SCIENCE

Antibacterial Properties of Common Gap Plants From Monteverde, Costa Rica

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Bioprospecting, or the study of biodiversity to target species for biochemical uses, can expedite the identification of plant extracts for medicinal purposes. In Monteverde, Costa Rica, species of plants that specialize in growing in recently exposed areas of tree fall gaps (gap plants) were found to have a high presence of adaptive chemicals called metabolites, but have not been tested for antibacterial properties. Many medicinal herbs have high levels of metabolites and exhibit antibacterial properties. Because gap plants tend to have high levels of metabolites like medicinal herbs, they are hypothesized to exhibit high levels of bacterial inhibition.

To measure the antibacterial properties of six gap plants common to Monteverde, metabolites were extracted using methanol. Filter paper discs were dipped in a solution of each species' extracts, distilled water, 100% methanol, or the antibacterial eye drop solution Dexametasona Neomicina (DN). Agar plates were left uncovered for 1.5 hours to expose them to bacteria before covering for growth. The zone of inhibition (ZOI), or the distance from the nearest bacterial colony to the disc, was measured every 24 hours until the growth remained unchanged (nine days). The mean ZOI of each solution was compared. No significant bacterial inhibition was found between the plant extracts and DI or methanol, but all
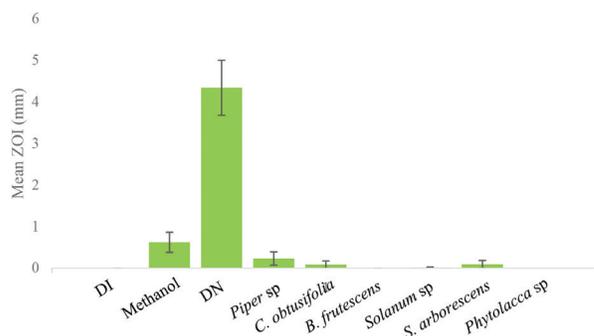
The mean zone of inhibition for each of the nine solutions studied after nine days of growth. The bars represent standard error. The ZOI was measured as the radius from the filter paper disk to the nearest bacterial group. The six gap plant species were compared to three controls: distilled water (DI), methanol, and Dexametasona Neomicina (DN), which is an eye drop solution with known antibacterial properties.

showed a difference from DN, which was expected due to its pharmaceutical uses. Although gap plants common to the Monteverde cloud forest contain metabolites like medicinal plants, they do not exhibit antibacterial properties, and with current knowledge, they should be avoided when bioprospecting.

Research advisor Adam Stein writes: "With over 2,500 known species of plants in the Monteverde zone of Costa Rica alone, the opportunity for discovering medically important compounds is still a big possibility. Although Hannah's research was unable to detect antibacterial properties in the plants she surveyed, she highlighted a cost-effective, logical approach for bioprospecting."

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