

Relevance of mycotoxins to product quality and animal health in organic farming

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Introduction

Many evaluations show that mycotoxin contamination of plant products is not bound to the farming system. It is obvious that the occurrence of the toxins in plant products is dependent on variety, crop rotation, weather conditions and post-harvest management. Especially in organic farming the infection of plants with mycotoxin-producing fungi is sometimes lower than expected. Nevertheless the mycotoxin contamination is of high significance in discussions about consumer protection. Beyond these quality aspects another important research topic is the negative impact of mycotoxins in animal nutrition and their effects on animal health.

Materials and Methods

The aim of this literature based study (50 sources) is to identify main factors that may influence mycotoxin contamination of products, foodstuff and fodder in organic farming and to evaluate special research fields. A special view is given to the aspects of mycotoxin related animal health damages in organic farming systems.

Results and Discussion

The occurrence of mycotoxins in agricultural production is mainly dependent on weather conditions. Other systematic differences in terms of the risk of mycotoxin contamination in contrast to conventional systems are shown in table 1. It is obvious that main factors (weather, site and storage conditions) determining the occurrence of mycotoxin producing organisms influence all farming systems in the same way. Due to the different management of the systems, organic farms have advantages because cereal varieties with longer stems can be used and growth regulators are banned. This leads to a lower infection risk of the ears. Intensive mechanical soil cultivation and ploughing (tillage), which is favourable for regulating the weed populations in organic farms and their wider crop rotations reduce the inoculum. Thus by lower population densities and more stable cell walls in the plant tissue due to the low fertilization level in organic farms the possibility for infections with toxin producing fungi is reduced further. The restrictions on the import of fodder components reduces the risk of mycotoxin contaminations established under foreign climatic conditions. On the other hand, organic farms are not allowed to use fungicides and offer more hosts for the mycotoxin producing fungi through higher weed densities. The demand for litter-based resting areas for livestock in organic farms could lead to higher exposures caused by fungi on this substrate.

Table 1: System based differences in organic and conventional farms and its influence on the risk of occurrence of mycotoxins in plant production

	Conventional farm	Organic farm
Weather	0	0
Site-conditions	0	0
Variety	-	+
Tillage	-	+
Crop rotation	-	+
Growth regulator	-	+
Fungicides	+	-
Fertilization	-	+
Population density	-	+
Weed	+	-
Fodder	-	+
Storage and conservation	0	0
Bedding areas for livestock	+	-

Influence on the risk for contaminations with mycotoxins:
 0 = same in both types
 + = lower risk in this farming system
 - = higher risk in this farming system

Conclusions

Organic farming is not generally more endangered by the risk of contamination of the products with mycotoxins than other farming systems. Knowledge about the influence of litter beddings on mycotoxin exposure of livestock is rare. Due to restrictions on silage additives and fungicides, organic farms are limited in their possibilities to prevent and to cure fungal diseases. But the organic production system offers several important factors for lowering infections with mycotoxin producing fungi.