

***Rapid classification and identification of pathogenic Legionella species in water samples by Raman spectroscopy***

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The genus *Legionella* comprises approximately 50 species and twenty of them, including all 16 serogroups of *Legionella pneumophila* are related to severe community-acquired pneumonia named Legionnaires' disease [1]. Conventional detection methods of individual bacterial species in environmental samples, which typically involves cultivation, are both time consuming and uncertain, due to the slow growth of the bacteria and the close relationship of these pathogens with the diverse and rich background microflora. Therefore, the aim of the investigation is to develop a cultivation independent and rapid detection method for clinically relevant *Legionella* species in water samples. Recently, Raman spectroscopy has emerged as a rapid and inexpensive method for identification of bacterial species [2]. This study evaluates the use of micro-Raman spectroscopy of single bacterial cells combined with chemometrics for rapid species and serogroup classification and identification of 20 *Legionella* species recognized as human pathogens. In order to avoid the cultivation step, immunomagnetic separation based on a fast and specific antigen-antibody reaction is a promising method and can be employed for separation of *Legionella* cells from various microorganisms and complex biofilm formations, which are usually present in environmental water samples [3].

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