

BIOCATALYSTS AGAINST THE ZEARALENONE MYCOTOXIN

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Animal feed frequently contain mycotoxins, especially zearalenone (ZEN). The mycotoxin, primarily produced by *Fusarium sp.*, has an estrogen-like molecular structure, disrupting hormone homeostasis leading to reproductive health problems upon acute and chronic dietary exposure, mostly in gilts and swine. Currently discarding the grains or the use of adsorbents are the most commonly used strategies to deal with the mycotoxin contamination. Enzymatic degradation of ZEN enables cereals initially contaminated with mycotoxins to be safely used for animal feed and protect the animals for any negative effects of ZEN in the feed.^[1]

Our research focuses on the discovery of novel enzymes for the biotechnological inactivation of ZEN. Lactone-hydrolases have attracted considerable attention because they can degrade ZEN to a non-toxic form by hydrolyzing the lactone bond in the molecule.^[2]



This research focused on finding new zearalenone degrading enzymes with K_M values comparable to the environmental contamination levels, and high k_{cat} values to enable the very effective degradation of ZEN. Zearalenone hydrolase was expressed in a recombinant, antibiotic marker-free pichia expression system, that is highly efficient for pure enzyme production, without the risk of contamination from the production host. Several formulations were tested to improve the storage and applicability of the enzyme in the food and feed industry. In conclusion, our study showed a formulation for possible application of ZEN degrading enzyme in food and feed industry.

[1] J. Alexander, H. Wallace, EFSA J, **2017**, 15(7), 4851.

[2]. S. Fruhauf, W. D. Moll, ACS Catal., **2024**, 14(5), 3392