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Original Article

# Fabrication and characterisation of novel algin incorporated bioactive-glass 58S calcium-silicate-based root canal sealer

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## KEYWORDS

Biomaterial;  
Endodontics;  
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**Background/purpose:** The usage of bioceramic-based root canal sealers has escalated over the years due to their excellent properties. The present study aimed to fabricate a novel algin incorporated bioactive glass 58S calcium-silicate (Bio-G) sealer and characterise its surface microstructure and chemical compositions in comparison to commercially available bioceramic sealers (BioRoot RCS and iRoot SP).

**Materials and methods:** The powder form of experimental Bio-G sealer consisted of synthesised BG 58S particle, calcium silicate, zirconia dioxide, calcium carbonate and alginic acid powder as binder. The liquid composed of 5% calcium chloride solution. Five standardised disc specimens were prepared for each sealer group according to the manufacturer's instructions. Subsequently, sealer disc-specimens were placed in an incubator at 37 °C, 95% relative humidity for 72 h to allow setting prior to testing under scanning electron microscopy (SEM), energy dispersive X-ray spectroscopy (EDS), Fourier transformed infrared spectroscopy (FTIR) and X-ray diffraction (XRD).

**Results:** Experimental Bio-G sealer revealed irregular micro-sized particles ranging from 0.5 μm to 105 μm aggregated in clusters comparable to those of BioRoot RCS and iRoot SP. EDS microanalysis showed that Bio-G had high content of oxygen, silicon, and calcium, with the presence of

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