

# Chromophore modified dextran: synthesize and applications in characterizing ultrafiltration membrane

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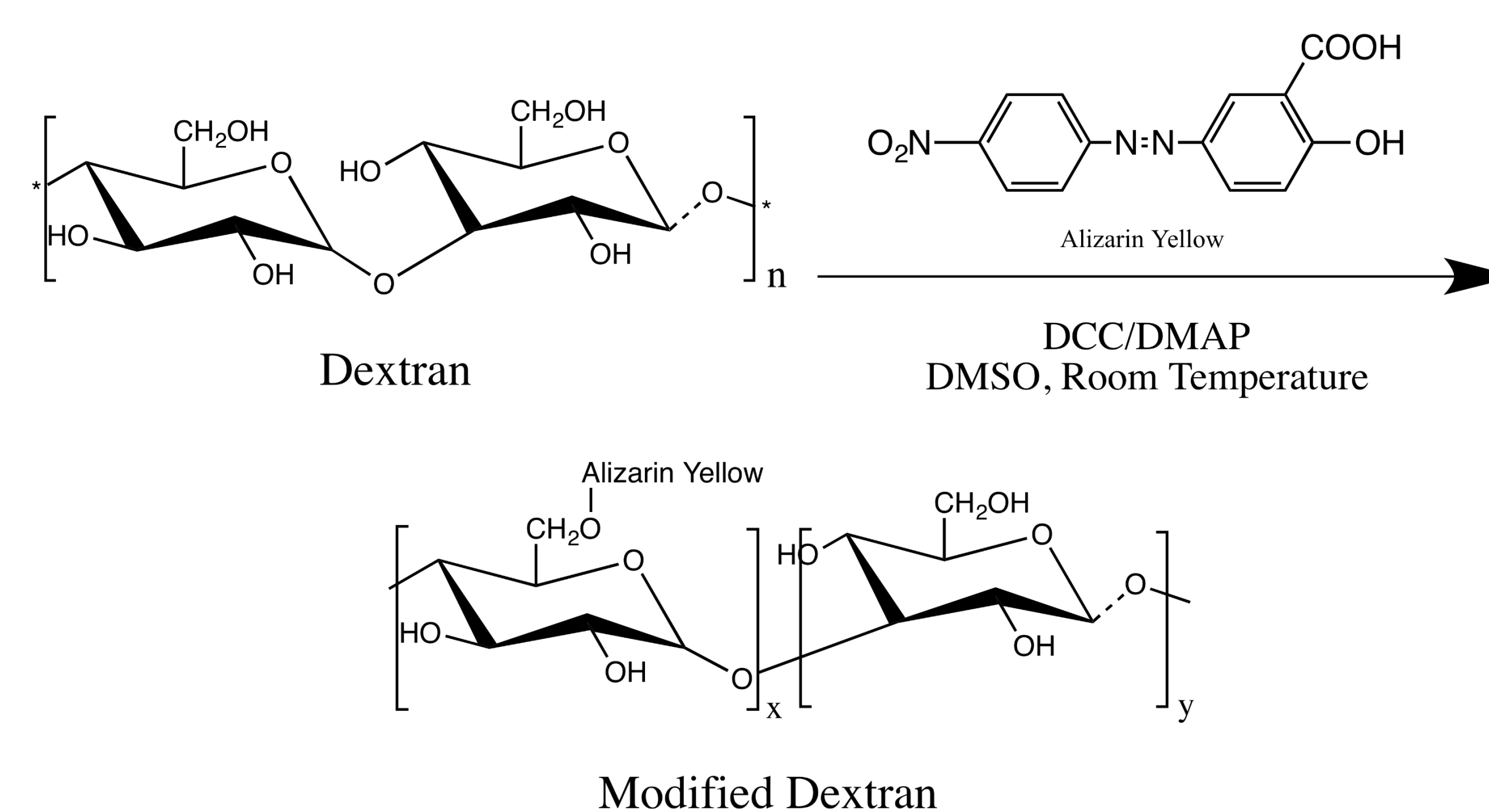


## Introduction

As one of the most important purification processes, ultrafiltration (UF) has been widely used in many modern industrial applications. Compared with the traditional purification methods, ultrafiltration process is energy-saving and. Among several characters of UF membrane, separation performance is the key in membrane selection. Benefit from several unique properties, dextran retention tests have been widely used to evaluate the ultrafiltration membranes for several decades. However, the gel permeation chromatography (GPC) is the only way to characterize the pristine dextran solution which is complicate and restricted in usage.

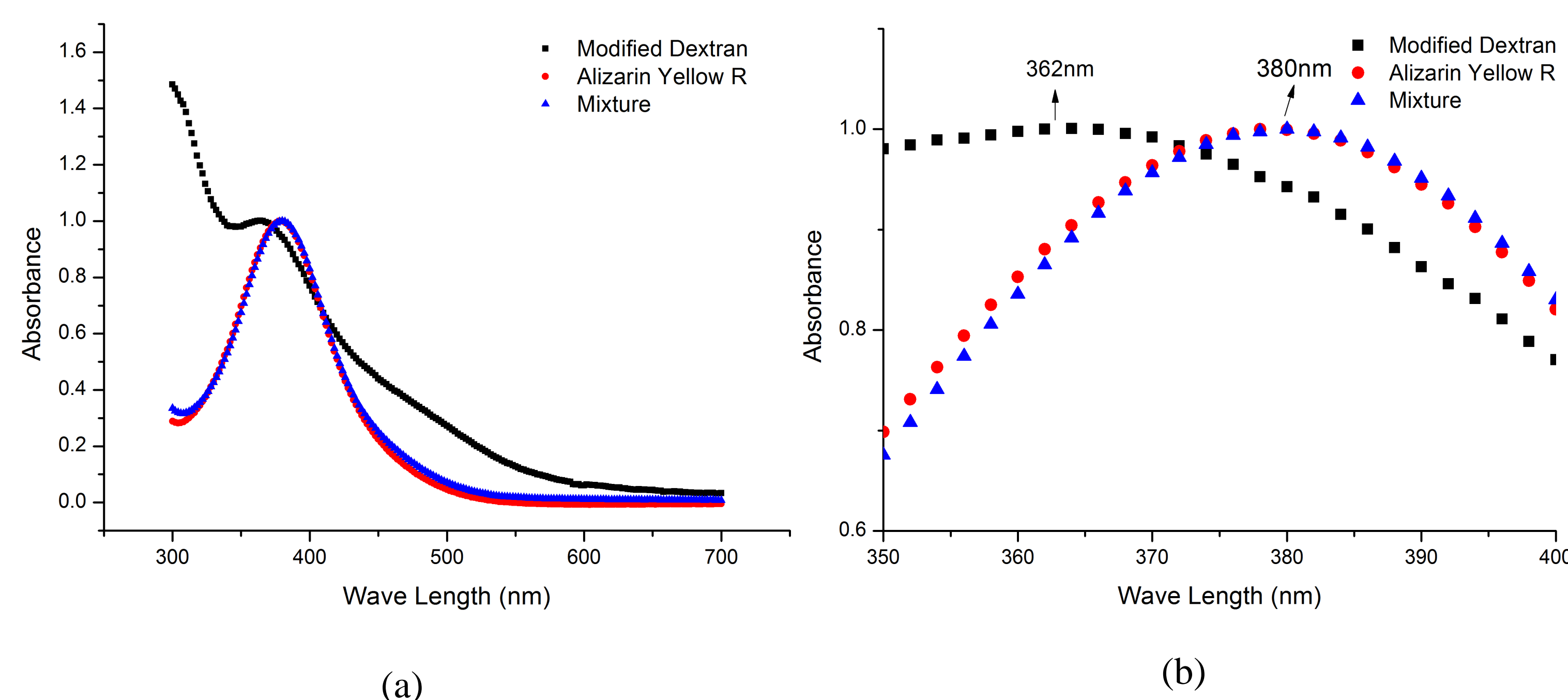
In this article, we present a novel alizarin yellow functionalized dextran synthesized via esterification reaction. The conjugated alizarin yellow group makes the dextran detectable using Ultraviolet-visible (UV-Vis) spectrum. This unique property of modified dextran will simplify the method to characterize the membrane sieving property and eliminate the affection of extracted membrane additives.

## Experimental Method



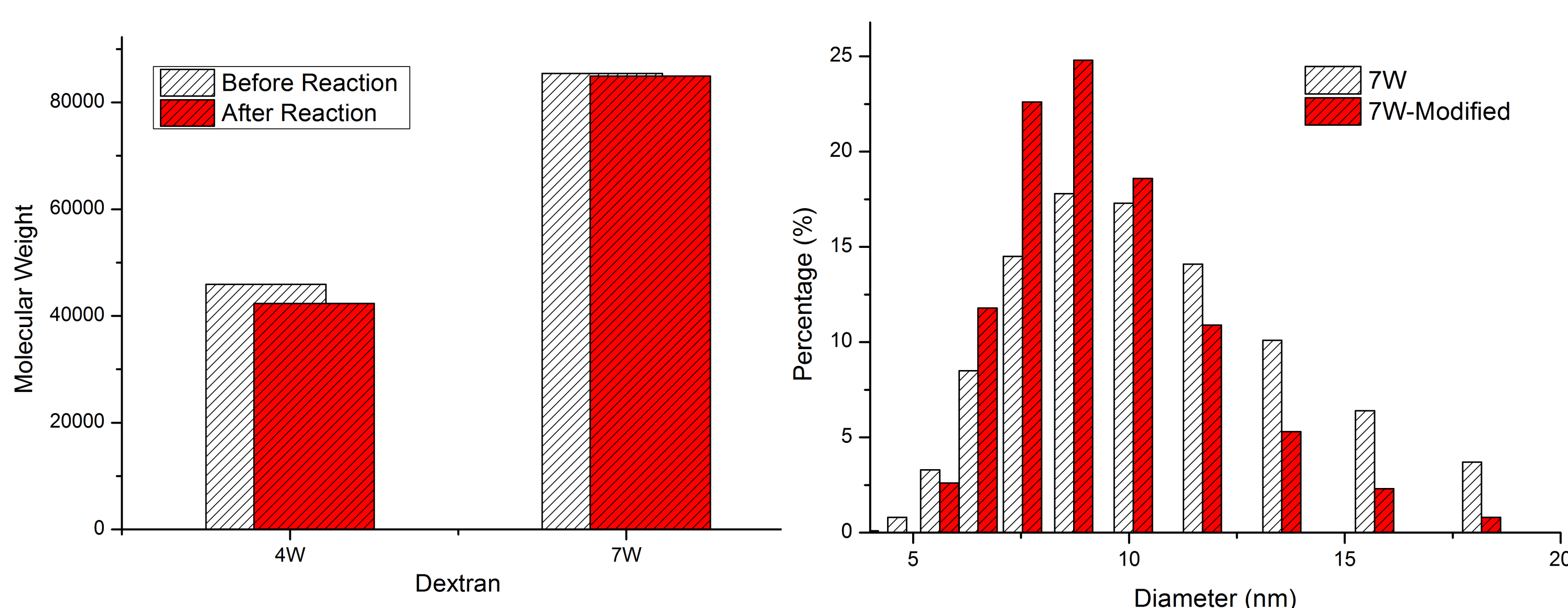
## Results and Discussions

### 1. Immobilization of chromophore



**Figure 1.** The absorbance of modified dextran, alizarin yellow R and the mixture of dextran with alizarin yellow R, (a) 300nm - 700nm; (b) 350nm -400nm

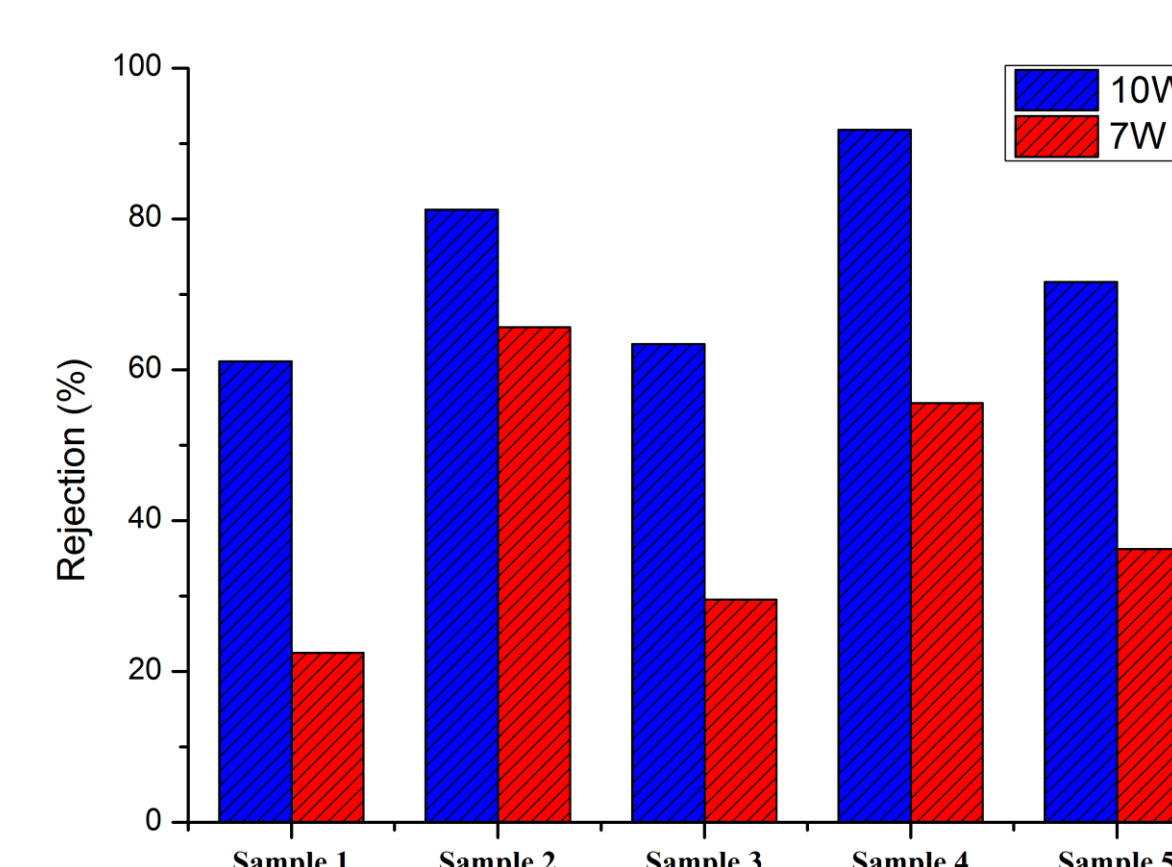
### 2. Characterization of the modified dextran



**Figure 2.** The molecular weight of dextran before (gradient) and after (red) the reaction

**Figure 3.** Hydrodynamic diameter of dextran (Mw=7W) before (gradient) and after reaction (red)

### 3. Rejection test



**Figure 4.** Rejection test for five commercialized UF membranes using modified dextran

## Conclusion

Chromophore modified dextran is an ideal standard to characterize the sieving performance of ultrafiltration membrane. It can be easily prepared via esterification reaction in the presence of DCC and DMAP without changing the physical properties of dextran significantly. The introduction of chromophore makes the dextran detectable using UV-Vis spectrophotometer which simplify the characterization method of dextran. Furthermore, the chromophore presents only on the dextran molecules which means the result not be distributed by other factors.

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