PROTEIN DETECTION THROUGH HYBRIDS OF METALLIC AND SINGLE CHAIN POLYMERIC NANOPARTICLES

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INTRODUCTION

Single-chain polymeric nanoparticles are artificial folded soft nano-objects of a very small size which have recently gained importance in nanoscience and nanotechnology due to their exceptional and sometimes unique properties (1). Single-chain nanoparticles (SCNPs) can be prepared starting from a linear polymer chain through intrachain folding/collapse using different methods.

RESULTS AND DISCUSSION

The starting point of this study was the synthesis of SCNPs using a copolymer of methyl methacrylate (MMA) and 4-vinylpyridine (4-VPy) as a precursor, which was collapsed intramolecularly by means of diiodobutane cross-linker units. Detection of zein was performed in an aqueous ethanol solution. In absence of zein, a pink color was observed upon addition of a gold salt in the presence of hydrazine as reducing agent (Figure 1). This was indicative of the formation of Au-nanoparticles of small size, as observed by TEM (Figure 2). Conversely, in the presence of zein, a blue color was observed (Figure
1). This was due to the interaction of zein and the SCNPs avoiding the stabilization of the formed Au-nanoparticles that, consequently, aggregate to give large Au-clusters (Figure 2).

**Scheme 1:** First step during the synthesis of hybrids of gold and SCNPs.

**Figure 1:** Colorimetric change for zein detection during Au-nanoparticle formation.

**Figure 2:** TEM images of Au-nanoparticles formed in the absence (left) and presence (right) of zein.

**CONCLUSIONS**

Formation of hybrids of metallic and single chain polymeric nanoparticles allows the detection of zein by colorimetric change in aqueous alcoholic media.

**References**

2. G. Doria; J. Conde; B. Veigas; L. Giestas; C. Almeida; M. Assunção; J. Rosa; P. V. Baptista *Sensors* 2012, 12, 1657.