



## MICROBIAL AIR AND WATER QUALITY ASSESSMENT OF A FRESHWATER LIMESTONE CAVE IN THE PHILIPPINES AND ITS IMPLICATIONS FOR ECOTOURISM MANAGEMENT

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**ABSTRACT** – The Philippines has an extensive cave system owing to its geologic history. However, as human populations and tourism expand, this unique ecosystem is increasingly threatened by anthropogenic influences. The extent of these human impacts and the suitability of ecosystems for human use can be assessed through measurement of indices. Cultivable microbial groups were used as quality indices for air and water habitats in the Cacupangan Cave, Pangasinan, Philippines. Air quality was measured by determining the Index of Microbial Air Contamination (IMA) using settle plates for enumeration of air-borne fungal spores. Water quality was measured by determining the concentration of coliforms expressed as Most Probable Number (MPN) using a multiple tube fermentation technique. Results showed that air quality ranges from good to very poor. IMA based on a cave assessment index indicates that the cave is already “threatened by fungi” signifying possible degradation of cave structures due to fungal activities. The most common genera identified were *Aspergillus* and *Penicillium*. These are commonly associated with epigeal sources such as soil and plants. They are ubiquitous in the environment and their spores are easily carried by wind currents. Water quality, on the other hand, is low because of high coliform content indicating fecal contamination and therefore the possible presence of pathogens. Coliforms may have come from bats as well as epigeal and anthropogenic sources. *Escherichia*, *Klebsiella*, and *Enterobacter* were the genera most commonly identified. Continuous regular monitoring of this ecotourism site is important for its sustainable management. Control of activities is necessary to maintain the integrity of the system.

*Keywords: air-borne fungi, Cave environmental monitoring, coliforms Index of Microbial Air Contamination, Most Probable Number*



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