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CELLULOSE-BASED MATERIALS –
FROM SCIENCE TO TECHNOLOGY

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Trypsin active paper for sample preparation steps in Paper-Spray Mass Spectrometry applications

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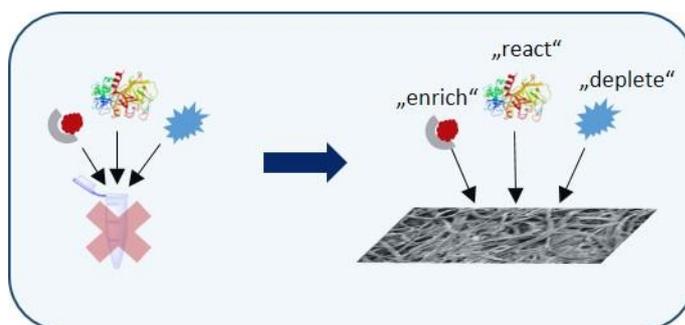
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Abstract

"How can paper enhance or facilitate sample preparation steps in analytical investigations?" This project works on paper that is able to conduct separation processes and/ or chemical modifications. It is aimed to transfer wet-chemistry sample preparation steps for analytical investigations as "Dried Blood Spots¹" or "Paper-Spray Mass Spectrometry²" to functional papers, forming a new field of application, called "Paper in the Lab".

So far, we have already established a modular immobilization strategy based on different types of click chemistry. Furthermore, we successfully immobilized trypsin on model paper for Paper-Spray MS analyses. Therefore, azide functionalization of cellulose fibers, alkyne functionalization of trypsin, followed by the click reaction between the azide-functionalized fibers and the alkyne-functionalized trypsin, as well as the impact of each functionalization step on the tryptic activity, were studied. Hereafter, the immobilization strategy will be applied to additional functionalities for a broader range of analytical applications in future.





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References

- (1) Demirev, Plamen A. "Dried blood spots: analysis and applications." *Analytical chemistry* 85.2 (2012): 779-789.
- (2) Wang, H.; Liu, J.; Cooks, R. G.; Ouyang, Z. Paper Spray for Direct Analysis of Complex Mixtures Using Mass Spectrometry. *Angew. Chem.* 2010, 122, 889–892.

KEYWORDS:

cellulose functionalization
functional paper
sample preparation
Paper-in-the-Lab
Paper-Spray Mass Spectrometry
Dried Blood Spots
click chemistry
analytics
enzymes
trypsin

Biography

Laura Hillscher started studying chemistry with focus on polymer chemistry at the University of applied sciences Reutlingen. For the bachelor thesis, she moved to Ludwigshafen am Rhein and worked there at BASF on characterization of the drying process of acrylic dispersions by confocal fluorescence microscopy. After her bachelor's degree, she moved to the universities of Freiburg and Strasbourg to obtain a master's degree in polymer sciences and went back to Ludwigshafen am Rhein and BASF for her master thesis on the permeation and retention behavior of hydrogel membranes together with Prof. Jürgen Rühle from the university of Freiburg. Now, she has been a doctoral student in the Merck Lab @ TU Darmstadt and Prof Biesalski's working group since July 2017, working on (bio-) functional paper for sample preparation steps.

