

Development of raw silk fabric with antibacterial activity and biocompatibility

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Raw silk can be doped with metal element such as Ca and Zn due to high affinity of sericin, outer layer of the raw silk. Thus, raw silk doped with metal element is expected to show various functions favorable as biomaterials. In this study, we investigated to apatite-forming ability in simulated body fluid (SBF) and antibacterial activity against *Escherichia coli* of metal-doped raw silk fabric. The samples were prepared by soaking in the aqueous solution containing Ca, Cu or Zn ion. Cu-doped and Zn-doped raw silk fabric showed antibacterial activity, suggesting antibacterial agents of Cu and Zn released from the samples killed the bacteria. On the other hand, Ca-doped raw silk fabric showed both apatite-forming ability and antibacterial activity. The apatite formation on fabric is might be because Ca ion released from the sample increased a degree of supersaturation of SBF to respect with apatite and accelerate the apatite formation. Also, it is considered that release of Ca ion causes pH increase locally and the bacteria hardly survive at the sample surface. Therefore, Ca-doped, Cu-doped and Zn-doped raw silk fabric are useful as antibacterial biomaterials. Further, Ca-doped raw silk fabric has potential to bond to living bone.