

## **Abstract**

The barnacle, a marine arthropod, adheres tenaciously to underwater substrata by secreting cement. Lauded by past researchers as a prospective dental adhesive due to its mechanical properties and water insolubility, barnacle cement was further examined in this study for its potential in dental applications. The biocompatibility, speed of polymerization, aesthetic appeal and acid-resistance of this cement was investigated. To study acid-resistance, tooth samples coated with barnacle cement were immersed in Coke and visual alterations of barnacle cement on tooth surfaces were observed at 24-hour intervals. The effect of  $\text{Ca}^{2+}$  ions and different electromagnetic radiation (UV and infrared radiation) on cement polymerization time was recorded based on visual and timed assessments of the cement polymerizing on teeth. To study the biocompatibility of barnacle cement, *Caenorhabditis elegans* was exposed to barnacle cement and the mortality rate was recorded after 30min, 1hr, 2hr and 3hr. Barnacle cement did not induce death of *C. elegans* and was observed to blend in with the tooth's natural color. The rate of barnacle cement polymerization, however, was found to be slower as compared to existing adhesives and it did not provide much protection to teeth from acidic conditions. Hence, given current understanding of barnacle cement, we concluded that the applicability of barnacle cement as a dental adhesive is limited. With further research on enhancing acid tolerance and rate of polymerization, barnacle cement could still be a potential dental adhesive.