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Data concerning the protein absorption and retention properties of xyloglucan-based hydrogel film

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ABSTRACT

In wound dressing applications, exudate absorption and retention are important properties. The data presented here assess the ability of the crosslinked xyloglucan-poly(vinyl alcohol) hydrogel films (XG-PVA), described in “Xyloglucan-based hydrogel films for wound dressing: Structure-property relationships” (Ajovalasit et al., 2018) [1] and “Biocompatibility, hemocompatibility and antimicrobial properties of xyloglucan-based hydrogel film for wound healing application” (Picone et al., 2019), to absorb and retain proteins. These properties were investigated by Comassie blue staining and electrophoresis of Fetal Serum Proteins.

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Specifications table

Subject area	Chemical Engineering; Chemistry; Biology
More specific subject area	Biomaterials
Type of data	Figures
How data were acquired	Gel electrophoresis; Proteins staining; Densitometric analysis
Data format	Raw, analyzed
Experimental factors	XG-PVA samples were incubated 24 hours with fetal bovine serum (FBS)
Experimental features	XG-PVA films were tested for their ability in absorbing and retaining FBS proteins.
Data source location	Palermo (Italy)
Data accessibility	Data are provided with this article
Related research article	P. Picone, M.A. Sabatino, A. Ajovalasit, D. Giacomazza, C. Dispenza, M. Di Carlo, Biocompatibility, hemocompatibility and antimicrobial properties of Xyloglucan-based hydrogel film for wound healing application, <i>International Journal of Biological Macromolecules</i> , 121 (2019) 784–795 [2].

Value of the data

- The protein absorption capacity of a biomaterial is relevant to assess the host-biomaterial interaction.
- The Comassie staining test is a simple and rapid experiment to determine the protein absorption and retention ability of a biomaterial.
- The presented data can help to evaluate new biomaterials for wound dressing.

1. Data

To evaluate the XG-PVA hydrogel film ability to absorb and retain the serum proteins, two *in vitro* assays were performed. As a first step, XG-PVA films, incubated or not with Fetal Bovine Serum (FBS), were stained with Comassie brilliant blue R-250. FBS protein absorption is evidenced by the intense blue staining of the XG-PVA film (Fig. 1).

Moreover, the protein retaining film ability was demonstrated by electrophoresis analysis. Two pieces of the XG-PVA film were incubated in FBS solution. Then, one of two was washed in PBS (Fig. 2) and the loaded and retained proteins were resolved by SDS-PAGE. In Fig. 3, the electrophoretic pathways of the two samples are shown. The most intense band corresponds to the molecular weight

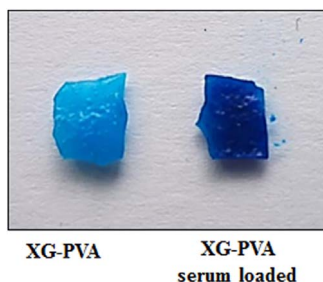


Fig. 1. XG-PVA film absorbs serum proteins. Comassie brilliant blue staining of the XG-PVA film incubated (XG-PVA serum loaded) or not (XG-PVA) with FBS.

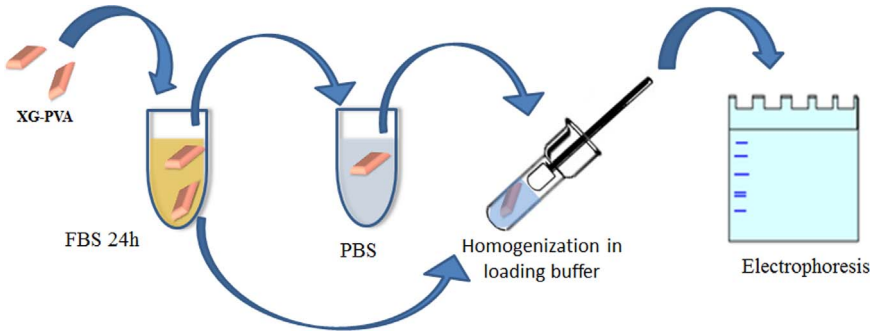


Fig. 2. Schematic representation of the experimental procedure to analyze the XG-PVA film proteins retention.

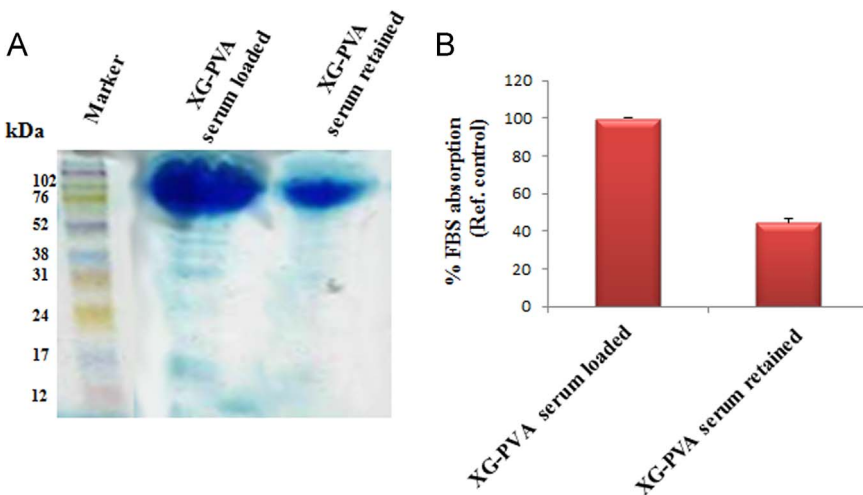


Fig. 3. XG-PVA film retains serum proteins. (A) Electrophoretic pathway of FBS proteins loaded in the film (XG-PVA serum loaded) and retained after washing with PBS (XG-PVA serum retained). (B) Histogram relative to the densitometric analysis of the serum proteins.

of albumin. Densitometric analysis indicates that about 50% of the serum proteins has been retained in the XG-PVA film after washing.

2. Experimental design, materials and methods

2.1. Serum absorption assay

XG-PVA film was soaked or not in FBS for 24 h. Successively, the samples were stained with Coomassie brilliant blue R-250 (0.1% Coomassie Brilliant Blue R-250, 50% methanol and 10% glacial acetic acid) for 24 h. Then, the XG-PVA films were incubated in the destaining solution (40% methanol and 10% glacial acetic acid) for 96 h.

2.2. Serum retention assay

Two pieces of the same size of XG-PVA film were soaked in FBS for 24 h. After incubation, one piece of the film was stored (control) and the other piece was placed in a paper filter funnel and washed three times with PBS. Both the samples were dissolved in the loading buffer (0.25 M Tris-HCl,

pH 6.8, 0.5 M; DTT 10%; SDS 50%; Glycerol 0.5%; Bromophenol blue 1.0%) and homogenates by potter tissue homogenizer. Successively the samples were incubated at 95 °C and resolved by 10% SDS-PAGE gel. The protein pattern was visualized by staining with Coomassie brilliant blue R-250 and successive destaining as described above. Band intensities were analyzed with a gel documentation system (BioRad) and the protein levels were expressed as densitometric values and percentage of the control.

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Transparency document. Supporting information

Transparency document associated with this article can be found in the online version at <https://doi.org/10.1016/j.dib.2018.11.035>.

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- [2] P. Picone, M.A. Sabatino, A. Ajovalasit, D. Giacomazza, C. Dispenza, M. Di Carlo, Biocompatibility, hemocompatibility and antimicrobial properties of xyloglucan-based hydrogel film for wound healing application, *Int. J. Biol. Macromol.* 121 (2019) 784–795.