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Antiwashout behavior of calcium phosphate cement incorporated with Poly(ethylene glycol) (Conference Paper) [\(Open Access\)](#)

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Abstract

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The effect of powder-to-liquid ratio and addition of poly(ethylene glycol) on the antiwashout behavior of calcium phosphate cement has been investigated. Calcium hydroxide, Ca(OH)₂, and diammonium hydrogen phosphate, (NH₄)₂HPO₄, were used as precursors with distilled water as the solvent in the wet chemical precipitation synthesis of hydroxyapatite powder. Cement paste was prepared by mixing the as-synthesized powder with distilled water at certain ratios, varied at 1.0, 1.3, 1.5 and 1.6. Poly(ethylene glycol) was added into distilled water, varied at 1, 2, 3, 4 and 5 wt% using the powder-to-liquid ratio of 1.3. The antiwashout properties of the cement has been investigated by soaking in Ringer's solution for 3 and 7 days. The evolution of compressive strength of calcium phosphate cement before and after soaking have been determined. After 7 days soaking, the strength of the cement increased by 94.4%, 2.98%, 11.39% and 111.29% for powder-to-liquid ratios 1.0, 1.3, 1.5 and 1.6 respectively. The addition of poly(ethylene glycol) up to 3% shows an increase in strength after 7 days soaking, with 57.75%, 16.4% and 19.97% increase for 1, 2 and 3% poly(ethylene glycol) contents respectively. The calcium phosphate cement produced in this current study shows excellent antiwashout behavior since no cement dissolution happened and the compressive strength of the cement increased with soaking time throughout 7 days soaking in Ringer's solution. © Published under licence by IOP Publishing Ltd.

Indexed keywords

Engineering controlled terms:

Calcium Calcium phosphate Cements Compressive strength Ethylene glycol
 Hydrated lime Hydroxyapatite Lime Liquids Manufacture Polyethylene glycols
 Polyols Precipitation (chemical)

Compendex keywords

As-synthesized powder Calcium phosphate cement Di-ammonium hydrogen phosphate
 Distilled water Hydroxyapatite powder Powder to liquid ratio Ringer's solution
 Wet-chemical precipitation

Engineering main heading:

Strength of materials

Funding details

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