ABSTRACT

Hydroxyapatite is a biomaterial that has attracted widespread attention as a drug delivery system because its structure supports drug loading. The loading capacity of HA is strongly influenced by crystallinity, specific surface area, and pore characteristics. The use of surfactants is considered to increase the crystallinity and loading capacity of hydroxyapatite. This research aims to obtain hydroxyapatite with potential loading characteristics and capacity as a drug delivery system. Hydroxyapatite was synthesized using the precipitation method by adding polyethylene glycol surfactant at 1 and 3% w/v. Synthesis is carried out by reacting calcium oxide and phosphoric acid in an alkaline medium, followed by the addition of polyethylene glycol. Methylene blue was used as a model drug in testing the loading capacity of hydroxyapatite. The formation of hydroxyapatite and its crystallinity were analyzed using X-ray diffraction. The adsorption characteristics of hydroxyapatite were tested using the Brunauer-Emmet-Teller method. The results showed that the hydroxyapatite phase formed was observed from the X-ray diffraction pattern. The addition of polyethylene glycol increases the crystallinity of hydroxyapatite and reduces the pore diameter. Hydroxyapatite has an average pore diameter of 50 nm, which categorizes it as a mesoporous material. The loading capacity of hydroxyapatite increased with increasing polyethylene glycol concentration. These findings suggest that the addition of polyethylene glycol enhances the crystallinity and loading capacity of hydroxyapatite, thereby supporting its potential as a drug delivery system.

Keyword : hydroxyapatite, polyethylene glycol, surfactant, drug delivery system