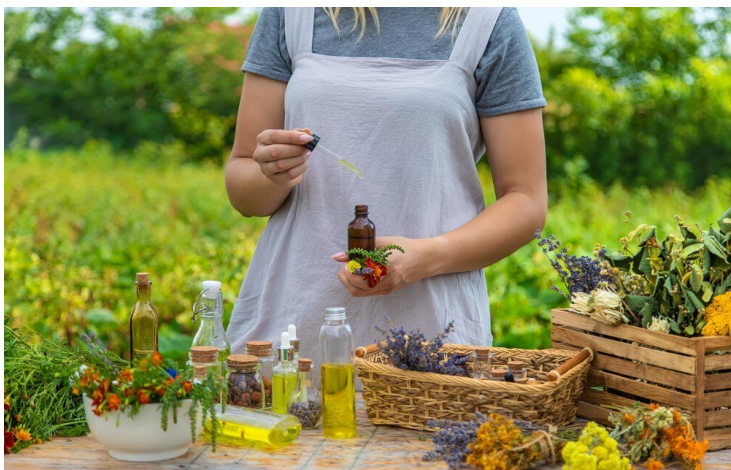


## Essential oils have been discovered to be effective in controlling post-harvest fungus attacks on mangoes

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**Findings pave the way for the development of natural products that control fungi and replace chemicals**



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Scientists from [Embrapa](#) and the State University of Campinas ([Unicamp](#)) have recorded antifungal activities of seven essential oils against four fungi that cause post-harvest diseases in mangoes. The study also identified the minimum inhibitory concentration of the four most efficient ones and the chemical composition of each of them. The findings showed that oregano, pepper-rosmarin (also known as rosemary pepper), cinnamon bark and clove basil essential oils inhibited 100% of the growth of the pathogens under study.

Despite having a complex composition, essential oils have been widely studied for their effectiveness against microorganisms. The results of the study showed that the action varies according to the pathogen.

The minimum inhibitory concentration varied according to the oil and target fungus. Oregano stood out for its inhibitory effect on the pathogens *C. siamense*, *L. theobromae* and *B. dothidea*, demonstrating excellent antifungal activity at the lowest concentration tested. Meanwhile *A. alternata* was more sensitive to cinnamon bark essential oil than to oregano.

### **More sustainable and competitive fruit**

According to Elke Vilela, an Embrapa Environment researcher, the use of fungicides in post-harvest mango treatment has been a common practice aimed at reducing the incidence of diseases and extending the shelf life of the fruit; however, given the awareness of their possible health risks, more sustainable treatments have been sought out, according to Vilela.

The use of alternative treatments, which do not use chemical products, also helps to circumvent non-tariff barriers by countries that do not buy fruits that contain traces of agrochemicals. "Moreover, the excessive use of agrochemicals not only causes chemical contamination of fruits, but can also cause the rise of pathogen strains that are resistant to the fungicide, making it difficult to control post-harvest diseases", the analyst warns.

Mango is a climacteric fruit, which is usually harvested while it is still unripe and ripens even after the harvest, in storage. Mango ripening involves physiological and biochemical changes, including a marked increase in respiration and ethylene production. "During this ripening process, fruits become more susceptible to pathogen attacks, especially during storage and transportation, causing severe losses", the Embrapa researcher [Daniel Terao](#) explains.

He reports that fungi are the main causes of fruit quality and productivity losses. "With fungi, having quality fruits reach consumers is a challenge," Terao says, citing that anthracnose, caused by the fungus *Colletotrichum siamense*, is the most common post-harvest disease in mangoes. In addition to this pathogen, the fruit is also the target of *Alternaria alternata*, a fungus that causes alternaria spot; *Lasiodiplodia theobromae*, and *Botryosphaeria dothidea*, which cause severe rots in fruits.

The essential oils' mechanism of antifungal action is attributed to their components, which work in a synergistic (one complementing the action of the other) or additive way as they perform their effects. Therefore, according to the researcher, knowledge of the antifungal activity of these constituents can help to understand the effectiveness of essential oils and their activity against fungi.