Antifungal and antibiofilm activity of Persian shallot (Allium stipitatum Regel.) against clinically significant Candida spp

ABSTRACT

Candida species are the most common cause of fungal infections that range from non-lifethreatening mucocutaneous illness to life-threatening invasive processes that may involve virtually any organ. Such a broad range of infections requires an equally broad range of therapeutic approach. Persian shallot (Allium stipitatum Regel.) is a medicinal plant that has been widely used in tradition Persian medicine for various ailments. Allium stipitatum is also used in modern medicine and has been reported to have a range of health benefits including antibiotic (antifungal) properties. The present study assessed the in vitro anticandidal and antibiofilm potential of hexane (ASHE) and dichloromethane (ASDE) extracts of Allium stipitatum (Persian shallot) against planktonic and biofilm forms of 5 medically important Candida spp. Antifungal activity was assessed by disk diffusion, minimum inhibitory concentration (MIC), minimum fungicidal concentration (MFC) and time-kill assay. The antibiofilm activity of ASHE and ASDE against reference strain C. albicans ATCC 14053 was determined [2,3-bis(2-methoxy-4-nitro-5-sulfo-phenyl)-2H-tetrazolium-5by XTT carboxanilide] reduction assay. The zone of inhibition ranged from 22 to 40 mm, while the MICs ranged from 8 to 32 µg mL-1. The MFCs of ASHE and ASDE were in the range of 16 to 32 µg mL-1 each respectively. Time-kill kinetics showed that both extracts were strongly fungicidal against planktonic cultures of C. albicans with ~ 1.45 log reduction in CFU at 4 h post-treatment (hpt). In addition, both ASHE and ASDE were shown to inhibit preformed C. albicans biofilms in a concentration-dependent manner. The results demonstrated that ASHE and ASDE were broad-spectrum in action, and could be developed as a promising alternative to synthetic antifungals in controlling infections due to Candida spp. of clinical significance.