

Titanium Dioxide Classified as Possibly Carcinogenic to Humans

Titanium dioxide has recently been classified by the International Agency for Research on Cancer (IARC) as an IARC Group 2B carcinogen "possibly carcinogen to humans". Titanium dioxide accounts for 70% of the total production volume of pigments worldwide. It is widely used to provide whiteness and opacity to products such as paints, plastics, papers, inks, foods, and toothpastes. It is also used in cosmetic and skin care products, and it is present in almost every sunblock, where it helps protect the skin from ultraviolet light.

With such widespread use of titanium dioxide, it is important to understand that the IARC conclusions are based on very specific evidence. This evidence showed that high concentrations of pigment-grade (powdered) and ultrafine titanium dioxide dust caused respiratory tract cancer in rats exposed by inhalation and intratracheal instillation*. The series of biological events or steps that produce the rat lung cancers (e.g. particle deposition, impaired lung clearance, cell injury, fibrosis, mutations and ultimately cancer) have also been seen in people working in dusty environments. Therefore, the observations of cancer in animals were considered, by IARC, as relevant to people doing jobs with exposures to titanium dioxide dust. For example, titanium dioxide production workers may be exposed to high dust concentrations during packing, milling, site cleaning and maintenance, if there are insufficient dust control measures in place. However, it should be noted that the human studies conducted so far do not suggest an association between occupational exposure to titanium dioxide and an increased risk for cancer.

The Workplace Hazardous Materials Information System (WHMIS) is Canada's hazard communication standard. The WHMIS Controlled Products Regulations require that chemicals, listed in Group 1 or Group 2 in the IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans, be classified under WHMIS Class D2A (carcinogenic). The classification decision on titanium dioxide has been published on the IARC website and in a summary article published in *The Lancet*

Representatives from Health Canada (National Office of WHMIS) recently consulted with the Quebec CSST and CCOHS (the two main agencies providing WHMIS classifications to the public) regarding the implications of the IARC decision to the WHMIS classification of titanium dioxide. It was agreed that titanium dioxide **does** now meet the criteria for WHMIS D2A (carcinogen) based on the information released by IARC to date, and that it is not necessary to wait for release of the full monograph.

Manufacturers and suppliers of titanium dioxide are advised to review and update their material safety data sheets and product labels based on this new information as soon as possible. Employers should review their occupational hygiene programs to ensure that exposure to titanium dioxide dust is eliminated or reduced to the minimum possible. Workers should be educated concerning this potential newly recognized risk to their health and trained in proper work procedures.

* Intratracheal administration is an exposure procedure that introduces the material directly into the lungs via the trachea, bypassing protective mechanisms in the respiratory system.

More information:

International Agency for Research on Cancer (IARC): [Titanium dioxide \(IARC Group 2B\), Summary of data reported, Feb. 2006](#)

Health Canada: [Hazard-specific issues - substances assessed for carcinogenicity](#)

[Explanation of the IARC evaluations](#)

Baan, R., et al. Carcinogenicity of carbon black, titanium dioxide, and talc. *The Lancet Oncology*. Vol. 7 (Apr. 2006). P. 295-296

Learn more about [CHEMINFO](#) (produced by CCOHS' occupational health and safety specialists). This resource provides comprehensive, practical occupational health and safety information on more than 1,300 important workplace chemicals.

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