Possible antifungal mechanism of bakuchiol and pseudolaric acid B on selected oral candida

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Introduction: Candida albicans and Candida glabrata are regarded as important agents of mucosal and systemic candidiasis. Their virulence factor affects the body's defense mechanism thus, enabling invasion of host tissues.

Objectives: The antifungal activity of bakuchiol (BK) and pseudolaric acid B (PAB) were investigated and data obtained were used to decipher their mode of action in the control of oral candida biofilm.

Methods: Candida cultures both in the planktonic and biofilm forms were subjected to BK and PAB treatment at sub-inhibitory concentration. Following treatment with the active compounds, the growth dynamics of these Candida species was analysed. Its effect on biofilm formation was assessed using a colorimetric technique. RNA of biofilm samples was extracted cDNA synthesis was performed. Real-time PCR was conducted and used to analyse the expression level of Candida proteinases, adhesins and other biofilm-mediating genes.

Results: Results indicated BK and PAB as having the capacity to inhibit the planktonic growth of C. albicans (40-50%), and C. glabrata (< 30%). The BK and PAB-treatment lead to a significant reduction in the specific growth rate of both species and extended the doubling time (p < 0.05) when compared to under untreated condition. BK and PAB also causes significant decrease in biomass production by C. albicans (p < 0.01) while such effect on C. glabrata was only a response to PAB (p < 0.01). Treatment of biofilm had caused a reduction in the expression levels of virulence factors for C. albicans. Most of the SAP and ALS genes were observed downregulated by BK and PAB. In contrast, BK was found to upregulate ERG11 genes of C. glabrata.

Conclusion: Results suggested the antifungal activity of BK and PAB may involve targets such as Saps, Alsl-3 and Epa1. PAB may also be effective in targeting the Erg11, which may lead to an increase of its antifungal susceptibility for C. albicans and C. glabrata.