**Triclosan conversion by laccase and metabolite formation in the presence and absence of redox mediators**

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Triclosan (2,4,40-trichloro-20-hydroxydiphenyl ether; TCS) is an antimicrobial agent, which is currently widely used in health care products. The extensive use of this compound has resulted in its entry into the environment. TCS is difficult to remove or degrade in the natural aquatic environment due to its stable chemical structure, and only low environmental concentrations. It can incite serious risks for the environment and human health [1].

In this study we investigated the laccase-catalysed TCS transformation in the presence and absence of natural (SYD; syringaldehyde) and synthetic redox mediators (ABTS; 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid)). Products resulting from TCS oxidation by commercial laccase (TvL; from *Trametes versicolor*) and purified laccase from the aquatic ascomycete *Phoma* sp. UHH 5-1-03 were analysed using liquid chromatography tandem mass spectrometry (LC-MS/MS). Quantitative parent compound analysis showed that in presence of ABTS 100% of the applied TCS was always degraded within 4 h. TCS removal was slower in presence of SYD, and least efficient without redox mediator.

The detection and structural elucidation of transformation products by LC-MS/MS was carried out in positive and negative ion mode to get a comprehensive view on the pathway and to check what happends to the mediator themselves and to the investigated chemical TCS oxidation by TvL as well as *Phoma* laccase in the absence of redox mediators yielded TCS dimers and trimers. In the presence of ABTS, TCS dimers were not detected and some new adducts resulting from coupling of TCS and ABTS, ABTS with oxygen and from cleavage of the TCS ether bond were formed. In the presence of SYD, the detected metabolites are: dimers of TCS, products resulting from coupling of TCS dimers to SYD, coupling products of SYD and TCS, and further adducts of SYD. Our results demonstrate that TCS oligomerization prevails if redox mediators are absent. The immediately formed coupling products with the redox mediators are not all dead end products and are further degraded by the laccases. One of these transformation lead probably to 2,4-dichlorophenol, which is expected to be the main product in former studies [2]. By these investigations we are able to give new insights in what happens in the complex laccase-mediator system with triclosan.

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