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Mycotoxins and cancer

Elmetwally DE

Botany Department, Faculty of Science, Suez Canal University, Ismailia 41522, Egypt.



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In his presentation during the activities of the Second International Conference on Mycology in MENA (ICM-2018), Prof. Ahmed Abdel-Azeem (Botany Department, Faculty of Science, Suez canal University presented his work on food contamination and health effects on children with special reference to mycotoxins.

He mentioned that ingestion of food is the major route of human exposure to chemical and biological contaminants, especially mycotoxins. Food additives have been used throughout history to perform specific functions in foods. A comprehensive framework of legislation is in place within Europe to control the use of additives in the food supply and ensure they pose no risk to human health. Further to this, exposure assessments are regularly carried out to monitor population intakes and verify that intakes are not above acceptable levels (acceptable daily intakes). Considering their toxic and carcinogenic effects, mycotoxins exposure assessment assumes particular importance, especially when vulnerable populations as children, are involved.

Although there are increasing evidences of mycotoxins co-contamination in food, scarce data are available concerning children exposure to multiple mycotoxins, their bioaccessibility and the potential toxic effects resulting from intestinal exposure. Young children may have a higher dietary exposure to chemicals than adults due to a combination of rapid growth rates and distinct food intake patterns. One of the most widely investigated unfavourable health effects associated with food additive intake in preschool-aged children are suggested adverse behavioural effects.

It's well known that fungi live everywhere around us. Fungi considered as a double-edged sword it can produce harmful and beneficial metabolites. Mycotoxins considered as one of the most important harmful secondary metabolites produced by filamentous fungi. Mycotoxins are very toxic and it would lead to cancer. Mycotoxins not only harmful to humans but it can cause

problems to animals and crops too. It could be transferred to human through eating the contaminated crops such as rice, wheat and corn with mycotoxins. Thus, food safety should be considered in order to minimize or to eliminate the mycotoxins concentrations in crops.

Mycotoxins contains different types such as aflatoxins, ochratoxins (A), fumonisin and trichothecenes, and they are produced as a secondary metabolite from fungi. *Aspergillus* produces aflatoxin B1 which causes liver cancer which is one of the cancers cause high deaths rate annually. While Ochratoxin A could be produced by *A. ochraceous*, *A. carbonarius*, *A. niger* and *Penicillium verrucosum*, Ochratoxin A may cause serious damages including urinary tract cancer. Fumonisin could be produced by several fungal taxa including *Fusarium* species and it would lead to esophageal cancer.



Fusarium solani, long monophialidic conidiogenous cells (left) and microconidia (right) © Nivien Allam Nafady.

* Corresponding author

E-mail address: doaaelsayed486@gmail.com (Doaa Elsayed Elmetwally)



According to the previously mentioned damages and diseases could be produced by mycotoxins transferred through crops, some precautions should be applied to minimize the fungal contamination or the production of mycotoxins such as using fungicides to prevent the fungal growth, storing food and crops after the harvesting process in a good way such as low temperature and low moisture content or dry places.

In conclusion a stricter regulation for mycotoxin levels in food should be applied in Egypt in order to control mycotoxins and their producing fungi in animal feed, maize, and other food commodities. Furthermore, reducing the maximum level of the regulated mycotoxins to a level accepted by the international standards is important to ensure consumers' safety and facilitate worldwide trade.

Further readings

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