

***BACILLUS SUBTILIS* investigated by bio- and nanotechnological methods**

O. Hekele¹, C.G. Goesselsberger¹, M. Brandstetter¹, M. Aumayr¹,
S. Radel¹, R. Sommer² and I.C. Gebeshuber¹

¹Institut fuer Allgemeine Physik, Vienna University of Technology,
Wiedner Hauptstrasse 8-10/134, 1040 Vienna, Austria

²Hygiene-Institute, Medical University of Vienna
Kinderspitalgasse 15, 1095 Wien, Austria

Bacillus subtilis is a single celled bacterium commonly found in soil. It can sporulate, i.e. reversibly form a tough and protective endospore that allows the organism to tolerate extreme environmental conditions. *B. subtilis* is not harmful to human health and its robust spores may therefore serve as safe model organisms for pathogenic microorganisms in drinking water. Thus, this organism can be used to monitor the quality of water disinfection devices that utilize UV radiation. One type of *B. subtilis* spores is highly resistant to UV irradiation, whereas the other type shows a low UV resistance.

Biotechnological methods used are ultrasonic treatment for separating cells from nutrient solution and inducing sporulation in vegetative *B. subtilis* by induction of adverse environmental conditions, such as shortage of certain nutrients. Nanotechnological methods comprise manipulation (cutting, moving, cleaning from debris and solid residua from the nutrient solution) on the single cell level and atomic force spectroscopy yielding information about changes in material properties depending on the type of sporulation induction.

Detailed scientific understanding of the sporulation of this organism shall provide information regarding the development of novel biomimetic UV resistant materials.