



# Inhibitory Action of Bioactive Composites on *S. mutans*

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## INTRODUCTION







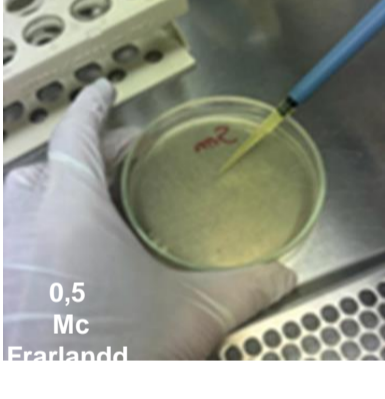
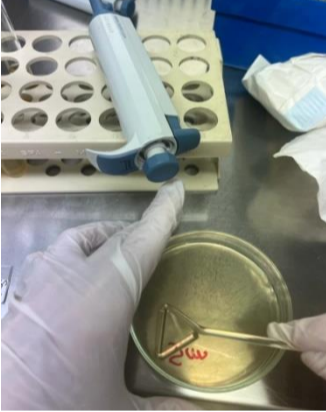

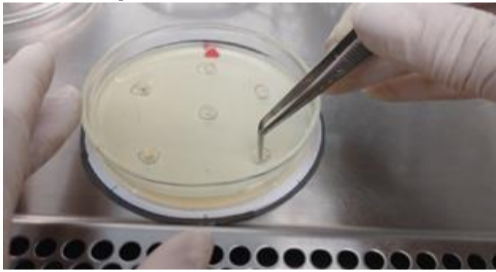
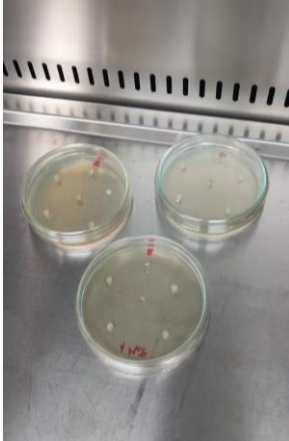


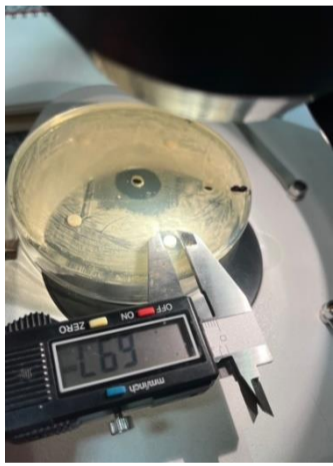
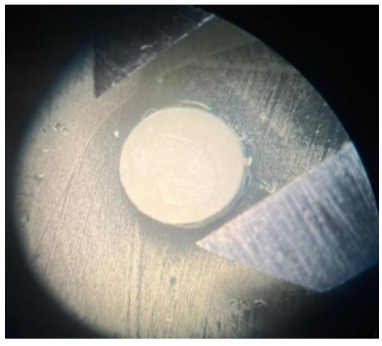
Composites are restorative materials that have evolved in recent years, becoming part of a new group of materials known as bioactive. These materials generate an ionic exchange with the dental structure, promoting remineralization and preventing bacterial microleakage. The objective of this study was to determine the bacterial inhibition of different restorative composites on Streptococcus Mutans Group (SMG).

## MATERIALS AND METHODS

Field strains of *S. mutans* were used, which were isolated at LABOFOUNT and confirmed with ATCC reference strains. The evaluated materials were prepared according to the manufacturer's instructions, following standardized biosafety protocols. The test specimens were fabricated using Teflon molds, following laboratory protocols. The evaluated materials were: nanohybrid composite Filtek Z350 (3M ORAL CARE), nanohybrid composite Filtek Bulkfill (3M ORAL CARE), Alkaside composite N Cention (Ivoclar Vivadent), and ACTIVA Bioactive Restorative composite (Pulpdent).

Two inhibition studies were conducted at different time points, and in both cases, the samples were studied in triplicate. A 50 µl inoculum of *S. mutans* at 0.5 on the McFarland scale was seeded onto SB20M medium, circular wells of 4mm in diameter and 2mm in depth were made for the placement of the composites and controls (negative: 0.12% chlorhexidine digluconate, positive: sterile distilled water). The plates were incubated at 37°C in a candle jar for 48 hours. The inhibition zones were then measured using a digital caliper under a stereoscopic magnifying glass.

## STUDY OF BACTERIAL INHIBITION

- 1. Activation of the *S. mutans* strain**  

- 2. Evaluated materials**  

- 3. Laminar flow to maintain an aseptic environment.**  

- 4. Preparation of test specimens in preformed molds**  
  

- 5. Preparation of the inoculum and seeding at a concentration of 0.5 McFarland. Seeding by spreading**  
  
  

- 6. Preparation of the wells and placement of the samples in triplicate.**  
  
  

- 7. Incubation for 72 hours in a candle jar under facultative anaerobic conditions**  

- 8. Reading and measurement of inhibition zones using a stereoscopic magnifying glass with a digital caliper. The values represent an average of the two studies conducted in triplicate.**  
  
  


## RESULTS

Studies	Negative Control	Positive Control	C.N Cention	C. Filtek Bulk Fill	C. Activa Bioactive	C. Filtek Z350
1	18,2mm	--	6,9mm	--	--	--
2	18,4mm	--	7,11mm	--	--	--

The measurement of the inhibition halos was recorded in a table: Filtek Z350 nanohybrid composite showed no inhibition, Filtek Bulkfill nanohybrid composite showed no inhibition, Alkaside N Cention composite showed inhibition of 7.05 mm, and ACTIVA Bioactive Restorative composite exhibited a discontinuous line with no bacterial growth that could not be measured.

## CONCLUSIONS

Among the materials studied, the composite that inhibited the growth of *S. mutans* was Alkaside N Cention composite. It is suggested to conduct inhibition studies regarding the minimum inhibitory concentration (MIC) and colony-forming units (CFU) count.

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