Susceptibility of Xanthorrhizol Isolated from Javanese Turmeric or Temulawak (*Curcuma xanthorrhiza* Roxb.) on Clinical *Candida* Planktonics Growth and Biofilms

Yaya Rukayadi[1,2*], Jae Seok Shim[3], Dongeun Yong[4] and Jae-Kwan Hwang[1,3]

[1]*Dept. of Biotechnology, College of Life Science and Biotechnology, Yonsei University, Korea;*

[2]*Biopharmaca Research Center, Bogor Agricultural University, Indonesia;*

[3]*Dept. of Biomaterials Science and Engineering, Yonsei University, Korea*

[4]*Department of Laboratory Medicine & Research Institute of Bacterial Resistance, Yonsei University, Seoul 120-749, Korea*

*yr32@yahoo.com

ABSTRACT

Candida species are now emerging as the major agents of nosocomial infections. Formations of *Candida* biofilms have important clinical repercussions because of their increased resistance to antifungal therapy and the ability of cells within biofilms to withstand host immune defense. The purpose of this study was to investigate the susceptibility of xanthorrhizol (XTZ) on clinical *Candida* biofilms. The clinical *Candida* isolates were obtained from body fluids, blood, urine, lung and genital of patients (The Research Institute of Bacterial Resistance, College of Medicine, Yonsei University, Korea). *Candida* biofilms were performed in presterilized, polysetyrene, flat-bottom 96-well microtiter plates. XTZ, at various concentrations, was investigated for its effect on biofilms formation and established biofilms of *Candida*. Effect of XTZ on biofilm of *Candida* species were assessed using XTT [2,3 - bis (2-methoxy-4-nitro-5-sulfo-phenyl)-2*H*-tetrazolium-5-carboxanilide] reduction assay for biofilm quantification. For most of the clinical *C. albicans* (n=16), *C. glabrata* (n=12), *C. guilliermondii* (n=2), and *C. parapsilosis* (n=19) strains tested, the biofilm inhibitory concentration (BIC) was 10 30 µg/ml, 8 25 µg/ml, 20 30 µg/ml, and 5 20 µg/ml, respectively, and biofilm eradication concentration (BEC) was 40 100 µg/ml, 40 120 µg/ml, 40 50 µg/ml, and 50 200 µg//ml. BEC values were two to ten times greater than the concentration required to inhibit planktonic growth (MIC). Significant differences ($P<0.05$) in biofilm formation values were observed between groups (different XTZ concentrations). XTZ at concentration of 1× MIC demonstrated a greater effect than those of ½× MIC and ¼× MIC. In the presence of 1× MIC XTZ, the mean biofilm formation values were equal to 28.05%, 27.87%, 26.33% and 28.80% for *C. albicans*, *C. glabrata*, *C. guilliermondii* and *C. parapsilosis*, respectively, compared to that of biofilms in control wells (without XTZ). XTZ displayed potent activity against clinical *Candida* planktonics growth and biofilms *in vitro* and therefore might have potential therapeutic implication for biofilm-associated candidal infections.

Key words: biofilm, *Candida* biofilm, *in vitro*, xanthorrhizol

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