

Avoid Food and Supplements With This Common Filler

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May 07, 2024

STORY AT-A-GLANCE

- › Without any nutrient value, titanium dioxide is commonly used in food products such as toothpaste, sweets, powdered sugar and chewing gum as well as paint, cosmetics and paper
- › The full extent of the impact on health from the compound is still under investigation, although research has linked it to pre-cancerous growths, lung cancer and brain disorders
- › By removing microparticles from the diet, research participants were able to put their Crohn's disease in remission; strategies include eating real food, using sunscreen without nanoparticles and using coconut oil for toothpaste

Editor's Note: This article is a reprint. It was originally published February 22, 2017.

Nothing more than a filler, without nutrient value or necessity in your products, titanium dioxide is used simply to whiten products from paint to sunscreen and food products.

When used in food products it is known as E171;¹ when in other products as PW6 or CI 7781. Although it is an inorganic compound, titanium dioxide carries significant risk when inhaled, ingested or absorbed.²

Millions of tons of **titanium dioxide** are produced each year. The compound naturally reflects ultraviolet (UV) light, which is why it is often added to **sunscreen**. While most of the product is used to pigment paint, it is also added to pharmaceutical drugs, toothpaste, paper and foods.

The full extent of the compound's impact on health is still under investigation, even though you can find it in many of the products you may use each day.

Topical use has resulted in allergic reactions, some of which may be serious.³ However, while some reactions are still under investigation, research⁴ has identified exposure to titanium dioxide can increase growth of precancerous lesions.

Titanium Dioxide or E171 Is Not Inactive in Your Body

When inhaled as a dust, titanium dioxide is classified as possibly **carcinogenic** to humans by the International Agency for Research on Cancer.^{5,6} Titanium dioxide nanoparticles are also linked with an inflammatory response in the body and with genetic damage in mice.⁷

In response to public pressure, Dunkin Donuts made a commitment to take titanium dioxide out of the powdered sugar on their donuts.⁸ As it doesn't add to the flavor of the donuts, it seems like a decision that could have been made without pressure from customers. The compound is no longer legally used in Germany.

Multiple animal studies⁹ demonstrated an increased rate of **lung cancer** with inhalation of titanium dioxide, as the particles are not easily cleared from the lung tissue. Studies have also demonstrated it produces reactive oxygen species (ROS) and induced oxidative DNA damage.

Titanium dioxide may also be produced as nanoparticles. These minute particles lose their white pigment, but not the ability to reflect UV light.

In this form, titanium dioxide induces cellular autophagy, or cell death through degradation of the cell contents.¹⁰ The complex process of autophagy is most commonly triggered by nutrient starvation.¹¹

How Titanium Dioxide Affects Cancer Cells

France, also concerned with the effect titanium dioxide may have on their population, ordered a review of the compound as a food additive after a study demonstrated negative health effects in an animal model.¹² The study demonstrated oral exposure to E171 crossed the intestinal wall and could reach other parts of the body.

Researchers observed disorders in the immune system linked to nanoparticles of E171, which led to the development of pre-neoplastic lesions in the colon of 40% of the animals in the study.¹³

Although the study did show the additive plays a role in the development of early stages of colorectal cancer in animal models, the researchers could not extrapolate the conclusions to humans.¹⁴

The research also demonstrated the continued exposure to titanium dioxide sped the development of these growths.¹⁵ Titanium dioxide spread to other parts of the animal's body, including the liver, and was also found to affect the immune system.

Oral exposure to E171 is of special concern in children as it is a common additive in sweets and chocolates.¹⁶ The rats were fed human relevant amounts of E171 in water and were tested after one week and 100 days.

At one week the rats demonstrated tissue distribution, while micro-inflammation and an increase in pre-neoplastic lesions were evident at 100 days.¹⁷ Taking a proactive approach to the release of this information, the French ministries for agriculture, health and economy issued a joint statement, saying:¹⁸

"A study carried out by the National Institute for Agricultural Research (INRA) and published today shows that oral exposure to titanium dioxide (E171), the additive used particularly in the agri-food industry, is likely to result in effects on health.

However, at this stage, the results of the study do not make it possible to extrapolate to humans.

In light of the findings of this study, the Ministries of Economy, Health and Agriculture decided to jointly refer the National Agency for Food, Environmental and Occupational Health Safety (Anses) to determine whether the food additive E171 presents a potential hazard to consumers."

Titanium Dioxide May Adversely Affect Your Gut and Brain

While this information is concerning, titanium dioxide has been associated with **leaky gut** and inflammatory bowel disease, both of which are associated with further negative health conditions. In this video, Dr. Greger discusses research demonstrating how nanoparticles of titanium dioxide may affect your gut wall.

Essentially, it appears that while the compound itself is inert, it may act as a Trojan horse, carrying endotoxin created by bacteria in the gut, across the gut wall.

Removing foods containing nanoparticles of titanium dioxide from the diet resulted in 7 out of 9 patients achieving remission from Crohn's disease and all experienced a significant reduction in symptoms.¹⁹

During this study the researchers also removed processed meats and fish from the participants' diet, which may have muddied the waters a bit.

A subsequent study, which removed processed meats from all participants and micro- and nanoparticles from only one group, demonstrated that both groups experienced a significant reduction in symptoms.²⁰

However, while research finds these nanoparticles are not responsible for the creation of leaky gut, they appear to exacerbate the inflammatory process in the intestinal wall²¹ and increase your risk of subsequent health conditions.

Coupled with the increasing evidence suggesting exposure increases production of ROS and tumor formation, titanium dioxide is a significant public health risk found in multiple store-bought products, including many dietary supplements.²² Researchers who demonstrated an increased inflammatory effect with titanium dioxide recommend:²³

"Our results suggest a cautionary use of titanium dioxide in pharmaceutical formulations and support a therapeutic benefit from low inorganic particle diet in patients with IBD."

Further research also demonstrates E171 nanoparticles lead to neurological dysfunction, specifically damage to astrocyte cells and mitochondria.²⁴ If not killed, damaged astrocytes were unable to absorb glutamate, increasing accumulation outside the cell, implicating it may contribute to Alzheimer's and **Parkinson's disease**.²⁵ Other research^{26,27,28} demonstrates further risk for brain damage.

Long-Term Risks to the Environment Are Unknown

Once washed down the drain or flushed down the toilet, these nanoparticles may continue to have an impact on your health.

In a paper²⁹ published in Environmental Science and Technology, the scientists quantified the amount of E171 nanoparticles released into the environment and found at least 36% of food grade particles were less than 100 nanometers (nm) and readily dispersed in water.

Author Paul Westerhoff, Ph.D., professor at the School of Sustainable Engineering and The Built Environment at Arizona State University, said:³⁰

"Many applications of titanium dioxide would benefit from smaller primary particle sizes, and we can expect the percentage of TiO₂ that is produced in or near the nano range to increase. TiO₂ nanomaterials in foods, consumer products, and household products are discharged as feces/urine, washed off of surfaces, or disposed of to sewage that enters wastewater treatment plants.

While these plants capture most of the TiO₂, nanoparticles measuring between 4 and 30 nm were still found in the treated effluent. These nanomaterials are then released to surface waters, where they can interact with living organisms."

Further research suggests the interaction of titanium dioxide nanoparticles with other chemicals in the environment may increase toxicity and adverse effects on wildlife.³¹

In an effort to discern the impact of these nanoparticles on soil bacterial communities, researchers exposed agricultural soil for just 90 days and discovered significant denitrification and modification of bacterial communities using the lowest realistic concentrations of the nanoparticles.³² The results indicate these pollutants have a significant impact on the ecosystem.

Reduce Your Exposure to Titanium Dioxide

Titanium dioxide nanoparticles are used pervasively in processed foods, so the best way to avoid exposure is to eat real foods. Also consider other areas in which you may be exposed, such as your toothpaste, sunscreen and chewing gum. Consider making your own toothpaste from coconut oil, which helps reduce pathogenic bacterial growth in your mouth and protect your gums.

Titanium dioxide and zinc oxide nanoparticles are top choices for sun protection. Unfortunately, while they do not carry the same hormone disrupting risk of oxybenzone, when washed down the drain, they will have a detrimental effect on the environment. I recommend using sunscreen that does not use the nanoparticles of titanium dioxide, and to use clothing to cover your skin when you are in the sun for extended periods of time.

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