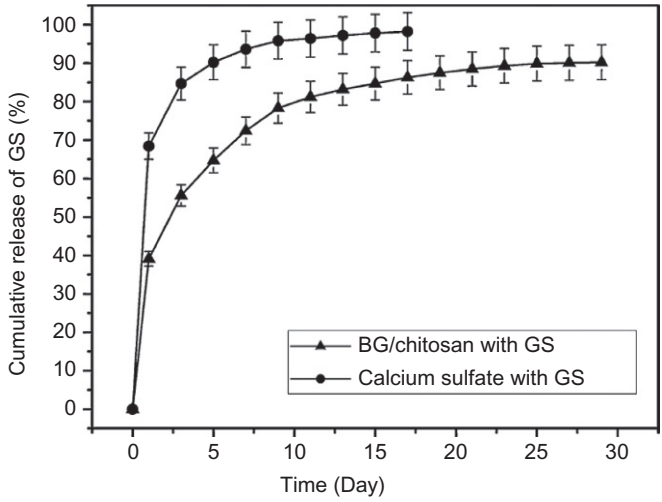

FIG. 5.7 Cumulative amount of gentamycin sulfate released from BG/chitosan composite and calcium sulfate as a function of immersion time in PBS. The amount is shown as a percentage of the total amount of gentamicin sulfate initially loaded into the carrier material (Cui et al., 2013).

monitoring their drug release profiles. The release profiles shown in (Fig. 5.7) confirmed a rapid release of gentamicin sulfate from calcium sulfate, which was attributed to its fast dissolution rate (Cui et al., 2013). In contrast, a sustained release of gentamicin was observed from the borate bioactive glass/chitosan composite, which was ascribed to the presence of chitosan. The free amine groups of chitosan can react with the phosphate ions from PBS to cross-link the chitosan, resulting in a reduced yet more sustained release of the drug. In addition, the dissolution of borate bioactive glass/chitosan composite resulted in the enhanced cell proliferation of alkaline phosphatase activity of osteogenic MC3T3-E1 cells, confirming the cytocompatibility of the composite. Ionic dissolution products of the BG/chitosan composite enhanced the cell proliferation and alkaline phosphatase activity of osteogenic MC3T3-E1 cells.

Magnetic nanoparticles are under investigation due to their potential applications in magnetic resonance imaging, tissue engineering, immunoassay, hyperthermia treatment of cancerous cells, and delivery of therapeutic drugs. Biomagnetic materials can be used to simultaneously treat bone defects caused by tumors, localized drug delivery, and magnetic hyperthermia treatment of tumor. Glass ceramic composed of $ZnO{\cdot}Fe_2O_3{\cdot}B_2O_3$ (20·40·40 mol%) with magnetization saturation (Ms) of about 11 emu/g has been used for the targeted delivery of anticancer drug 5-fluorouracil. Results confirmed a fast release of the drug (48 mg/L) in the first 24 h followed by a relatively slower phase where 78 mg/L of the drug was released after 4 days and then a steady release of 117 mg/L was observed after 30 days. The authors suggested that the oxides of Fe, Zn, or B present in the sample can undergo hydrolysis to form the OH group, which can