

# 2. BIOSENSOR SYMPOSIUM

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## Monitoring of Nutrient Bioavailability Using Recombinant Cyanobacterial

### Reporter Strains

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### Poster

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Massive growth of cyanobacteria, known as "algal blooms", have become a major concern for water monitoring. Besides their negative effect on turbidity, taste and smell, cyanobacteria are associated with severe toxin production. However, the reasons for formation of cyanobacterial blooms are still not completely understood. It has been observed that certain patterns of P, N, and Fe-availability promote their increased proliferation and toxin production.

In order to investigate bloom forming environmental conditions two cyanobacterial reporter strains under control of nutrient responsive genetic elements have been constructed. M1415 is a phosphorus responsive strain of *Synechococcus* PCC 7942. Its genomic DNA harbors the gene coding the reporter protein luciferase from *Vibrio harveyi* under control of the inducible alkaline phosphatase promoter from *Synechococcus* PCC 7942, and it can be induced under phosphorus limitation [1]. NbIA\_2000 is the nitrogen responsive strain of *Synechocystis* PCC 6803 harboring an insertion of *luxAB::km'* within *nbIA1* in its chromosomal DNA, and can be induced under nitrogen limitation. M1415 and NbIA\_2000 are able to detect phosphorus and nitrogen bioavailability, respectively, in physiological and ecological relevant concentration range. To increase the practicality of the concept, luminescent sensor strains were immobilized using agar as the matrix and "packaged" into an easy-to-use biosensor format.

### Literatur

1. Schreiter, P., Gillor, O., Post, A., Belkin, S., Schmid, R.D., Bachmann, T.T. Monitoring of Phosphorus Bioavailability in Water by an Immobilized Luminescent Cyanobacterial Reporter Strain, *Biosens. Bioel.*, accepted.