

## ABSTRACT

The main purpose of 3D in vitro models is to impersonate the complexity of real tissue organs. An organoid is a 3D micro-physiological system that can capture the structural and functional characteristics of real organs. Organoid 3D culture is usually cultured from pluripotent stem cells, organ or tissue fragments which are often cultured in hydrogels. The composite of hydrogels has been found to produce an optimal extracellular matrix (ECM) that can support tissue and organ development. Their hydrophilic nature and their crossed-linked polymer networks take after the hydrated nature of native ECM (Zhao et al., 2020). Hydrogels made up of polymers combined with other materials have been found to improve the mechanical strength of the polymer and its biocompatibility. The compatibility of these materials needs to be tested on cells. There have been various methods in producing a three-dimensional (3D) environment for cells, however hydrogel-based polymer via ionic gelation is one of the most simple and common methods in forming a non-toxic polymer that can serve as a 3D environment for cells. This study aims to test the compatibility of hydrogel-based polymer made up of keratin which is integrated with another polymer; pectin. These hydrogels will produce a 3D environment for keratinocyte cells (HaCaT fibroblast cells (NIH/3T3)). The histology and viability of the cells would be analyzed. The morphology and viability of the cells will determine the quality of the hydrogel when it interacts with fibroblast cells.

**Keywords:** Hydrogels, Pectin, Keratin-based hydrogels, Cell cytocompatibility, Cell histology.