



## Calcium Phosphate Ceramic Tablets for Studying De- and Remineralization Processes

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Calcium orthophosphates are of particular interest among the other phosphorus inorganic compounds because calcium orthophosphates are the mineral basis of the bone tissues. The latest requirements not to test new materials on living organisms pose a challenge to finding suitable artificial substitutes.

In this work, the possibility of using ceramic tablets based on hydroxyapatite (HA), which represent an approximate model for studying biomimetic processes in an environment free of biological macromolecules, was investigated.

Poorly crystalline carbonate apatite powder was obtained via wet precipitation method from 1M solution of  $\text{Ca}(\text{NO}_3)_2$  and 0.6M solution of  $(\text{NH}_4)_2\text{HPO}_4$  at a Ca/P ratio of 1.67 and pH 12 (keeping with  $\text{NH}_4\text{OH}$ ). The resulting precipitate was matured for 24 h, centrifuged, washed and dried at 90°C for 15 h. Tablets with a diameter of 13 mm and a height of 2.2 mm were prepared at a pressure of 6.5 t for 1 min and sintered at 1000°C for 1 h. The degradation ability of the tablets was tested by immersion in a 0.1% solution of lactic acid containing 2.2 mM  $\text{CaCl}_2$  and 2.2 mM  $\text{NaH}_2\text{PO}_4$  for different duration. Lactic acid was chosen as demineralized agent because it was produced by the bacteria in the oral cavity and participates in the dental biofilm causing caries. Remineralization was examined in the presence of artificial saliva after biostimulating of the tablet surface with polycarboxybetaine. XRD, SEM and EDX analysis of all samples were performed and obtained results were discussed.

**Keywords:** hydroxyapatite, ceramic tablets, demineralization, remineralization

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