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# An Antibacterial Dental Restorative Containing 3,4-Dichlorocrotonolactone: Synthesis, Formulation and Evaluation

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**Abstract :** The objective of this study was to synthesize and characterize 5-acryloyloxy-3,4-dichlorocrotonolactone (a furanone derivative), use this derivative to modify a dental restorative, and study the effect of the derivative on the antibacterial activity and compressive strength of the formed restorative. In this study, a furanone derivative was synthesized, characterized, and used to formulate a dental restorative. Compressive strength (CS) and S. mutans viability were used to evaluate the mechanical strength and antibacterial activity of the formed restorative. The fabricated restorative specimens were photocured and conditioned in distilled water at 37oC for 24 h, followed by direct testing for CS or/and incubating with S. mutans for 48 h for antibacterial testing. The results show that the modified dental restorative showed a significant antibacterial activity without substantially decreasing the mechanical strengths. With addition of the antibacterial derivative up to 30%, the restorative kept its original CS nearly unchanged but showed a significant antibacterial activity with 68% reduction in the S. mutans viability. Furthermore, the antibacterial function of the modified restorative was not affected by human saliva. The aging study also indicates that the modified restorative may have a long-lasting antibacterial function. It is concluded that this experimental antibacterial restorative may potentially be developed into a clinically attractive dental filling restorative due to its high mechanical strength and antibacterial function.

**Keywords :** antibacterial, dental restorative, compressive strength, S. mutans viability
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