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Comparative Evaluation of Zinc Oxide Eugenol and Its Combination with Manuka Honey as Obturating Materials in Primary Molars: An *In Vitro* Study

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Abstract

Background: An ideal root canal filling material for primary teeth should be non-irritating, antibacterial, and non-inflammatory while ensuring ease of insertion, adhesion, and dimensional stability.

Objectives: This study evaluates the safety and effectiveness of manuka honey (MH) as an obturating material by comparing zinc oxide eugenol (ZOE) alone versus ZOE with MH in extracted posterior deciduous teeth.

Methods: This prospective *in vitro* comparative study assessed antibacterial properties using the agar well diffusion method, measuring the zone of inhibition and minimum inhibitory concentration and evaluating MH's synergistic antibacterial effect with ZOE. Handling properties, including mixing, setting, and obturation times, were recorded, and radiographic quality was evaluated based on taper, density, and length.

Results: Each group included 15 teeth. The mean zone of inhibition was 20.53±1.18 mm for ZOE alone (Group 1) and 22.07±1.09 mm for ZOE with MH (Group 2) (p=0.0021). The MIC was significantly lower in Group 2 (0.248±0.01 mg/mL) than in Group 1 (0.516±0.034 mg/mL, p<0.05), showing greater antibacterial efficacy. The MIC was reduced by 2.08-fold, confirming a strong synergistic effect. However, Group 1 had shorter setting (22.2±28.73 min) and obturation (4.76±0.22 min) times than Group 2 (28.73±1.28 min, 5.47±0.32 min, p<0.00033). Radiographic quality showed no significant difference (p=0.77).

Conclusions: Incorporating MH into ZOE improves antibacterial properties and reduces infection risk without affecting radiographic quality, making it a promising option for primary tooth obturation.

Keywords: antibacterial efficacy, manuka honey, obturation, pulpectomy, zinc oxide eugenol