TITANIUM DIOXIDE- EMERGING CONCERN

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Abstract

Titanium dioxide (E171) is an additive that is used in food as a colour. The function of food colours is to make food more visually appealing, or to restore the original appearance of food. Titanium dioxide is used to provide whiteness and opacity to foods. In terms of dietary exposure, titanium dioxide is often used in a variety of food categories, including bakery products, soups, broths, sauces, salads, savoury based sandwich spreads and processed nuts. It is also used in confectionary, chewing gum, food supplements and cake icing. The European Food Safety Authority (EFSA) conducted a safety assessment in May 2021, which concluded that Titanium Dioxide can no longer be considered safe as a food additive, due to the potential genotoxic effect it can have. Shortly thereafter, the European Union banned the use of TiO_2 as a food additive in consumable products with the ban in full effect by August 2022. Food Chemistry Unit of Dubai Central Lab is conducting the determination of TiO_2 in a wide range of food products since 2015. A rapid method for the determination of TiO_2 in food and food products by inductively coupled plasma optical emission spectrometry (ICP OES) is described.

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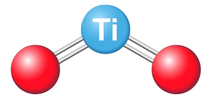
Keywords: Titanium Dioxide, E171, EFSA, ICPOES, EFSA

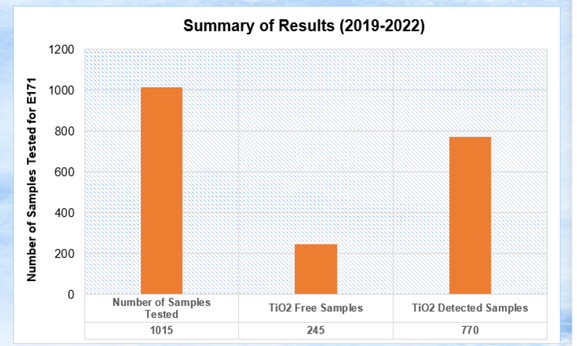
What foods contain titanium dioxide?

The main food categories contributing to dietary exposure of **E171** are fine bakery wares, soups, broths and sauces (for infants, toddlers and adolescents); and soups, broths, sauces, salads and savoury based sandwich spreads (for children, adults and the elderly). Processed nuts are also a main contributing food category for adults and the elderly.

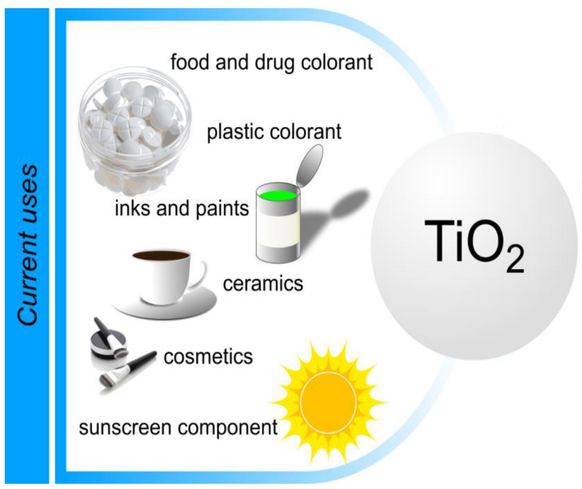


Results and discussions

Summary of Results		
Number of Samples Tested	1015	Year (2019-2022)
TiO_2 Free Samples	245	Not Detected
TiO_2 Detected Samples	770	> LOD

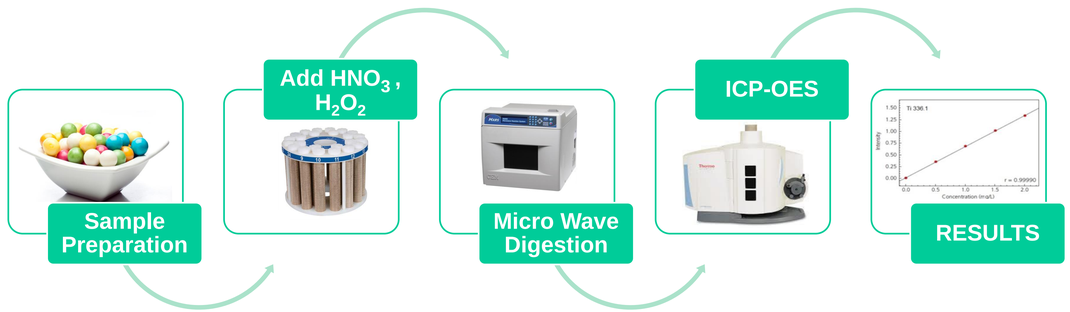


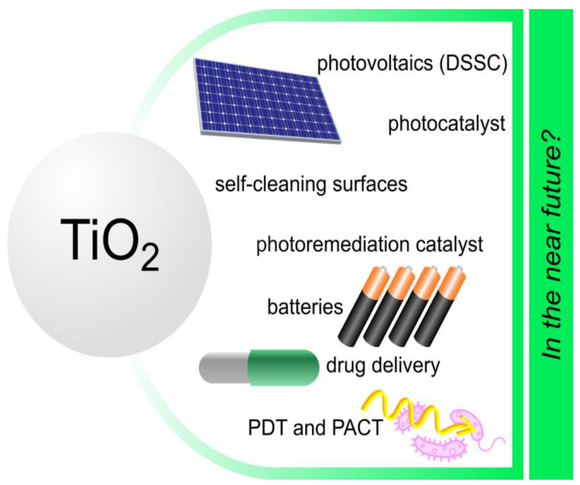
From the results data titanium dioxide (E171) detected commonly in food products like candy, chocolate, coffee creamer, cake decorations, chewing gum, jelly beans etc. E171 content is very high mostly in candy, milk chocolates etc.



Analytical Methodology

The concentration of Mineral (Titanium) in different sample is determined by using **Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES)** after Microwave Digestion with Nitric acid and Hydrogen peroxide. An homogenized test portion is heated at 200˚C with Nitric Acid, and Hydrogen peroxide in a closed-vessel microwave digestion system (MDC), Elemental form of Titanium is determined as Titanium Dioxide (ICP-OES).





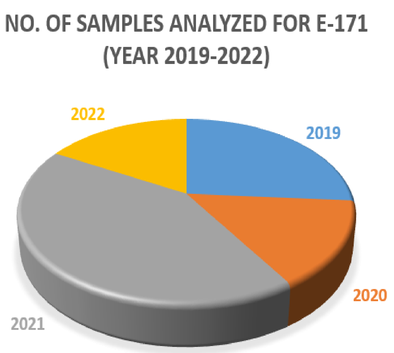
Introduction

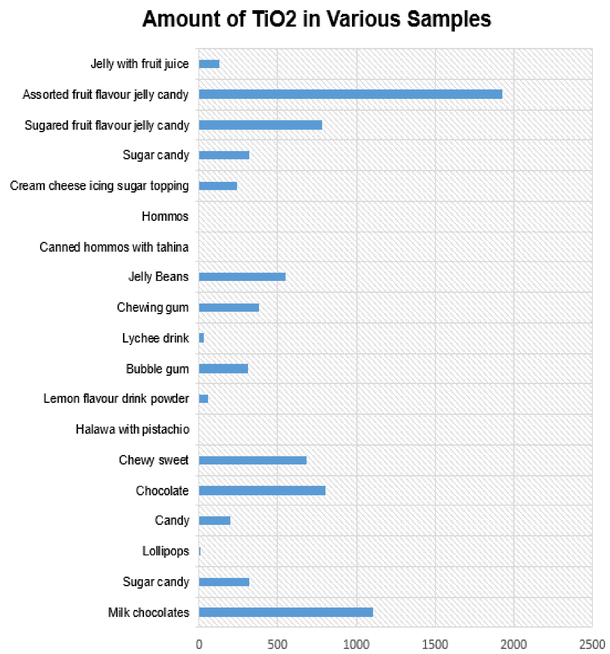
Titanium dioxide (TiO_2) is a naturally occurring mineral that is mined from the earth, processed and refined, and added to a variety of foods to make them look brighter and whiter. Until recently it was an authorised food additive in the EU, however the European Commission has now officially adopted a ban on the use of Titanium Dioxide as a food additive. From 7 February 2022 the use of titanium dioxide (TiO_2 - E171) as a food additive is no longer permitted in the EU and in Northern Ireland, due to the application of the Northern Ireland Protocol, following the publication of Commission Regulation (EU) 2022/63, amending Annexes II and III to Regulation (EC) No 1333/2008.

This regulation was published with a 6-month transition period which ends on 7 August 2022.. This follows the decision that French authorities made in January 2020 to have Titanium Dioxide banned in foods placed on the French market.

After 7 August 2022, food products containing TiO2 will no longer be able to be placed on the EU/NI market, however, foods already on the market will be able to remain on the market until they reach their date of minimum durability or ‘use by’ date.

Different Samples like drink powder, chewing gum, candies, milk chocolates, lollipops, jelly beans, icing sugar, sauce, tahina etc. declared with titanium dioxide **(E171)** was obtained from local market of Dubai in the year **2019- 2022** for the determination of Titanium Dioxide .





Why was a review into Titanium Dioxide needed?

Titanium dioxide is highly versatile in application. Although the amount of titanium dioxide particles absorbed after oral ingestion is low, they can accumulate in the body. Taking into account all available scientific studies and data, the panel concluded that titanium dioxide can no longer be considered safe as a food additive.

EFSA's report noted there was no conclusive evidence that titanium dioxide is harmful, but raised concerns that some studies suggest it may damage DNA. Because of this EFSA decided they were not able to set an amount of titanium dioxide that could be safely consumed each day.

Consumers can identify foods containing the additive “to make an informed purchasing decision” as the ingredients list will include “colour: titanium dioxide” or “colour: E171” if the additive is present .

Dubai Central Laboratory is waiting for the regulatory authority to amend the applicable standard or to adopt any international standard for compliance check of foods containing Titanium dioxide.