Regulation of Candida CWP-encoding Genes under Influence of Piper betle

N. MOHD-AL-FATSHAL, A.R. FATHEILH, and W.H. HIMRIATUL-AZNITA, Department of Oral Biology, University of Malaya, Kuala Lumpur, Malaysia

Abstract:

Objectives: The study aimed to analyse the transcript levels of cell wall protein (CWP)-encoding genes in Candida species following exposure to P. betle extract.

Methods: Total RNA was extracted from candidal cells grown overnight in Yeast Peptone Dextrose (YPD) and under treatment of P. betle extract at sub-minimal inhibitory concentrations (sub-MICs) of 1, 3 and 6 mg/mL. Specific primers designed for SAP9, SAP10 and HWP1 genes were applied, and reverse transcription-polymerase chain reaction (RT-PCR) was performed to analyse the CWP expressions. The liquid chromatography (LC-MS) was carried out to validate the bioactive components possibly present in the extract.

Results: It was shown that the Sap9, Sap10 and Hwp1 transcript levels were extremely sensitive and responsive to changes in environmental growth conditions. The CWP-encoding genes were highly expressed in normal condition. This reflects the higher level of the yapphi-like proteins and adhesins secretions will contribute to the virulence properties of Candida species. The respective genes were gradually down-regulated with the increased concentration of the extracts, suggesting the suppression effect was concentration dependent. Hydroxybenzoic acid, chavicol and hydroxychavicol were identified in the P. betle extract.

Conclusions: The regulation of SAP9, SAP10 and HWP1 was down-regulated following treatment with P. betle extract, rendering the cells unable to secrete the enzymes and makes them less virulent. This finding could lend support to the extract to be considered as a promising candidate for the development of antifungal agent of natural products.