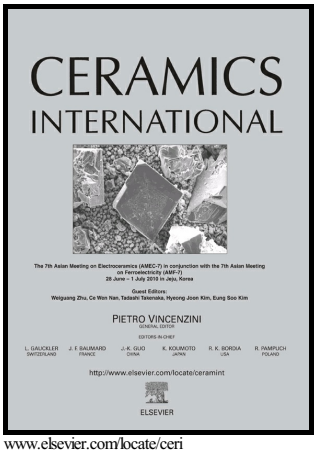


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# Effect of wollastonite and a bioactive glass-ceramic on the *in vitro* bioactivity and compressive strength of a calcium aluminate cement

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**Abstract**

Calcium aluminate cement-wollastonite (CAC-W) and calcium aluminate cement-bioactive glass ceramic (CAC-BGC) systems were developed. The effect of W and BGC contents on mechanical strength, bioactivity and hemolytic behavior of cements was studied. Cements were prepared from mixtures of calcium aluminate (CA) and either W or BGC (0, 5, 7.5 or 10 wt% of W or BGC) using a water/cement ratio (w/c) of 0.4. The *in vitro* bioactivity assessment was performed by immersing samples in a simulated body fluid (SBF) for 1, 7, 14 or 21 days at 36.5 °C. Compressive strength was evaluated before and after each immersion period. In all the cases, the formation of hydroxyapatite (HA) on the samples surface was detected after immersion in SBF. The amount of HA formed increased as the amount of W or BGC was increased. It was found that W increases HA nucleation due to a high quantity of Si-OH groups which act as the main nucleation sites for this phase. On the other hand, the amount of formed HA on the CAC-BGC system is mainly due to the high solubility of the amorphous phase. The compressive strength increased as the amount of W or BGC was increased. Cements containing W showed higher strength than cements containing BGC due to their higher amount of W crystals. In addition, all the cements were not hemolytic. According to the results obtained, these materials are promising candidates for biomedical applications due to their high mechanical strength and bioactivity.

**Keywords:** D Apatite, D Glass ceramics, Calcium aluminate cements, Wollastonite.