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Nano-composite of silk fibroin-chitosan/nano diopside for tissue engineering applications: Fabrication and morphology

Abbas Teimouri[1], **L Ghorbanian**[2] and **Alireza Najafi Chermahini**[2]
[1]Payame Noor University, Iran
[2]Isfahan University of Technology, Iran

Tissue engineering uses a scaffold inhabited with signifying molecules and cells to encourage the regeneration of host tissue. Silk fibroin (SF) has attracted important interest in the generation of new materials, because SF is a biocompatible and biodegradable natural polymer with excellent mechanical properties and high chemical reactivity. Chitosan (CS) is a deacetylated product of chitin that can be extracted from crustaceans. Due to its excellent bioactivity and degradability, diopside has been proposed as a potential material for the bone tissue regeneration. In continuation of our recent study on the construction of composite scaffolds, in the present study, Silk (SF), Chitosan (CS) and Nano Diopside were all combined using the freeze drying technique to fabricate a bio-composite scaffold. The composite scaffold (SF/CS/ Nano Diopside) was characterized by SEM, XRD, TGA, BET and FT-IR studies. The scaffold possessed a porous nature with pore dimensions suitable for cell infiltration and colonization. The presence of Diopside in the SF/CS/ Nano Diopside scaffold increased compressive strength and water uptake capacity and decreased porosity. Cytocompatibility of the SF/CS/ Nano Diopside scaffold was assessed by MTT assay revealed non-toxicity to the Human Gingival Fibroblast (HGF, NCBI: C-131(Thus, we suggest that SF/CS/N Nano Diopside composite scaffold is a potential candidate to be used for tissue engineering.

a_teimoory@yahoo.com

Antibacterial activity of Sri Lankan tea samples against MRSA, *E. coli* and *Mycobacterium smegmatis*

P D Abeysinghe[1], **William McCully**[2], **L Baillie**[2] and **A White**[2]
[1]University of Ruhuna, Sri Lanka
[2]Cardiff University, UK

Tea is one of the most important industries which contribute to the gross national product (GNP) of Sri Lanka. In order to investigate the one of the health effects of drinking Sri Lankan black and green tea, antimicrobial activity of Gram (+) Methicillin-resistant Staphylococcus aureus (MRSA) and Gram (−) Escherichia coli, and Gram (−) acid fast bacterium Mycobacterium smegmatis was carried out using tea infusions as well as polar and non polar fractions. Out of the tea samples tested green tea showed the higher antibacterial activity for both MRSA and M. smegmatis on agar plates incorporated with different dilutions on tea infusions. However, none of the infusions showed antibacterial activity against E. coli. Followed by green tea, oolong and black tea samples also showed considerable antibacterial activity against both MRSA and M. smegmatis. Polar and non-polar (hexane, pet-ether, diethyl ether, ethyl acetate and methanol) sequential Soxhlet crude extracts of selected black and green tea samples were separated on Thin Layer chromatographic (TLC) plates using different solvent systems. Antibacterial activities of the separated chemicals were tested on the TLC plates which were covered with MRSA and M. smegmatis suspensions separately. Bio-autography was carried out using p-iodonitrotetrazolium on TLC plates and observed antibacterial activities for both species. This study showed that Sri Lankan black and green tea have antibacterial effect on Gram (+) MRSA and Gram (−) acid fast bacterium M. smegmatis. As a future prospective, active compound/s is being isolated and structure determination is carried out.

pushpa@bot.ruh.ac.lk