶ Incineration of triclosan may also result in the formation of dioxin.⁷ There is some evidence that triclosan may be partially converted into dioxin with exposure to ultraviolet light.^{8,9} Dioxins are toxic chemicals that persist in the environment and can bioaccumulate in an individual and biomagnify up the food chain.¹⁰

How Are We Exposed to Triclosan?

Although triclosan was developed more than 30 years ago, over the last ten years there has been a substantial increase in consumer products containing triclosan.^{11,12} Daily exposure to consumer products that contain triclosan (including at least one brand of toothpaste, skin-care products, and other household products) is most likely the main source of exposure for the U.S. population.¹³ A number of companies that make toothpaste and soap products with triclosan claim that the active ingredient continues to work for up to 12 hours following use. As a result, exposure to triclosan lasts long after the few minutes it takes to wash hands or brush teeth.² Triclosan can be absorbed through the skin, mouth, and nose.^{3,14} Humans may also be exposed to triclosan in food, specifically fish or other aquatic organisms, because triclosan is known to bioaccumulate.^{5,14} Some breakdown products such as methyltriclosan are more bioaccumulative than the original product.¹⁵

Triclosan In Our Bodies

In an on-going nationwide study of the U.S. population's exposure to environmental chemicals, scientists from the Centers for Disease Control and Prevention (CDC) measured samples taken from 2003-2004 for triclosan in 2,517 people throughout the U.S. and found that 74.6% had detectable levels of triclosan in their urine.¹⁴ In a pilot study of 90 girls ages 6-9 years old, triclosan levels in urine were detected in 67.8%.¹⁶

Triclosan has also been found in the breast milk and plasma of breast-feeding mothers. In one study that collected and tested the breast milk and plasma of 36 mothers for triclosan, those who used personal care products containing triclosan had higher levels, suggesting that consumer products are a main source of exposure.¹⁷

What Does Exposure to Triclosan Mean for Our Health?

The presence of environmental chemicals in the human body does not necessarily imply that they are causing adverse health effects; however, environmental chemical exposures can and do affect human health. It is important to note that both the dosage and the timing of exposure have significant effects on any potential health outcome.

The following information is intended to inform the reader about the current state of knowledge on the health effects of triclosan, including both human and animals studies.

The health effects of triclosan on the general population are not well understood. In acute toxicological studies (or studies of short-term exposure) of rats and rabbits, triclosan has been found to have low acute toxicity from oral and dermal exposure and higher acute toxicity from inhalation exposure.¹⁸ However, many cases of skin irritation and eczematous rash resulting from skin contact with products containing triclosan have been reported from chronic (long-term or frequent) exposure.¹⁹ The overuse of triclosan (and other antibacterial chemicals) may also be linked to increased allergies and asthma.^{2,20,21}

There are no studies that suggest triclosan is presently causing widespread negative health effects in humans. However, there is evidence to suggest that triclosan is capable of interfering with hormones in multiple species. Combined with the

bioaccumulative nature of triclosan, this raises concerns about long term exposure. The health effects that have been associated with chronic exposure to triclosan are described below.

Endocrine Disruption

Research on rats shows that triclosan may disrupt normal function of androgens in males and estrogen binding in females.²² Metabolites (or breakdown products) of triclosan may be estrogenic, and they have the most potent endocrine-disrupting effect on thyroid hormones.²² Triclosan has been found to disrupt sulfonation of estrogen in the placenta in sheep, which is likely to cause problems in the transport of estrogen from the placenta to the fetus. Disruption of estrogen transport to the fetus may result in abnormal development.²³

Triclosan was found to have estrogenic and androgenic activities in human breast cancer cells, which could potentially stimulate the growth development of cancer cells.²⁴ A study of male rats found that triclosan reduced sperm count and produced degenerative damage to male reproductive tissues such as the testes, vas deferens and prostate. In the same study, triclosan was found to disrupt androgen (male hormone) production in rats.²⁵ There is clear evidence that disruption of normal steroidal hormone levels, such as estrogen or testosterone, during pregnancy can lead to altered brain development.²⁶

Thyroid Disruption and Neurodevelopmental Outcomes

The thyroid gland regulates development and metabolism. Thyroid hormones are critical for normal growth and development in fetuses, infants, and small children.²⁷ Reducing or altering maternal thyroid hormone concentrations during pregnancy has been linked with numerous adverse neurodevelopmental outcomes, including altered development, retardation, decreased intellectual capacity, psychomotor delays, and deafness.²⁸

Several studies have shown that triclosan disrupts thyroid hormones in animals. When exposed to high concentrations of triclosan orally in laboratory studies, rats show a decrease in thyroid hormone levels.^{29,30} One study showed that triclosan

interfered with thyroid hormone in frogs and affected the timing of metamorphosis in tadpoles after exposure to levels commonly found in the environment.³¹

Is It Worth It?

In addition to posing risks to health and the environment, triclosan is an ineffective tool against disease-causing microorganisms.

- Antibacterial soaps containing triclosan are no more effective at preventing disease than traditional soap products.³²
- Soaps containing typical concentrations of triclosan (0.2% or 0.3%) are no more effective than plain soap at reducing bacterial populations.³²
- The CDC has stated that regular use of antibacterial products, such as antibacterial soap, causes the emergence of resistant bacteria.³³

Regulation of Triclosan

Antimicrobial pesticides, such as triclosan, are made to destroy or suppress the growth of microorganisms and are regulated by the EPA. However, when triclosan is used in products intended for contact with the human body (i.e., personal care products such as soaps, antiseptics and toothpaste) or in food or food wrappers, it is not considered a “pesticide” by U.S. law and is regulated by the Food and Drug Administration.¹⁸

Some Products Containing Triclosan²

SOAP: Dial® Liquid Soap; Softsoap® Antibacterial Liquid Hand Soap; Tea Tree Therapy™ Liquid Soap; Provon® Soap; Clearasil® Daily Face Wash; Dermatologica® Skin Purifying Wipes; Clean & Clear Oil Free Foaming Facial Cleanser; DermaKleen™ Antibacterial Lotion Soap; Naturade Aloe Vera 80® Antibacterial Soap; CVS Antibacterial Soap; pHisoderm Antibacterial Skin Cleanser; Dawn® Complete Antibacterial Dish Liquid; Ajax® Antibacterial Dish Liquid.

DENTAL CARE: Colgate Total®; Breeze™ Triclosan Mouthwash; Reach® Antibacterial Toothbrush; Janina Diamond Whitening Toothpaste.

Reducing Your Exposure

You can prevent or minimize your exposure to triclosan in the following ways:

- Keep clean without using antimicrobials: Wash hands often and thoroughly. Lather hands for at least 10 to 15 seconds and rinse with warm water. Regular soap lowers the surface tension of water and washes away unwanted bacteria.
- Wash hands often, especially when handling food, before you eat, after you go to the bathroom, or when you are around someone who is sick.
- Dry hands with a clean towel to help remove any germs that did not get washed away.
- Wash children’s hands and toys often.
- Since triclosan is almost always found in personal care products, make sure to read all the ingredients when buying these products. Triclosan may also be found in clothing, footwear, and some appliances. **Triclosan is also called Microban, Irgasan, Lexol, Ster-Zac, Cloxifenolium, and Biofresh.**
- Australian tea tree oil and grapefruit seed extract have natural antimicrobial properties and are included in some soaps.

COSMETICS: Supre® Café Bronzer™; TotalSkinCare Makeup Kit; Garden Botanika® Powder Foundation; Mavala Lip Base; Jason Natural Cosmetics; Blemish Cover Stick; Movate® Skin Litening Cream HQ; Paul Mitchell Detangler Comb; Revlon ColorStay LipSHINE Lipcolor Plus Gloss, Dazzle.

DEODORANT: Old Spice High Endurance Stick Deodorant; Right Guard Sport Deodorant; Queen Helene® Tea Trea Oil Deodorant and Aloe Deodorant; Nature De France Le Stick Natural Stick Deodorant; DeCleur Deodorant Stick; Epoch® Deodorant with Citrisomes; X Air Maximum Strength Deodorant.

OTHER PERSONAL CARE PRODUCTS: Gillette® Complete Skin Care MultiGel Aerosol Shave Gel; Murad Acne Complex® Kit; Diabet-x™ Cream; T.Taio™ sponges and wipes, Aveeno Therapeutic Shave Gel.

FIRST AID: SyDERMA® Skin Protectant plus First Aid Antiseptic; Solarcaine® First Aid Medicated Spray; Nexcare™ First Aid, Skin Crack Care; First Aid/Burn Cream; HealWell® Night Splint; 11-1X1: Universal Cervical Collar with Microban.

KITCHENWARE: Farberware® Microban Steakknife Set and Cutting Boards; Franklin Machine Products FMP Ice Cream

Scoop SZ 20 Microban; Hobart Semi-Automatic Slicer; Chix® Food Service Wipes with Microban; Compact Web Foot® Wet Mop Heads.

COMPUTER EQUIPMENT: Fellowes Cordless Microban Keyboard and Microban Mouse Pad.

CLOTHES: Teva® Sandals; Merrell Shoes; Sabatier Chef's Apron; Dickies Socks; Biofresh® socks.

CHILDRENS TOYS: Playskool®: Stack 'n Scoop Whale, Rockin' Radio, Hourglass, Sounds Around Driver, Roll 'n Rattle Ball, Animal Sounds Phone, Busy Beads Pal, Pop 'n Spin Top, Lights 'n Surprise Laptop.

OTHER: Bionare® Cool Mist Humidifier; Microban® All Weather Reinforced Hose; Thomasville® Furniture; Deciguard AB Ear Plugs; Bauer® 5000 Helmet; Aquatic Whirlpools; Miller Paint Interior Paint; QVC® Collapsible 40-Can Cooler; Holmes Foot Buddy™ Foot Warmer; Blue Mountain Wall Coverings; California Paints®; EHC AMRail Escalator Handrails, Dupont™ Air Filters, Durelle™ Carpet Cushions; Advanta One Laminate Floors; San Luis Blankets; J Cloh® towels, JERMEX mops

Endnotes

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