

Food processing technologies recommended to reduce the levels of mycotoxin contamination in food

07 November 2016

Food processing steps that reduce mycotoxin levels should be integrated wherever possible in food production recommends a paper commissioned by ILSI Europe's Process-Related Compounds and Natural Toxins Task Force. Mycotoxins, naturally-occurring toxins produced by certain fungi or moulds can be present in a wide range of food commodities (e.g. dairy, corn, cereals, dried fruits, nuts, coffee and spices). Reducing mycotoxin levels in food products would significantly lower the potential health risks to consumers and can also help to reduce significant economic losses for industry. Nowadays, food processing technologies are required to both mitigate mycotoxin contamination while also maintaining the nutritional composition and quality of food.

Food processing techniques that can reduce levels of mycotoxin contamination include physical, chemical, enzymatic and microbial methods. Physical processing methods (such as sieve-cleaning, flotation density sorting, heating and washing) are well established and efficient. Manual and automatic sorting, milling, steeping and extrusion can also significantly lower mycotoxin content in food. Heat treatment at specific time/temperature combinations is one of the most important physical treatments, by which to reduce the mycotoxin content in a finished product.

Chemical methods can be used to transform mycotoxins into less or non-toxic compounds (also known as detoxification). Physical and chemical processes can be combined to increase the efficiency of mycotoxin removal.

Detoxification of mycotoxins can also be achieved enzymatically or microbiologically, since certain enzymes and microorganisms can transform mycotoxins into less or non-toxic compounds. However, these approaches need further development before they can be used on a widespread scale.

Pre-harvest prevention measures following the principles of good agricultural practices (e.g. growing resistant crop, varieties, soil tillage, crop rotation, plant diseases management, insect control, etc.) as well as post-harvest measures (such as adequate storage and transportation) still play a key role in mitigating mycotoxin contamination. Yet, effective as they are, at present these measures cannot guarantee complete mycotoxin absence. Therefore, food processing techniques like the ones described above are an essential element of a comprehensive strategy to reduce mycotoxin levels in food products.

Currently, mostly physical treatments are used in food production in the EU. A few chemical and biotechnological techniques are approved for use in animal feed production. Novel technologies (such as e.g. cold plasma treatment, possibly in combination with novel detoxification agents) show promise as tools to reduce mycotoxin contamination but need further research and development before they can be approved for use by European regulators.

The authors recommend that research into developing detoxification techniques suitable for the highest-risk products should be a priority. Prioritization should be based on criteria such as consumption of the contaminated commodity (staple foods that are consumed in the highest quantities and commodities consumed by sensitive population groups like young children), occurrence of mycotoxin at high levels in such commodities and level of toxicity of specific mycotoxin contaminants. Different geographical regions require different prioritizations.

They also note that further research is needed to better understand mechanisms of mycotoxin degradation and to identify resulting mycotoxin transformation products and their biological activity.

For further information:

Karlovsky P, Suman M, Berthiller F et al. (2016) Impact of food processing and detoxification treatments on mycotoxin contamination. *Mycotoxin Res* 32:179.