

Mycokey

Integrated and innovative key actions for mycotoxin management in the food and feed chain

Lay summaries

Knowledge transfer to stakeholders



UNIVERSITÀ
CATTOLICA
del Sacro Cuore

Volatilisation of Bioactive compounds

ISSUE

The storage of cereals is a critical phase of food production. Spores of *Aspergillus* and *Penicillium* genera can contaminate the grain causing important economic losses.

These fungi represents also a big problem for human health due to the production, during storage, of secondary toxic metabolites, mycotoxins

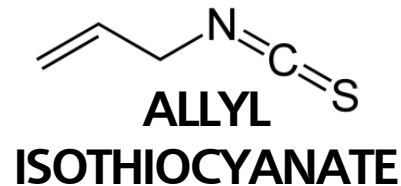


APPROACH

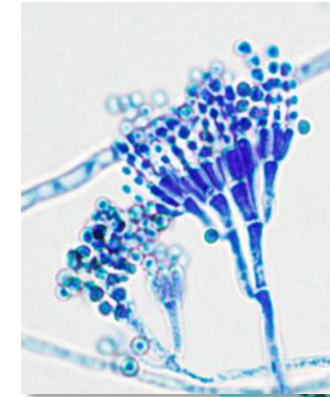
Volatile bioactive compounds were used to reduce fungal contamination during grain storage in silos.

Isothiocyanates are natural compounds of *Brassicaceae* family plants.

Allyl Isothiocyanate is the major isothiocyanate of oriental mustard and has a high antifungal activity due to its electrophilic properties; it reacts easily with nucleophiles such as amines, amino acids, alcohols, water and sulfites.



Antifungal
device based
on AITC



Penicillium spp.



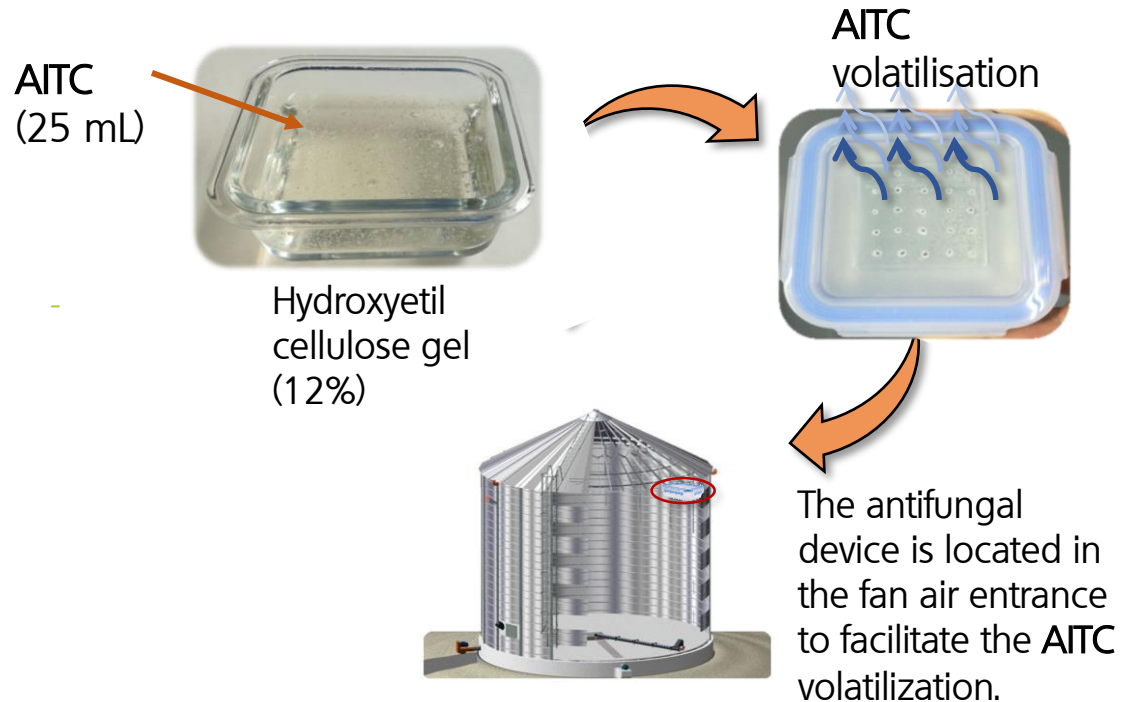
Aspergillus spp.



OUTCOMES

A device based on a hydroxyethyl cellulose gel for the controlled release of volatiles, such as Allyl isothiocyanate, has been developed.

This was effective in reducing fungal contamination of grain both in laboratory silos contaminated with *Aspergillus flavus* and *Penicillium verrucosum* and in true scale silos with naturally contaminated grain.



Quiles JM, Nazareth TM, Luz C, Luciano FB, Mañes J, Meca G. Development of an antifungal and antimycotoxigenic device containing allyl isothiocyanate for silo fumigation. *Toxins*, 11, (2019) 137-150 doi:10.3390/toxins11030137

