



Fungicides Linked to Fungal Drug Resistance

[Source: TH](#)

A study reveals that the **agricultural fungicide tebuconazole** is driving **increased resistance in *Candida tropicalis*** (a **fungal pathogen**) by causing **unexpected genetic changes** that make the **strains resistant to commonly used antifungal drugs** like **fluconazole** and **voriconazole**.

- *Candida tropicalis* is responsible for **severe fungal infections**, with a **mortality rate of 55-60%**.

Tebuconazole

- **About:** Tebuconazole is a **systemic, broad-spectrum fungicide** used widely in agriculture to **control fungal diseases** in crops like **wheat, barley, rice, fruits, vegetables, and turf**.
- **Working:** Tebuconazole, similar to medical antifungals like **fluconazole** and **voriconazole**, works by **inhibiting ergosterol biosynthesis**, essential for fungal cell membrane formation, giving it both **preventive and curative properties**.
 - It is widely applied as a **seed treatment, soil drench, or foliar spray**, offering versatile crop protection. However, its **overuse in agriculture** has raised concerns due to its role in promoting **antifungal resistance**.
- **Impact of Overuse:** Overuse of the fungicide **tebuconazole** in agriculture promotes **cross-resistance** in *Candida tropicalis* by inducing **aneuploidy** i.e. changes in chromosome number that lead to the **overexpression or deletion of resistance-related genes**.
 - Strains with **altered ploidy** grow slower without drugs but survive better when exposed to antifungals.
 - Some strains became **haploid (having only one set of chromosomes and the ability to mate)**, potentially **spreading resistance further**.
 - **Ploidy** refers to the number of complete chromosome sets in a cell. **Diploid (2n)** has two sets (common in human cells), **haploid (1n)** has one set (seen in sperm and egg), and **triploid (3n)** has three sets.

Fungicides

- These are crop protection **chemicals (pesticides)** used to control the spread of fungal diseases in plants. It includes **Chlorothalonil, dithiocarbamates** (e.g. **mancozeb, maneb, zineb**), **sulfur derivatives** etc.

Read More: [Pesticide Poisoning](#)