Upsorn Boonyang 2010: Productions of the Hydroxyapatite from Calcium Based Natural Sources and Their Application as Drug Delivery. Doctor of Philosophy (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Sutatip Siripaisarnpipat, Ph.D. 130 pages.

The crocodile bone powder was successfully converted into hydroxyapatite by thermal process. The XRD and FTIR spectra support the type B hydroxyapatite. High purity hydroxyapatites (HAp) were synthesized from coral (*Acropora Formosa*), freshwater shell (*Hyriopsis myersiana*) and crocodile eggshell by hydrothermal process. The *in vitro* bioactivity study in simulated body fluid (SBF) at 37 °C reveals that the bone hydroxyapatite is less bioactive than the hydroxyapatite from calcium based natural source. The size and shape of drug molecule and pore size of hydroxyapatite affect the amount of drug loading in the hydroxyapatite. Thus, percentage drug loading of vancomycin whose structure is large and bulky is less than that of tetracycline. The release profiles for both drugs show that the release behavior consists of two stages: the initial step was fast release, followed by a relatively slow release.

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