

## Design of Wireless and Traceable Sensors for Internally Illuminated Photoreactors

**Authors :** Alexander Sutor, David Demetz

**Abstract :** We present methods for developing wireless and traceable sensors for photobioreactors or photoreactors in general. The main focus of application are reactors which are wirelessly powered. Due to the promising properties of the propagation of magnetic fields under water we implemented an inductive link with an on/off switched hartley-oscillator as transmitter and an LC-tank as receiver. For this inductive link we used a carrier frequency of 298 kHz. With this system we performed measurements to demonstrate the independence of the magnetic field from water or salty water. In contrast we showed the strongly reduced range of RF-transmitter-receiver systems at higher frequencies (433 MHz and 2.4 GHz) in water and in salty water. For implementing the traceability of the sensors, we performed measurements to show the well defined orientation of the magnetic field of a coil. This information will be used in future work for implementing an inductive link based traceability system for our sensors.

**Keywords :** wireless sensors, photoreactor, internal illumination, wireless power

**Conference Title :** ICEE 2020 : International Conference on Electrical Engineering

**Conference Location :** Buenos Aires, Argentina

**Conference Dates :** February 27-28, 2020