



## Obtaining of a hydrogel gel dressing of PVP with nanosilver for deep and complex wounds

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### Introduction

Chronic and some acute wounds of difficult treatment that challenge medical and nursing teams are classificadas como Complex wound (Ferreira et al., 2006). Due to the long cicatrization time and successive relapses, cause a problem social on patients' lives and economic a major impact on the health system (Azoubel et al., 2017).

Throughout the world there has been a growing interest in the use of hydrogels for application as dressings in view that they are able to maintain the humidity of the wound, favoring the epithelialization of lesions and favoring the relief of pain.

On the other hand, silver is an agent that has been used since ancient times, but it has been replaced after the discovery of antibiotics. However, with the advent of bacterial resistance to antibiotics and the development of nanotechnology, it has regained notoriety, since the clinical incidence of silver resistance remains low (Chopra, 2007). In addition to its bactericidal properties, silver nanoparticles (AgNPs) also have anti-inflammatory properties, which, allied to hydrogels' advantages of maintaining moisture in the wound, represent a great advantage for use as a dressing. However, conventional dressings do not address the need for direct contact with the wound when this is a deep wound.

The objective of this work was to obtain a hydrogel gel with silver nanoparticles for wound dressing, synthesized *in situ* by using ionizing radiation for gelation (crosslinking of PVP-Ag<sup>+</sup> aqueous solution), synthesis of the AgNPs and simultaneous sterilization of the final product, able to fill the cavity of deep wounds, thus allowing the direct contact of the dressing with the lesioned walls.

### Methodology

The gel was prepared from the mixture of PVP with plasticizers, water, and silver ions; next, the mixture was irradiated / sterilized by gamma-irradiation from a 60-Co source at a dose of 20 kGy.

### Results

The result of this work is a viscous and transparent gel (Fig. 1), easy to be applied, able to control pain since it reduces the local temperature due to evaporation of water.



**Fig. 1** - Hydrogel gel of PVP with silver nanoparticles for wound dressing.

The studies are being continued with the aim of evaluating its stability and bactericidal activity.

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