

## Synthesis and characterization of polyurethane/gelatin bio adhesive for hemostat after angiography

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### ABSTRACT

In order to stop bleeding after angiography, tissue adhesives have received more attention compared to different kinds of sutures. Both polyurethane and gelatin possess the long history of being tissue adhesives. In the present work, a bio-adhesive based on polyurethane and gelatin has been prepared and evaluated. To this end, firstly polyurethane was synthesized, and then blended polyurethane/gelatin samples with varying blend ratios were prepared. Then, synthesized polyurethane and blended bio-adhesives were characterized using many techniques. According to the experimental results, blended sample with 50:50 volume ratio possesses minimum curing time (around 10 min), least gelatin solubility which is reduced 5 level in 50-50 volume ratio blended bio-adhesive in comparison with pure gelatin. Moreover, this specimen reveals appropriate amount of bulk (water absorption about 105%) and also acceptable level of cell viability. According to the experimental findings, it can be concluded that blended polyurethane/gelatin with 50:50 blend ratio merges the benefits of both polymeric fractions and have the potential to be a bio-adhesive to prohibit bleeding after angiography.

**Keywords:** Angiography, Bio-adhesive, Polyurethane, Gelatin, Blending

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### 1. INTRODUCTION

Angiography is one of the most important ways to diagnosis cardio-vascular diseases. The point is to achieve hemostasis after angiography at the wound site. Traditional method for achieving hemostasis after catheter removal is to perform a manual hold by using gauze and occlusive pressure at the wound site by 3-5 kg sand bags for 4-6 hours [1]. However, this makes patients so displeased because of not moving for some hours, so the patients face muscle-skeleton diseases [2]. So, there must be other ways to stop

bleeding other than using sand bags like fastening sutures by absorbable or non-absorbable staples or bio-adhesives. Hemostatic agents like bio-adhesives are more comfortable and useful way due to their benefits like less pain, easy synthesis, no damages on the surrounding tissues and no remaining scars. There are three main classes of bio-adhesive named natural, synthesis and biomimetic bio-adhesives [1-2]. This article will describe a blended biopolymer bio-adhesive which consists of two main synthetic and natural polymers like castor oil polyurethane (COPU)