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Potassium Bromate Induced Hepatotoxicity: Understanding the Risks

Chin Lu*

Department of Bioscience, Zhejiang University, China

DESCRIPTION

Potassium bromate is a chemical compound commonly used in the baking industry to improve dough strength and produce a desirable texture in baked goods. However, despite its widespread use, there is growing concern about the potential health risks associated with potassium bromate, particularly its hepatotoxicity the ability to cause liver damage. Several studies have indicated a strong correlation between potassium bromate exposure and liver toxicity in both animal models and human subjects. When ingested or metabolized, potassium bromate can form Reactive Oxygen Species (ROS) that induce oxidative stress in liver cells. This oxidative stress leads to cellular damage, disruption of cellular functions, and ultimately, liver injury. Potassium bromate is primarily used as a dough conditioner and flour improver in baking processes. It enhances dough elasticity, volume, and texture, resulting in lighter and fluffier bakery products. However, the use of this additive has raised concerns due to its potential to cause liver damage when consumed in significant quantities. One of the primary mechanisms through which potassium bromate induces hepatotoxicity is the depletion of the antioxidant defence system in the liver. Normally, the liver possesses an array of antioxidant enzymes and molecules that neutralize ROS and maintain cellular homeostasis. However, prolonged or high-dose exposure to potassium bromate overwhelms the antioxidant defence system, resulting in an imbalance between ROS production and antioxidant capacity. This imbalance leads to oxidative damage and inflammation in liver tissues.

Furthermore, studies have shown that potassium bromate can also trigger DNA damage in liver cells. The ROS generated by potassium bromate can directly attack DNA, causing DNA strand breaks and other genetic alterations. These DNA lesions can lead to mutations, which, if left unrepaired, may increase the risk of liver cancer and other liver-related diseases. Animal studies have provided further evidence of the hepatotoxic effects of potassium bromate. Experimental animals exposed to potassium bromate displayed various signs of liver damage, including elevated liver enzyme levels, liver inflammation, and histological changes such as hepatocyte necrosis and fibrosis. These findings highlight the potential for potassium bromate to cause severe liver injury. In light of the mounting evidence regarding the hepatotoxicity of potassium bromate, regulatory bodies in many countries have taken action to restrict or ban its use in food products. The United States, Canada, the European Union, and several other countries have either prohibited or imposed strict limits on the use of potassium bromate in food. These measures aim to protect public health and reduce the potential risks associated with its consumption. Nevertheless, it is crucial for consumers to remain vigilant and informed about the potential presence of potassium bromate in food products. Reading product labels and choosing foods that are labeled as potassium bromate-free can help minimize exposure to this potentially harmful compound.

In summary, potassium bromate-induced hepatotoxicity is a significant concern due to its potential to cause liver damage. The formation of ROS and subsequent oxidative stress and DNA damage are key mechanisms underlying its hepatotoxic effects. The evidence from both animal studies and human observations warrants caution regarding the use of potassium bromate in food. Continued research and regulatory efforts are necessary to ensure the safety of food products and protect public health from the risks associated with potassium bromate exposure.

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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Corresponding author Chin Lu, Department of Bioscience, Zhejiang University, China, E-mail: 6002207001@qq.com

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