

# Application of novel technologies against carcinogenic fungi mycotoxins

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Credit: Picture: By BorgQueen - Sources clockwise from top left: File:Amanita muscaria tyndrum.jpg, File:Scarlet elf cap cadnant dingle.jpg, File:Mouldy bread alt.jpg, File:Spizellomycete.jpg, File:Aspergillus.jpg, CC BY-SA 2.5, [commons.wikimedia.org/w/index.php?curid=7395392](https://commons.wikimedia.org/w/index.php?curid=7395392)

Mycotoxins are a group of low-molecular-weight compounds with a lot

of diversity at their structures, which are mainly produced through the secondary metabolism of fungi. They are produced on different types of foods and are considered as hazardous substances for both animal and human health. Their impact on health may be very hard and can be categorized in three forms as mutagenic, carcinogenic, and genotoxic. On the other hand, the contamination of foodstuffs and plant materials, particularly grains, with mycotoxins goes along with intense financial losses. For example, nearly one-third of the total crop value was lost in Hungary in 2014, partly due to the lowered prices owing to the higher toxin contamination and partly because of losses in animal husbandry and extra costs of toxin binders, medication, etc.

Currently, the application of non-thermal techniques has been noticed due to the advantages such as low cost, low time consuming, and low food matrix side effects. Non-thermal plasma, electron beam irradiation, and pulsed light are among the newest and [promising technologies](#) used to decrease the concentration of mycotoxins in grains. Moreover, due to the non-thermal character of presented techniques, those impacts on the quality of foods and plants may be, in general, only negligible.

Non-thermal plasma, electron beam radiation, and pulsed light are possible novel non-thermal technologies offering promising results in degrading mycotoxins with potential for [practical applications](#). Researchers now evaluated the State of Art. "In our research, the available publications are reviewed—some of them report efficiency of more than 90%, sometimes almost 100%. The mechanisms of action, advantages, efficacy, limitations, and undesirable effects are reviewed and discussed. The first foretastes of plasma and electron beam application in the industry are in the developing stages, while pulsed light has not been employed in large-scale application yet," says one of researchers Vladimír Scholtz from University of Chemistry and Technology Prague.

A direct comparison of efficacy of promising technologies on the [mycotoxin](#) degradation is a complicated issue. Therefore, there is a need for studies, comparing developing methods against mycotoxins in the same conditions. It seems that the application of some of these technologies against food mycotoxins in the industry is in the developing stages. "Nevertheless, it appears that [electron beam](#) and Non-thermal plasma are preferred compared to pulsed light to be used in food industries," researchers conclude.

**More information:** Mohammad Yousefi et al, Application of Novel Non-Thermal Physical Technologies to Degrade Mycotoxins, *Journal of Fungi* (2021). [DOI: 10.3390/jof7050395](https://doi.org/10.3390/jof7050395)

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