

# Tree nut research may unexpectedly lead to medical advances

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Experiments by now-retired ARS research leader Bruce C. Campbell, ARS molecular biologist Jong H. Kim, and their co-investigators suggest that pairing conventional antifungal medicines with natural, edible compounds from plants may enhance healing of fungal infections.

Prescription drugs that today help patients fight severe fungal infections might tomorrow be even more effective, thanks to unexpected findings from agriculture-based, food-safety-focused studies by U.S. Department of Agriculture (USDA) scientists and their colleagues.

Petri-dish experiments conducted by now-retired USDA Agricultural Research Service (ARS) research leader Bruce C. Campbell, ARS [molecular biologist](#) Jong H. Kim, and their co-investigators suggest that pairing conventional antifungal medicines with natural, edible compounds from plants—such as thymol, extracted from the popular herb thyme—can boost the healing effects of some of these drugs.

Campbell and Kim's work at the ARS Western Regional Research Center in Albany, Calif., with

species of *Aspergillus* mold, for example, has attracted the attention of medical and public health researchers. Found worldwide in air and soil, *Aspergillus* can infect corn, cotton, pistachios, almonds, and other crops, and can produce aflatoxin, a natural carcinogen.

Aflatoxin-contaminated crops must be identified and removed from the processing stream, at times resulting in large [economic losses](#). Since 2004, Campbell, Kim, and colleagues have carefully built a portfolio of potent, plant-based compounds that kill a target *Aspergillus* species, *A. flavus*, or thwart its ability to produce [aflatoxin](#).

Further research and testing might enable tomorrow's growers to team the best of these [natural compounds](#) with agricultural fungicides that today are uneconomical to use, according to Kim.

*A. flavus* and two of its relatives, *A. fumigatus* and *A. terreus*, may impact the health of [immunocompromised individuals](#) exposed to the fungus in moldy homes. In a 2010 article in *Fungal Biology*, the team reported that thymol, when used in laboratory tests with two systemic antifungal medications, inhibited growth of these fungi at much lower-than-normal doses of the drugs.

A related study provided new evidence to support earlier findings, at Albany and elsewhere, which had suggested that plant compounds such as thymol may sabotage a target fungi's ability to recover from oxidative stress triggered by antifungal drugs. A 2011 [article](#) published by Kim, Campbell and others in *Annals of Clinical Microbiology and Antimicrobials* documents this research.

Using plant-derived compounds to treat fungal infections is not a new idea, nor is that of pairing the compounds with antifungal medicines. But the Albany team's studies have explored some apparently unique pairs, and have provided some

of the newest, most detailed information about the mechanisms likely responsible for the impact of powerful combinations of drugs and natural plant [compounds](#).

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