

**2010年臺灣國際科學展覽會  
優勝作品專輯**

**國家： HONG KONG**

**編號： 100027**

**作品名稱**

**The Titanium Dioxide Toilet Disinfectant**

**得獎獎項**

**Engineering Third Award**

**作者姓名**

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## **Abstract**

### **Contents of Abstract: (maximum 500 words) include**

This project aims to improve the quality of toilet hygiene. The product designed should fulfill the requirements of being an environmentally friendly, user friendly and economical toilet seat system which guarantees the safety and hygiene of the toilet. This project also aims to discover the efficiency of the toilet seat system in eliminating pathogens through conducting various experiments.

In this project, the photocatalytic property of titanium dioxide is applied. When titanium dioxide is under exposure to ultraviolet radiation, they generate free radicals, which are efficient oxidizers of organic substances. Also, research has shown that the safest ultraviolet light used will be UVA. Thus, by using titanium dioxide paint under exposure to ultraviolet light to oxidize pathogens and toxins, the aims will be achieved. Other than that, experiments will be conducted to explore the efficiency of titanium dioxide under exposure to UV radiation in eliminating pathogens by counting the number of bacteria on the toilet seat system after different time intervals the seat system has been turned on.

The procedure of constructing the product includes drafting the product, purchasing the appropriate apparatus and materials, constructing the prototype, and checking if the product fits the goals set. Lastly, improving the design based on the flaws found during the checking procedure, as well as checking the product to see if it fits the original goals set.

The procedure of the experiments aimed to explore the efficiency of titanium dioxide under exposure to UV radiation in eliminating pathogens conducted includes

counting the number of bacteria on the toilet seat system after different time intervals by inoculation of bacteria on the agar plates.

Test results showed that the number of bacteria had a steady and notable decline after different time intervals. Results also showed that bacteria would be thoroughly terminated after the system had been turned on for at most one hour. The information was then used to set the delay timer to restrict the amount of time the ultraviolet lamp was turned on to save energy.

Moreover, the toilet seat system has also been improved so that it will complete the automatic cleaning procedure even without the user lowering the toilet seat. This improvement was made so that the product could be more convenient to toilet users.

The system also deodorizes the toilet as the oxidization of bacteria and organic substances reduces the putrid odor released by them when they carry out chemical reactions.

In conclusion, the project succeeds in accomplishing the goals set and is capable of improving the quality of toilet hygiene, especially in common households. The project is also successful in finding out that the toilet seat system is efficient in eliminating pathogens.

Two copies of the "Abstract of Exhibit" (in English) should be sent to the National Taiwan Science Education Center or email to [fung@mail.ntsec.gov.tw](mailto:fung@mail.ntsec.gov.tw) or [yuonne@mail.ntsec.gov.tw](mailto:yuonne@mail.ntsec.gov.tw) before December 31, 2009.