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Role of enniatins as emerging mycotoxins and their association with deoxynivalenol in plant, insect, animal and human systems

M. Pasquali¹, M. Saracchi¹, A. Agazzi², L. Ederli³, I. Bellezza⁴, R. Romani³, G. Beccari³, L. Covarelli³

¹Dipartimento di Scienze per gli Alimenti, la Nutrizione e l'Ambiente, Università degli Studi di Milano, Via Celoria, 2, 20133, Milano, Italy; ²Dipartimento di Medicina Veterinaria e Scienze Animali, Università degli Studi di Milano, Via dell'Università, 6, 26900, Lodi, Italy; ³Dipartimento di Scienze Agrarie, Alimentari e Ambientali, Università degli Studi di Perugia, Borgo XX Giugno, 74, 06121, Perugia, Italy; ⁴Dipartimento di Medicina e Chirurgia, Università degli Studi di Perugia, Piazzale Severi, 1, 06132, Perugia, Italy. E-mail: giovanni.beccari@unipg.it

Deoxynivalenol (DON), produced by *F. graminearum* (FG), a causal agent of *Fusarium* Head Blight (FHB) of wheat, is notoriously toxic to animals and humans. Enniatins (ENNs), produced by *F. avenaceum* (FA), have also received attention for chronic exposure to contaminated feeds and foods but little is known about their effects. Therefore, this project aims to investigate the role of ENNs [enniatin B (ENB) in particular] and their association with DON: 1) in fungal virulence towards wheat; 2) in fungal competition; 3) towards the wheat microbiome and biocontrol agents (BCAs); 4) on wheat pests and their natural enemies; 5) on dairy cows health; 5) on human intestinal barrier permeability. So far, our research has shown that ENB plays a marginal activity in FA virulence but its role in defense priming is under evaluation. ENB also shows involvement in FA competition against FG. *Streptomyces* strains modulate DON production by FG in wheat being effective as BCAs. The effect of DON+ENB on BCAs fitness and on the whole microbiome are under investigation. While DON shows a toxic contact effect towards wheat aphids, ENB does not play the same activity. DON+ENB show a toxic effect on the topical application on lacewing larvae. ENNs in livestock diets are primarily from consuming cereal grains. Little information is available on their effects on dairy cows concerning chronic or acute exposure and well-balanced or acidotic diets. ENB and DON exert time and concentration-dependent toxic effects on human intestinal Caco2 cells. However, when combined, no additive effects are observed.

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