

COMPARATIVE STUDY OF FUNGAL GROWTH IN *Myristica fragrans* (NUTMEG) KERNELS UNDER VARYING POSTHARVEST STORAGE CONDITIONS

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Fungal population dynamics are influenced by various environmental and handling factors, particularly in postharvest systems. This study investigated the temporal variation of total fungal populations in nutmeg (*Myristica fragrans*) kernels, focusing on fungal contamination under different drying and storage conditions, addressing the lack of published research on nutmeg processing in Sri Lanka. Two hundred nutmeg fruits were collected from a commercial grower at Pilimalalawa (7.2595° N, 80.5452° E), Sri Lanka, and divided equally into two treatment groups to compare traditional and improved postharvest practices. Fungal contamination was assessed through culture-based enumeration immediately post-harvest, post-drying, and during storage. Traditional methods involved sun-drying on reused palm mats and storage in dark, poorly ventilated rooms, while the improved method involved hygienic drying at (32±2) °C and storage with adequate lighting and ventilation. Results revealed a significant ($p < 0.05$) increase in fungal population with extended storage. Dominant contaminants included *Aspergillus flavus*, *A. niger*, *Penicillium* sp., and *Rhizopus* sp., with *A. flavus*, a known aflatoxin producer, particularly abundant in inadequately dried and poorly stored samples. Total fungal colony-forming units (CFU) were significantly ($p < 0.05$) higher in nutmegs subjected to open-air sun drying, and storage under poorly ventilated environments at Pilimalalawa, compared to those processed under improved laboratory-controlled hygienic conditions. *A. flavus* counts increased significantly ($p < 0.05$) after two weeks of storage, particularly under conventional conditions, emphasising its ability to thrive under suboptimal postharvest conditions. Water activity of the kernels (0.700 – 0.780) did not directly correlate with fungal counts, suggesting temperature and inoculum exposure during processing play greater roles in fungal growth. Ultraviolet fluorescence spectroscopy and scanning electron microscopy confirmed *A. flavus* through visible sclerotia formation on shells, indicating potential aflatoxin accumulation. These findings emphasise the need for optimised drying and storage practices to mitigate fungal contamination and ensure nutmeg safety and quality for export.

Keywords: *Aspergillus flavus*, Colony-forming units, Fungal contamination, *Myristica fragrans*