Poster

Tyrosinase bioconjugates with gold nanoparticles for use as nanoprobes

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Tyrosinase (EC 1.14.18.1) is a copper containing oxidoreductase which catalyzes two different reactions via separate active sites: (i) the o-hydroxylation of monophenols (cresolase activity) and (ii) the oxidoreduction of o-diphenols to o-quinones (catecholase activity). It is commonly found in fungi, yeast, apples, and potatoes.
Tyrosinase offers great potential for the development of biosensors [1-3] for the detection of phenolic compounds (pollutants, pesticides) in e.g. wastewaters. The enzyme has been reported for use in electrochemical sensors with success, in particular when applied on top of a layer of gold nanoparticles [4,5].

Our goal was to prepare active bionanoconjugates of the enzyme tyrosinase (TYR, from *Agaricus bisporus*) and spherical gold nanoparticles (AuNPs) with different surface functionalities. The bionanoconjugates (BNC) were prepared at different conditions (buffer, pH) and for a range of ratios AuNP:TYR (1:5 up to 1:500). The conjugation yielded BNCs with equivalent or superior enzymatic activity compared to the free enzyme, with increased stability for lower pH levels. The bionanoconjugates were further characterised using Dynamic Light Scattering spectroscopy and ζ–potencial measurements, confirming the attachment of the enzyme to the AuNPs.

The interaction of AuNPs with tyrosinase afforded bionanoconjugates that present properties that are useful for their employment as novel bionanoprobes for use in biosensors or in biocatalysis.

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