

Effect of Caffeine on Fungal Growth

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SUMMARY

Studies conducted on coffee beans revealed that the monsooned coffee beans had significantly lower caffeine content than the cherry and parchment coffee in Robusta variety compared to Arabica. Also, monsooned coffee beans had more number of fungal species associated with it than the non-monsooned beans and so the effect of caffeine on fungal growth was studied. Fungi like *Rhizopus stolonifer* and *Absidia heterospora* failed to grow even at a low concentration (5 mg caffeine/ml of MEA) while two species of *Penicillium* showed sparse growth. Fungi of *Aspergillus* group grew fairly well even up to the highest concentration used i.e., 20 mg caffeine/ml of MEA. An evident reduction in growth on solid media was observed on a daily basis as the concentration increased. At each concentration (5, 10, 15 and 20 mg caffeine/ml of MEA), the fungi showed an initial lag phase in their growth as measured by its percent reduction when compared to control but increased exponentially as the days of incubation increased. Microscopic examination revealed that there was a great reduction in the sporulation, formation of pigments in the spores, and branching of phialides as the concentration of caffeine increased. Using a gradient-HPLC system consisting of a phenylhexyl column it was found that one potential species out of the 9 fungal species isolated from coffee beans was capable of using caffeine as the sole nitrogen source and thereby degrading it completely in synthetic liquid media. Results point out the potential use of this fungus in bringing about decaffeination of coffee using fungal enzymes.