An integrated chip-mass spectrometry and epifluorescence approach for online monitoring of bioactive metabolites from incubated Actinobacteria in picoliter droplets.

Wink K, Mahler L, Beulig J, Piendl S, Roth M, Belder D (2018) An integrated chip-mass spectrometry and epifluorescence approach for online monitoring of bioactive metabolites from incubated Actinobacteria in picoliter droplets. *Anal Bioanal Chem* 410(29), 7679-7687.

Details



Abstract

We present a lab-on-a-chip approach for the analysis of secondary metabolites produced in microfluidic droplets by simultaneous epifluorescence microscopy and electrospray ionization mass spectrometry (ESI-MS). The approach includes encapsulation and long-term off-chip incubation of microbes in surfactant-stabilized droplets followed by a transfer of droplets into a microfluidic chip for subsequent analysis. Before the reinjected droplets are spaced and electrosprayed from an integrated emitter into a mass spectrometer, the presence of fluorescent marker molecules is monitored nearly simultaneously with a custom-made portable

epifluorescence microscope. This combined fluorescence and MS-detection setup allows the analysis of metabolites and fluorescent labels in a complex biological matrix at a single droplet level. Using hyphae of Streptomyces griseus, encapsulated in microfluidic droplets of ~ 200 picoliter as a model system, we show the detection of in situ produced streptomycin by ESI-MS and the feasibility of detecting fluorophores inside droplets shortly before they are electrosprayed. The presented method expands the analytical toolbox for the discovery of bioactive metabolites such as novel antibiotics, produced by microorganisms

Involved units

Bio Pilot Plant Miriam Agler-Rosenbaum Read more

Leibniz-HKI-Authors



Lisa Mahler

Details



Martin Roth

Details

Identifier

doi: 10.1007/s00216-018-1383-1

PMID: 30269162