

## ABSTRACT

Keratin was found to be a promising alternative material as biomaterial due to several advantages such as supporting cell attachment, fibroblast growth, and naturally abundance. Unfortunately, keratin also have fragile and poor mechanical properties that limits its usage. On the other hand, low methoxyl pectin is widely known as a gelling agent and can be formed into hydrogel by addition of divalent cation but resulted in a weak hydrogel. While, silver nanoparticle has been widely known as antibacterial agent to overcome antibacterial resistance cases. Thus, in this study the combination of keratin and pectin as well as silver nanoparticle was fabricated by addition of calcium chloride that would have a good physicochemical and antibacterial activity. The hydrogel will be fabricated in 2 concentration which were 2% and 4% total polymer with 3 different ratios; 1:1, 1:2, and 2:1. Shindai's method will be used in human hair extraction then followed with determination of molecular weight using SDS-PAGE, protein and thiol content using BCA assay and Ellman assay, respectively. Hydrogel then fabricated by the addition of calcium chloride and measured its swelling and erosion index, antimicrobial activity using Kirby- Bauer method, and drug release studies. Statistical analysis was done to calculate the data significance. It is shown from the result that keratin and pectin hydrogel possessed good mechanical properties compare to the material on its own. Higher incorporation of keratin resulted in lower swelling index and higher erosion index due to lower number of hydrophilic functional groups. In antimicrobial activity, pectin keratin hydrogel will have a better antibacterial activity compared to pectin alone, with the higher amount of keratin resulted in better antibacterial activity. While, the inclusion of silver nanoparticle didn't show any trend due to factors that might interfere with swelling, erosion index, and antibacterial activity. Lastly, the increase of concentration of pectin in drug release of silver nanoparticle resulted in a higher cumulative release. While, in combination of keratin, total cumulative release of hydrogel will be higher with higher amount of keratin responsible to the highest cumulative release. Therefore, the fabrication of keratin and pectin hydrogel exhibited good mechanical properties for wound healing application.