GROWTH INHIBITORY EFFECT OF PIPER BETLE EXTRACT ON ORAL CANDIDA

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Introduction: Piper betle is a tropical plant belonging to the pepper family. The leaves of P. betle have been reported to possess antimicrobial properties, thus making it widely used as traditional remedy to treat infectious diseases including those occurring in the oral cavity.

Objectives: The study was undertaken to evaluate the antifungal activities of P. betle against oral Candida based on their growth profiles produced following treatment with the extract of P. betle.

Materials and Methods: Crude aqueous extract of P. betle leaves was prepared and stored at 4°C. Seven strains of oral Candida species used in the study were purchased from the American Type Culture Collection (ATCC), USA. The strains were C. albicans ATCC 14053, C. dubliniensis ATCC MYA-2975, C. glabrata ATCC 90030, C. parapsilosis ATCC 22019, C. krusei ATCC14243, C. lusitaniae ATCC64125 and C. tropicalis ATCC 13803. The growth of the Candida was monitored periodically and the changes in the growth turbidity were recorded. Growth curves of each of the strains were plotted and the generation time was determined. The readings obtained were compared to those obtained following treatment of the strains with the P. betle extract.

Results: At concentration of 12.5 mg/mL, which represents the minimal inhibitory concentration (MIC) value of P. betle extract, it was found that P. betle was able to highly suppress the growth of all oral Candida as indicated by the extended lag phase. These suggest fungistic effect of the extract whereby cells become dormant for a period of time before being able to multiply. In addition, P. betle-treated Candida also exhibited reduction in the generation time which involves the time taken for the cells to double. P. betle extract has caused the growth generation time to reduce as much as 80.7% for C. dubliniensis, followed by C. parapsilosis (45.6%), C. albicans (35.8%), C. glabrata (30.1%), C. tropicalis (17.43%), C. lusitaniae (12.95%) and C. krusei (3.14%). In addition, the cells were only able to be in the log phase for a shorter period of time and ended with less population produced. The presence of P. betle aqueous extract is thought to possibly interfere with the normal biological functions and suppress the growth generation time of Candida species.

Conclusion: P. betle exhibited fungistic activity towards oral Candida. The extended lag phase and reduced generation time indicates the ability of P. betle extract to interfere with the normal growth activities of the candidal cells that leads to the inhibition of growth.