Anti-Candida Potential of *Allium ascalonicum* Linn: Antibiofilm Activity and Biomolecular Mechanism of Action

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Persian Shallot (*Allium ascalonicum* Linn.) has been proven to possess some antimicrobial properties against some of bacteria, viruses and fungi. Indeed the aim of this study was to investigate the antifungal properties of several Persian Shallot extracts against important *Candida* species. In the first stage the preliminary screening of antifungal activity was determined by disc diffusion test. The effective extracts (hexane, ethyl acetate, methanol, and water) were proceeded to obtain minimum inhibitory concentration (MIC) using broth microdilution test and time-kill study was also performed at time intervals. Results showed that the Shallot-hexane extract was more effective in terms of *Candida* species growth. Subsequently, the effects of the extracts on *C. albicans* biofilm were determined using XTT assay. Finally the expression level of a crucial gene involved in biofilm formation in *C. albicans* was analysed by semi-quantitative RT-PCR.

The MIC was ranged from 5-600 μg/mL for different species of *Candida*. Moreover in time-kill study, no colonies were observed at 1× MIC after 24 h of incubation period. On the other hand, XTT assay showed the significant reduction of biofilm in *Candida* -treated by Shallot at level *p*<0.05. Eventually the expression level of *HWP1* was down regulated through the semi-quantitative RT-PCR (*p*< 0.05). The present study indicates that *HWP1* could be one of the possible targets of Shallot to inhibit biofilm in *C. albicans*.

Key words: *Candida* species, *Allium ascalonicum* Linn., *HWP1*, Biofilm.

The incidence of candidiasis has increased over recent years, especially in immunocompromised patients1,2. Reports show that there are possible antifungal drug resistance of *Candida*.  

Among *Candida* species, *C. albicans* is more available to form biofilm on the surface of medical devices such as stents, shunts, prostheses, implants, endotracheal tubes, pacemakers resulting in resistance to antifungal therapy3,4.

Besides, conventional medicine may pose side effects and abusive or incorrect usage of synthetic drugs result in complications. To further worsening the issue, large percentage of world’s population do not have access to conventional pharmacological treatment, natural products are the preferred choice to treat candidiasis5.

Clearly the alternative therapies should be considered as a way to overcome drug resistance of fungi. One of the alternative therapies is the research and development of natural products. New and effective natural products that