

## Invitation

Removal of Cyanobacteria  
and Cyanotoxins from  
Lake Water by Composites  
of Bentonite with Micelles  
of the Cation Octadecyl  
Trimethyl Ammonium  
(ODTMA)

Tuesday 26 February 2019  
17:00

Room 1 (1<sup>st</sup> floor)  
Tassos Papadopoulos Building  
Themidos and Ifigenias corner  
Limassol

The Department of Environmental Science and Technology of the Cyprus University of Technology invites you to the speech on the following topic:

### **“Removal of Cyanobacteria and Cyanotoxins from Lake Water by Composites of Bentonite with Micelles of the Cation Octadecyl Trimethyl Ammonium (ODTMA)”**

**Speaker:** Prof. Assaf Sukenik  
Israel Oceanographic and Limnological Research (IOLR)

#### **Bio-sketch**

A senior scientist at the Kinneret Limnological Laboratory, Israel Oceanographic & Limnological Research, expert in phytoplankton ecology with major focus on harmful blooms of toxic cyanobacteria (cyanoHAB). Currently studies bloom developments and effective bloom control measures.

#### **Abstract**

Cyanobacteria and their toxins present potential hazard to consumers of water from lakes, reservoirs and rivers, thus their removal via water treatment is essential. The capacity of nano-composites of octadecyltrimethyl-ammonium (ODTMA) micelles complexed with bentonite clay to remove cyanobacteria and their toxins from laboratory cultures and from lake water, was evaluated using column filters packed with granulated clay-ODTMA complex. Using laboratory cultures we demonstrated a significant reduction in the concentration of cyanobacteria cells or filaments and their corresponding toxins. Fluorescence measurements and microscopic observations demonstrated that cyanobacteria cells and filaments disintegrated and lost their metabolic activity (photosynthesis) upon exposure to the granulated micelle (ODTMA)-bentonite complex (ED50 estimated at 1 g L<sup>-1</sup>), or to ODTMA monomers (estimated ED50 ranged between 0.05 and 0.1 mM for different cyanobacteria species). Other organic quaternary ammonium cation (QAC) such as hexadecyltrimethyl ammonium (HDTMA), tetradecyltrimethyl ammonium (TDTMA) and dodecyltrimethyl ammonium (DDTMA) had similar inhibitory effect but varied by their ED50 values. The granulated micelle (ODTMA) - bentonite complex efficiently removed cyanobacteria toxins (microcystins and cylindrospermopsin) with an exceptional high removal capacity for microcystins. The effectiveness of the granulated micelle (ODTMA) - bentonite complex in elimination of cyanobacteria was further demonstrated with lake water containing cyanobacteria and other phytoplankton species. These results and model calculations suggest that filters packed with granulated composites can secure the safety of drinking water in case of an event of toxic cyanobacteria bloom.

#### **Information:**

Tel. 25002277

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