

The influence of a non-ionic surfactant on the adherence of *Candida albicans* to human buccal epithelial cells

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The initiation of oral candidosis involves adherence of the yeast *Candida albicans* to human buccal epithelial cells (BECs). Antimicrobial agents, such as hexetidine, in the form of an oral rinse can reduce yeast adherence to BECs and may prevent oral infection (Jones *et al* 1997). The successful formulation of a mouth rinse incorporating an antimicrobial agent of limited solubility may require the inclusion of a surfactant, one such non-ionic surfactant being polyoxyethylene sorbitan monooleate (Tween 80). In order to investigate whether the inclusion of surfactant in oral antimicrobial formulations influences yeast-BEC interaction, this study examined the effect of Tween 80 on the *in vitro* adherence of *C. albicans* to BECs.

Stationary phase *C. albicans* suspension was washed and resuspended in sterile phosphate buffered saline (PBS), pH 7.4, to a viability of 1×10^7 cfu/ml. A volume of suspension (10 ml) was added to solutions of Tween 80 in PBS (1.0, 0.1, 0.01 and 0.001% v/v, 10 ml) and to sterile PBS (10 ml) acting as a control. The yeast cells were treated for 10, 30, 60 and 300 seconds, the period of exposure being terminated by centrifugation. The resulting supernatant was decanted and the pellet resuspended to its original 10 ml volume with sterile PBS. BECs from twelve healthy adult volunteers were pooled, washed and resuspended in sterile PBS to a total count of 1×10^5 cells/ml. Using the same surfactant concentrations and treatment times, BEC suspension (2 ml) was then treated with Tween 80 as described above.

For each yeast and BEC treatment, equal volumes (1 ml) of *C. albicans* and BEC suspension were mixed in test tubes and incubated in an orbital incubator (100 oscillations/minute) for 2 hours at 37°C. After this time, samples were taken from each test tube and examined microscopically. A count of candidal cells adherent to 150 BECs was determined for each treatment. The effect of Tween 80 on *C. albicans* adherence was analysed statistically

using Wilcoxon signed rank test, $p < 0.05$ denoting significance.

Treatment of yeast cells with surfactant for each of the times studied led to a significant reduction in adherence to BECs. At treatment times greater than 10 seconds, this reduction in adherence became more pronounced as the concentration of surfactant increased (figure 1). Similarly, surfactant-treatment of BECs was followed by a significant lowering of adherence by yeast cells. However, as Tween 80 concentration increased, the anti-adherent effect of the surfactant, although significant, diminished.

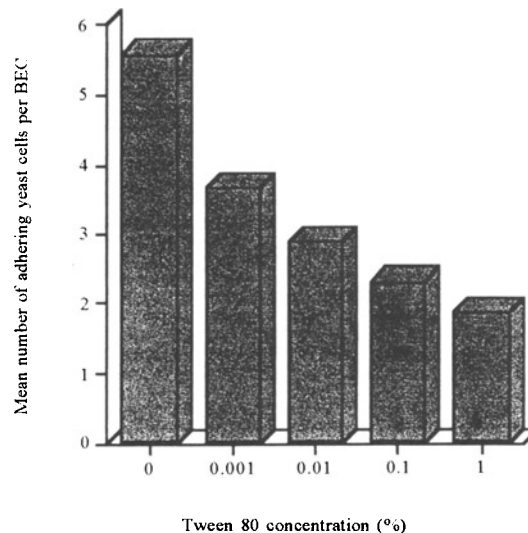


Figure 1. Effect of surfactant treatment (Tween 80, 1 minute) of *C. albicans* on adherence to human BECs

The results of this study have shown that the non-ionic surfactant Tween 80 significantly reduces the interaction between *C. albicans* and human BECs. Furthermore, the possibility exists that inclusion of surfactant in an oral mouth rinse formulation may enhance the anti-adherent behaviour of the antimicrobial agent.

Jones, D.S., McGovern, J.G., Woolfson, A.D., Gorman, S.P. *Pharmaceutical Research* 1997; 14: 1765-1771