**Anti-hyphal formation property of allicin in suppression of Aspergillus fumigatus growth**


ABSTRACT

Aims: The aim of this study was to examine whether allicin, a compound derived from fresh garlic, leads to growth inhibition and changes in the ultrastructure of the cell surface on medically important filamentous fungi, particularly Aspergillus fumigatus. Methodology and results: The minimum inhibitory concentration (MIC) of allicin in A. fumigatus ATCC 36607 was determined by broth microdilution method according to the CLSI M38-A2 documents whereby the minimal fungicidal concentration (MFC) was determined by plating suspensions from visibly clear wells onto Sabouraud dextrose agar (SDA). Morphological changes on cell surface were observed through scanning electron microscopy (SEM) after 48 h incubation with allicin. In addition, time kill assay was conducted by incubating A. fumigatus at selected time points within 24 h period. Our finding indicated that the MIC and MFC for allicin were both 3.2 ε g/mL. Quantitative data for optical density obtained through microplate reader indicated that $p<0.05$ at MIC value in comparison with untreated control. Observation of allicin-treated cells through SEM demonstrated complete abrogation of hyphae formation at 3.2 ε g/mL and reduced mycelial growth at 1.6 ε g/mL of allicin. This finding revealed anti-hyphal activity of allicin at 3.2 ε g/mL. When A. fumigatus was incubated with 3.2 ε g/mL allicin in the time course assay, the inhibitory effect of allicin was evident after 12 h incubation. Conclusion, significance and impact of study: Our finding strongly implied that allicin exerts its antifungal activity against A. fumigatus via inhibiting the fungal cell proliferation as well as hindering transformation of the conidia into hyphae. Thus, this study depicted potential antifungal property of allicin to be used as alternative therapy to alleviate invasive fungal infection caused by A. fumigatus.



**Keyword:** Allicin; Aspergillus fumigatus; Minimum fungicidal concentration; Minimum inhibitory concentration; Scanning electron microscopy; Time kill assay