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Incorporation of the microencapsulated antimicrobial agent phytoncide into denture base resin (Article)

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Abstract

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Background: This study aimed to fabricate a denture base resin (DBR) containing phytoncide microcapsules (PTMCs) and determine the mechanical properties of the resin and antifungal activity. **Methods:** Fifty-four heat-cured rectangular DBR specimens ($64 \times 10 \times 3.3 \pm 0.2$ mm) containing nine concentrations of PTMC between 0 and 5% (wt/wt) were fabricated and subjected to a three-point bending test. A phytoncide release bioassay was developed using DBR containing 0% and 2.5% PTMCs (wt/wt) in a 24 well-plate assay with incubation of *Porphyromonas gingivalis* at 37 °C for 74 h. The antifungal activity of PTMCs against *Candida albicans*, in a pH 5.5 acidic environment was determined in a plate assay. **Results:** Flexural strength decreased with increasing PTMC concentration from 97.58 ± 4.79 MPa for the DBR alone to 53.66 ± 2.46 MPa for DBR containing 5.0% PTMC. No release of phytoncide from the PTMCs in the DBR was detected at pH 7.4. The PTMCs had a minimal inhibitory concentration of 2.6% (wt/vol) against *C. albicans* at pH 5.5. **Conclusions:** PTMCs can be added to DBR 2.5% (wt/wt) without adversely affecting flexural strength. PTMCs released the antimicrobial agent at pH 5.5 at concentrations sufficient to inhibit the growth of the *C. albicans*. © 2018 Australian Dental Association

Author keywords

[antimicrobial activity](#) [denture base resin](#) [mechanical property](#) [microencapsulation](#) [phytoncide](#)

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