

New pairs of compounds may help tree nuts fight fungal foe

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ARS research leader Bruce C. Campbell (right) and molecular biologist Jong H. Kim have teamed up with colleagues in Russia to explore new strategies for destroying fungi that attack tree nuts, grains, and other crops.

(PhysOrg.com) -- Some crunchy, good-for-you tree nuts like almonds and pistachios are vulnerable to attack by a troublesome mold known as *Aspergillus flavus*. The mold produces cancer-causing natural compounds called aflatoxins.

U.S. Department of Agriculture (USDA) scientists in Albany, Calif., are fighting back. They have teamed up with colleagues halfway around the globe—in Moscow—to explore new strategies for destroying *A. flavus*.

The researchers' anti-*Aspergillus* tactics might help quell other troublesome fungi as well. That's why this collaboration with the All-

Russian Research Institute of Phytopathology in Moscow encompasses not only *A. flavus* but also several other key fungal foes. Targeted microbes include, for instance, *Fusarium culmorum* and *Bipolaris sorokiana*, both of which can cause root rots and other problems, and *Alternaria alternata*, which causes leaf spot disease of some crops.

Research leader Bruce C. Campbell, who heads the USDA Agricultural Research Service (ARS) Plant Mycotoxin Research Unit at Albany, developed the international collaboration to quicken discovery of [natural compounds](#) that could work in concert with commercial fungicides. Ideally, the natural compound would make the target fungi more vulnerable to the fungicide.

Studies at Albany, started in 2004 by Campbell and ARS research molecular biologist Jong H. Kim, provide strong evidence to support this concept. By reducing the amount of fungicide commonly used today, the strategy may prove to be less costly and more environmentally friendly than conventional approaches, according to Campbell.

At the Moscow institute, scientists are rigorously testing the concept in studies coordinated by Vitaly Dzhavakhiya and Larisa Shcherbakova. In one study, the team paired thymol, a natural compound from thyme, with Folicur (tebuconazole), a commercial fungicide. The researchers determined that adding a very small amount of thymol to Folicur was about twice as effective in reducing growth of *A. alternata* than applying either thymol alone or the fungicide alone.

More information: Some of the research findings have been published in [Applied Microbiology and Biotechnology](#), [Biochemical and Biophysical Research Communications](#), [FEMS Microbiology Letters](#), [Fungal Biology](#), [Letters in Applied Microbiology](#), [Mycopathologia](#), and [World Mycotoxin Journal](#).

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