Novel Membrane for Wound Dressing Applications

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Available wound dressings in market continue to have defects such as adhesion to the wound, lack of aeration, lack of moisture and penetration of water, which aggravate the wound rather than heal it. And the types that resolve these problems and have antimicrobial activity involve using extremely expensive and non-natural materials. Therefore, we decided to manufacture a cheap and bio-compatible hydrogel membrane that solves the defects mentioned and has anti-microbial activity to prevent bacterial infection. So, we started from the latest research in this field that used chitosan and PVA and we worked to improve it. So, in this research: • PVA is used as an agent because it is flexible, excellent in film formation, non-adherent and is fully biodegradable. • aminated chitosan is used. Chitosan is a recycled material from shrimp shells. Amine groups are added to chitosan for better elimination of bacteria beside its unique properties such as coagulation enhancing, non-toxic biodegradability, low cost and commercial availability. • cedarwood essential oil is used to kill pain. In addition, it has an antiseptic effect, anti-fungal effect and antimicrobial effect; and prevents skin damage. • different properties like aeration and moisture are provided by making our bandage hydrogel by using the freeze thawing method. Tests have been conducted on cotton gauze, PVA\chitosan, PVA\AmCh and PVA\AmCh\cedar. We conducted three tests (antimicrobial test which showed increasing in the efficiency by 147.05%, VIVO test on rats which showed increasing in wound closure percentage by 100% and histological test).   From the results we can confirm that the new membrane shows the best dressing properties with low-cost, non-toxic and recycled components.

Awards Won:

Raytheon Technologies Corporation: Each winning project will receive $3,000 in shares of UTC common stock.