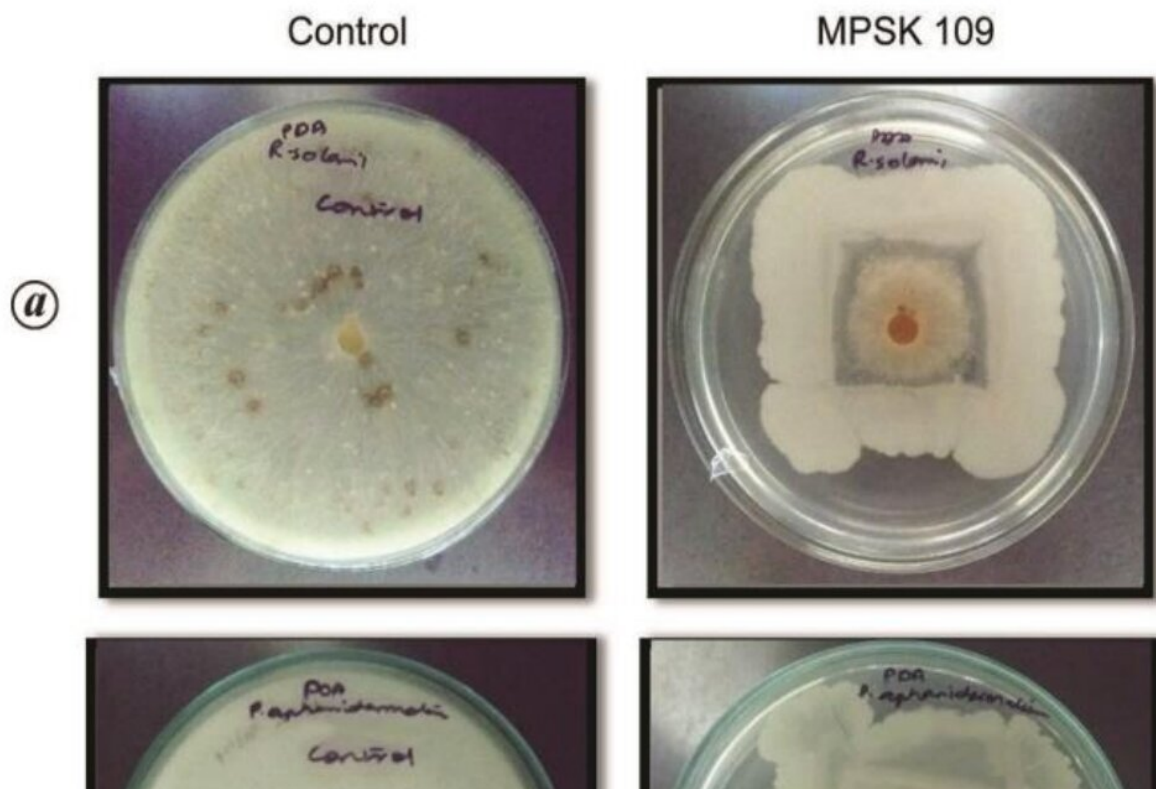


Salt-tolerant bacteria 'can fight fungal attacks on chili'

November 17 2022, by K.S. Harikrishnan



Antagonism exhibited by *Bacillus cabrialesii* strain MPSK 109 against fungal phytopathogens. a, *Rhizoctonia solani*; b, *Pythium aphanidermatum*; c, *Fusarium oxysporum*; d, *Fusarium pallidoroseum*. Credit: *Phytotherapy Research* (2022). DOI: 10.1002/ptr.7660

Salt-tolerant bacteria found in salt pans can be used to contain fungal

attacks on chili (*Capsicum annuum*), a major export crop of India, according to a new study published this month.

India, the largest grower, consumer and exporter of chillies in the world, is estimated to have produced in the 2021—2022 fiscal year 1.87 million tons, widely used to spice food. Thailand and China are also major producers.

According to the study, conducted by researchers at Goa University, salt-tolerant bacteria can be deployed to counter [fungal pathogens](#) that flourish as a result of increasing soil salinisation. This can lead to better nutrient management and improved yields, the researchers say.

"Among abiotic (non-biological) factors, soil salinisation is the most detrimental and considered a significant limiting factor of agricultural productivity and food security," says Savita S. Kerkar, an author of the study and senior professor of bio-technology at Goa University.

"Halophilic (salt-loving) and halotolerant (salt-tolerant) microorganisms from solar salt pans are known to produce several [secondary metabolites](#) (substance needed for metabolism and plant growth) which can be exploited for various applications," Kerkar tells us. "That is why researchers decided to evaluate the potentiality of halotolerant salt-pan bacteria in this study."

Manasi Pawaskar, co-author of the study, says that while several kinds of bacteria have been reported as potential bio-control agents, there were no previous studies on the application of salt-pan bacteria against fungal pathogens in chili plants.

"In this study, about 196 bacteria isolated from salt pans in Goa, were screened for their antifungal activity. Halotolerant isolates of six types of [bacteria](#) could grow under a wide range of pH (acidity or alkalinity

level), temperature and NaCl (salt) concentrations, thus demonstrating their ability to survive and proliferate in the varying dynamics of the soil," Pawskar said.

First introduced to Asia by 16th century Portuguese and Spanish explorers, chili cultivation has spread to all continents, especially the *C. frutescens*, or chili pepper, and *C. annuum*, which includes the bell pepper, cayenne, friggittello, jalapeños, paprika, and serrano varieties.

Research published in October says that apart from its use as a spice, chili is also an ingredient in many traditional medicine systems. "The fruits of *C. annuum* have been used as a tonic, antiseptic, and stimulating agent, to treat dyspepsia, appetites, and flatulence, and to improve digestion and circulation," says the study in *Phytotherapy Research*.

Anoop Kuttiyil, researcher in [plant pathology](#) and assistant professor at Zamorin's Guruvayurappan College, in Kozhikode, southern India, tells us that chili pepper is rich in bioactive compounds and has natural ingredients of value to the agro-food, cosmetic and pharma industries. "But, chili is susceptible to several fungal pathogens that affect crop yield. These include *Cercospora capsici* and *Alternaria solani* that damage the leaves and *Colletotrichum* sp. that causes fruit rot in chili."

Kuttiyil, who was not involved in the study, said, "Management of these fungal diseases is often difficult due to conducive environment and lack of prophylactic measures and the study offers potential for bacterial bio-control agents that can compete with pathogens as well as promote crop growth, especially in extreme saline soil conditions."

More information: Sudip Kumar Mandal et al, *Capsicum annuum* L. and its bioactive constituents: A critical review of a traditional culinary spice in terms of its modern pharmacological potentials with toxicological issues, *Phytotherapy Research* (2022). [DOI:](#)

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