

## **Abstract**

**Subject:** The cytocompatibility and hemocompatibility evaluation of Arabic gum/Gelatin hydrogel

**Introduction:** Hydrogels are three-dimensional structures with high water content. The hydrophilic nature of hydrogels has led to their widespread use in the field of medicine and drug delivery. In this study, natural polymers of gelatin and gum arabic were used for the synthesis of hydrogels. Also, Fe<sup>3+</sup> was used as a cross-linking agent in the hydrogel structure. In the following, due to the importance of biocompatibility of hydrogels in therapeutic applications such as wound healing, after the synthesis of hydrogels, their practical and important properties were evaluated.

**Methods:** In this research, two types of hydrogels with different concentrations of Fe<sup>3+</sup> were made and then the hydrogels were evaluated in terms of gelation time, initial water content, swelling capacity, gel content and water retention ability. Next, the optimal concentration of Fe<sup>3+</sup> was selected. In the next step, the self-healing property of the hydrogel was observed macroscopically. Then, cytotoxicity tests (MTT test) were performed to investigate the toxicity effects of hydrogels and hemolysis test to determine their blood biocompatibility in laboratory conditions.

**Results:** The results of this research showed that the physicochemical properties of hydrogels can be easily changed by changing the Fe<sup>3+</sup> concentration. The results obtained from the evaluation of the self-healing property of hydrogels showed that the cut parts of the hydrogel were completely repaired after a few minutes of contact at their interface. Also, in all hydrogel concentrations, cell viability was shown to be more than 70%, so gum arabic/gelatin based hydrogels have low cytotoxicity and can be considered as biocompatible materials. The results of the hemolysis test also indicated very low hemotoxicity of hydrogels synthesized from gum arabic and gelatin.

**Conclusion:** The above results show that hydrogels synthesized from natural polymers have high biocompatibility and low toxicity, so they can be used as a suitable option for application in the fields of medicine and drug delivery.

**Keywords:** Arabic gum, Cytotoxicity/hematology, Gelatin, Hydrogel