

## Xylitol sweetener production via photocatalytic glucose conversion

**Surawut Chuangchote**

King Mongkut's University of Technology Thonburi, Thailand

**V**alue-added chemicals can be converted from biomass and its derivatives by various methods. Glucose is one of biomass derivatives, which can be transformed to various forms of value-added chemicals and fuels. There are number of techniques that can be used to convert glucose to fuels and high-value chemicals. However, many techniques are thermochemically or biochemically conversion processes which are limited by some restrictions in practice, such as high cost of reagents and equipment, high energy consumption and harsh reaction conditions. Therefore, the exploration of new routes for the production of platform chemicals or fuels from biomass is becoming increasingly important. In this work, xylitol sweetener was obtained from photocatalytic conversion of glucose with titanium dioxide (TiO<sub>2</sub>) photocatalysts. Moreover, other chemicals, e.g. gluconic acid, arabinose and formic acid, were found from the photocatalysis. Two surfactants, polyethylene glycol and cetyltrimethylammonium bromide, were used in conventional sol-gel, ultrasonication sol-gel and hydrothermal methods to fabricate photocatalysts with different structural and textural properties. Appropriate surface area and phase composition of photocatalysts

for production of the highest yields of xylitol were investigated. It was found that all surfactant assisted fabrications increased surface area and anatase content of the photocatalysts, resulting in high glucose conversion and high yields of xylitol, arabinose and formic acid. The highest yield of xylitol (6.45%) could be achieved in this work.

### Biography

Surawut Chuangchote has completed his BEng in Petrochemical and Polymeric Materials Engineering in 2004. He has completed his MSc in Polymer Science from Silpakorn University and Chulalongkorn University, respectively in 2006. He has completed his PhD in Energy Science from Kyoto University, Japan in 2009. He is an Assistant Professor in the Department of Tool and Materials Engineering, Faculty of Engineering, KMUTT. He has published more than 40 papers in the international journals and books and received a number of awards. His research interests focus in development of advanced nanomaterials for energy applications, emerging solar cells, photocatalysts for energy, environment and green chemicals/materials from biomass.

surawut.chu@kmutt.ac.th