ABSTRACT

Osteoporosis is a bone disorder that results in a decrease in density so that the bones become porous and brittle. Osteoporosis bone density can be increased with hydroxyapatite (HA) based calcium phosphate cement. HA has similarities with bone minerals so it is biocompatible and can form strong bonds with bone. HA has the disadvantage of low mechanical strength. To increase the mechanical strength of HA, it can be composited with biopolymers such as chitosan. Modification of chitosan into chitosan Schiff base compounds causes changes in intramolecular and intermolecular hydrogen bonds so that its interaction with HA will change. In this study, HA was composited with chitosan-benzaldehyde Schiff base (BSK-B) and the effect of variation in BSK-B content on the characteristics of HA/BSK-B composite was studied. The effect of varying BSK-B content on the mechanical strength of HA/BSK-B composites did not show a linear or fluctuating trend. The compressive strength and strain of the composites were in the range of 0.87-2.07 MPa and 1.52-2.58 mm/mm. The greatest compressive strength was obtained in the 2.5% HA/BSK-B sample which amounted to 2.07 MPa, while the greatest strain was obtained in the 12.5% HA/BSK-B sample which was 2.58 mm/mm. In the HA/BSK-B composite, there was a shift in the peak of the C=N group at a wave number of 1620 cm-1 and the XRD peak according to JCPDS-01-089-4405 with a slight shift in the 2θ value compared to the HA peak. The 12.5% HA/BSK-B particles look irregular and the surface is uneven. The average crystallite size of HA/BSK-B 12.5% (29.67 nm) is larger than the average crystallite size of HA (24.59 nm). The composition of HA/BSK-B consists of Ca (31.98%), O (51.93%), P (11.40%), N (4.68%), and C (0.02%). The Ca/P ratio was found to be 2.81, the Ca/O ratio was 0.62, and the surface was abundant with Ca and O. The results obtained show that the variation of BSK-B content has an influence on the characteristics of HA/BSK-B composites including mechanical strength, crystallinity, and surface morphology.

Keywords: *Schiff base, hydroxyapatite, chitosan, calcium phosphate cement*