

Intensive fungicide use may lead to azole resistance in humans

December 1 2009



(PhysOrg.com) -- A team of scientists from the Netherlands, including Gert Kema of Plant Research International, published an article in the *Lancet Infectious Diseases* about the relationship between fungicide use in agriculture and azole resistance. In the article the scientists argue that the intensive use of fungicides may contribute to resistance against pharmaceuticals in humans with life-threatening lung infections caused by the *Aspergillus* fungus. It is the first time that a probable relationship between fungicide use in agriculture and human health is demonstrated.

Azoles - a group of nitrogen compounds - are found in a large number of natural substances but they are also used in agriculture as fungicide, in cosmetics, in various materials such as clothing and mattresses for protection against fungal growth. Azoles are also applied as biocides in non-agricultural applications.

The *Aspergillus* [fungus](#) is occurring throughout the environment. The spores of this fungus are floating through the air and can be inhaled. When these spores remain in the lungs of healthy people, they are taken care of by the immune system. In people with a weakened immune system (e.g. people with leukaemia) the fungus may, however, cause serious pneumonia which is usually fatal without treatment.

[Resistance](#) rapidly increases since the emergence of the multiresistant fungus *Aspergillus fumigatus* in 2000. In 2007 6% of the patients with an *Aspergillus* pneumonia were infected by a multiresistant variant. The chance of resistance development in humans seems small (the chance of patient to patient transmission is very small) while the uniform way in which the fungus becomes resistant may point at the role of [fungicides](#) in the environment. 94% of the fungal isolates from patients in the Radboud hospital and 69% of those in other hospitals in the Netherlands were found to be resistant by two identical mutations. This concerned patients who had never been treated with azoles. This seems to indicate that all these patients have inhaled resistant spores from their environment.

The chance that intensive azole use in agriculture may lead to resistance problems in humans has been subject of debate for years. The evidence that *Aspergillus* acquires resistance in the outside environment has become more convincing with the now published research in the article in the [Lancet Infectious Diseases](#).

Provided by Wageningen University

Citation: Intensive fungicide use may lead to azole resistance in humans (2009, December 1)
retrieved 21 November 2023 from

<https://medicalxpress.com/news/2009-12-intensive-fungicide-azole-resistance-humans.html>

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